



# BIOPATRIKA

NEWSLETTER OF  
DEPARTMENT OF BIOTECHNOLOGY

Volume 1 | Issue 2 | August 2018

## From the Chairperson's Desk



Greetings!

It is a matter of pride and happiness to pen down the message for the second issue of the newsletter of Jeeva Srujana. My heart fills with immense pleasure as I perceive the progress being made in all academic, co-curricular, extracurricular activities and events of Jeeva Srujana in the session Jan -May 2018. It also gives me great satisfaction that Jeeva Srujana is progressing in its

endeavour towards the overall development and personality of the students.

The seeds of an idea sown in August 2017 has successfully come to fruition and Jeeva Srujana is growing stronger and stronger. It is the result of the focussed and passionate efforts of all the members of the club. Jeeva Srujana is a platform for the students to express their creative pursuit which develops in them originality of thought and perception. I believe that the newsletter will serve as a window through which the complete profile of the academic and co-curricular activities, achievements and progress made by our budding biotechnologists during the stipulated period can be viewed.

Right from its inception to now, Jeeva Srujana has marched forward to instil a spirit of oneness and pave the path of academic excellence for every student. The key focus areas continue to remain - creating opportunities, challenging minds, encouraging innovation, sustaining excitement and holistic development. The healthy interaction among the students across the semesters stands a testimony to the wonderful show put up by the Department in Prakalpa and winning the special prize for the first time.

My sincere thanks to the management, faculty, enthusiastic office bearers and students without whom these successes - big and small - would not be possible. I extend my warm wishes to all the members of Jeeva Srujana to continue this journey on the road of excellence.

Best wishes for the success and bright future of "Jeeva Srujana".

- Dr. Shanti K.N

## The Pillars of Jeeva Srujana – Our Office Bearers



(From right, Sagar Shivayogi Balikai, Vishakha Ramamurthy, Saarika P B)

In the beginning of the semester, Vishakha Ramamurthy from 6<sup>th</sup> Semester was chosen as the President, Saarika P B from 6<sup>th</sup> Semester was chosen as the Vice President and Sagar Shivayogi Balikai from 4<sup>th</sup> Semester was chosen as the Secretary for the club.

They co-ordinated with the faculty members and the guests and helped make the events a success.

## Jeeva Srujana Events Aavishkarana – The Journal and Innovation Team



Mar, 27

### · The Mann Hummel Challenge

A challenge by Mann Hummel, a German company; was organized for all the students of PES University during March 2017. The company's idea was to encourage students of different branches like Electronics, Mechanical and Biotechnology to collaborate and come up with an innovative solution to the given problem statement. The two problem statements or topics were as follows - outdoor air purification, and indoor air purification.

We were given the topic "Indoor air purification".

Initially there was an "idea presentation round", where we had to present a PowerPoint presentation with the framework of our idea at the Mann Hummel Company in Peenya.

The second round was a detailed and improved presentation of our idea in front of the German delegates.

The third and final round was held in PES University. In this round, we were asked questions from PES professors as well as Mann Hummel delegates based on our final presentation. We had to give an estimated cost of our prototype along with calculations of the amount of air being purified per unit time for a 8 cubic ft room.

The results were based on the following criteria involvement and contribution of each team member in the presentation, quality of presentation, format of presentation, calculations and estimations, and answers given to their questions.

### Team 5

Yogeesh K N – Electronics and Communications Engineering

Shreekara R – Mechanical Engineering

Sumukha K Bhat – Mechanical Engineering

Kavya Phalachandra – Biotechnology Engineering

Bhairavi B K – Biotechnology Engineering



- Bhairavi B K, 4<sup>th</sup> Semester



Apr, 26



The day bustled with excitement and flurry as the students of the Health Diagnostics elective braced themselves for the much-awaited poster presentation. This presentation was not only in front of distinguished guests and judges, but also amongst their own teaching staff and peers, making the atmosphere all the more charged with determination and happiness. The students were tasked with choosing any disease from their syllabus, and designing a novel diagnostic tool/technique for the same.

This exercise not only enriched them with the experience of a formal poster presentation, but also gave the students an opportunity to be able to comprehend the vast field of diagnostics. The task involved a lot of research in the form of papers, and troubleshooting their novel ideas. It not only helped them understand the subject better, but also its implications in the real world. The students indeed worked hard – their posters showing the results, designed and articulated with the utmost care and thought.

Everyone was declared a winner at the end, symbolizing the very importance of knowledge and the willingness to learn and understand new concepts.

- Vishakha Ramamurthy, 6<sup>th</sup> Semester

August 2018

## Kala – The Music and Art Team

### · Lab Ethics - A Short Film



Apr, 26



A couple of the 6<sup>th</sup> semester students made a funny video to discuss what students should do in a lab, by depicting what shouldn't be done in a lab! This was followed by a brief talk on important things to keep in mind while working in the lab. Do check out the video "Lab atrocities" on YouTube.

- Akshay Udayashankar, 6<sup>th</sup> Semester

### · Ugrah - A Short Film

Mar, 15



"You will never understand the damage you did until someone else does the same to you, that's why I am here." - Karma

Ugrah is a Kannada short film based on one of the biggest problems in the electronic age. According to a recent survey, nearly four out of five women in India have been a victim of sexual harassment. The invasion of privacy is often intertwined with sexual harassment. This short film sends out a strong message that we must jump over the hurdle of silence and promise to be a part of the solution in ending violence against women. The short film is available on YouTube.

Don't be afraid. Be fierce.

- Raveen Armstrong, 6<sup>th</sup> Semester



· In Pursuit of Knowledge - A Quiz for Government Schools



A quiz was conducted by the Department of Biotechnology for students across eight government schools adopted by PES University on the occasion of Republic Day on the 20<sup>th</sup> of January, 2018. The Quiz is an annual event conducted to encourage and give them exposure to newer experiences.

The event was presided by Dr. Reshma S V of Department of Biotechnology and Mr. Srinivas P of Department of Computer Applications, and was conducted by Mr. Bharath, an alumnus of the Biotechnology Department.



The Quiz was conducted over a span of 4 hours where 8 teams of 2 students each participated in several rounds. The first round was an elimination round which had a written quiz, out of which 4 teams were selected. The subsequent rounds involved Audio Based Questions, Science and Technology and History questions which had a time limit of 1 minute per question. The students showed great enthusiasm while

participating and definitely learnt a lot from it. The event concluded with felicitation for the teachers who were actively involved in the participation of children from their respective schools, followed by lunch.

The four teams were felicitated for their participation on the official Republic day celebration held in the university.

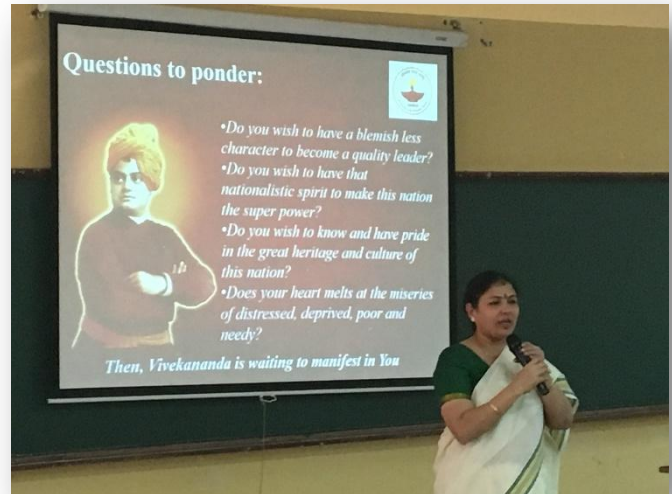
- Arjun S Pejathaya, 6<sup>th</sup> Semester

## Suneeti – Ethical and Moral Values



### · Vivekananda Jayanthi

Vivekananda Jayanthi is celebrated every year as National Youth Day on 12th January. On this day, one celebrates the philosophy of Swamiji and the ideals for which he lived and worked. This is considered to be a great source of inspiration and encouragement for today's youth. The day emphasizes not only on certain incidents and inspiring events in Swamiji's life but also how the youth can take the necessary steps required to solve real-world issues.



It is observed throughout the country, overall schools and colleges with processions, speeches and youth conventions. Disha Foundation organized an event on campus premises showcasing the importance and greatness achieved by one man. The gathering was also addressed about certain awe-inspiring incidents in the life of Swamiji, and how one can learn from the same.

- Vishakha Ramamurthy, 6<sup>th</sup> Semester

## Samaaja – The Social Awareness Team

### · Jagriti Yatra

Apr, 05



Ms. Chetna is a young aspiring Computer Science student currently in her final year of B-Tech course in PES University. She enumerated on the various experiences on the 'Jagriti Yatra' program which she had embarked on from December 26th 2017 to January 8th 2018, which culminated at the Rashtrapati Bhavan in New Delhi. It was a train trip crisscrossing the Indian subcontinent. The journey started, starting from Mumbai.

Chetna had a life transforming experience on this trip. Staying on a train for 15 days and making stops at prominent places in 12 states and meeting eminent personalities on this trip, it helped her to regain inspiration, learn leadership skills and also helped her to break her previously set barriers – physically, mentally and emotionally, to move ahead. She explains this opportunity as one not to be missed. In the end, she also inspired the student audience to embark on this life transforming journey.

The applications for the Yatra open in September every year.

- Tushar Kaushik, 6<sup>th</sup> Semester

August 2018

## Sammelana – Guest Lectures and Workshops

· Genetic Flow of Information - An Address by Prof. H A Ranganath



Jan, 11



Professor Hassan Annegowda Ranganath obtained his PhD in 1975 from the University of Mysore and has postdoctoral experience in the laboratories of Germany and United Kingdom. He was instrumental in establishing two national research facilities at University of Mysore, namely “Drosophila Stock Centre” and “Unit on Evolution and Genetics”. He is the elected fellow of the Science Academics of our country. He is considered the “Father of Drosophila Genetics” in India.

During his talk, he mainly concentrated on speaking about the Genetic Flow of Information. He addressed the students about genetics and epigenetics. He spoke about why *Drosophila melanogaster* is an ideal model organism for the study of genetics for numerous reasons, which is why he devoted himself to the creation of a Drosophila Stock Center in University of Mysore. He believes that *Drosophila* is the ideal model organism to study and explain various topics in biology.

He went on to explain the basics of biology, which is the central dogma of life. He then spoke about epigenetics with respect to cancer, and how external and internal factors can affect the rate of mutations. He also spoke about genome imprinting, gene protein co linearity and the histone code.

- Siddhi V Kamath, 6<sup>th</sup> Semester



## Sammelana – Guest Lectures and Workshops



### · Interactive Session with Byju's

Feb, 15

The field of Biotechnology is a vast one, and every day, new inventions and discoveries emerge. As students who are passionate about this domain, we all want to go to the best places across the globe to learn about the cutting-edge research in biotechnology. But going abroad for higher studies is not easy, so the mentors at Byju's Learning Center came to our college to set us on the right path. We were told about the best countries to pursue our higher education and the entrances we require to clear to get into the top universities. The mentors were also very kind and patient to give us a one-on-one session to assess our strengths and weaknesses and help us achieve our dreams and aspirations. Overall, our interaction with Byju's was very enlightening.

- Shreya J, 4<sup>th</sup> Semester

### · The Three E's of Agri-Business Management - Interaction with Dr. Senthil Kumar

Mar, 15

The Agriculture Sector contributes around 17% of the Indian GDP, with around 60% of our population involved in the sector. With the growing population, the agriculture field has more demands than ever, and therefore, it is necessary for new innovative methods to meet the needs of the people.

To address this issue, Dr. Senthil Kumar of GPS Institute of Agricultural Management spoke about the various courses offered in their institute. The aim of the GPS Institute is to educate, elevate and empower the students in Agri-business management, and Dr. Senthil Kumar made us realize the significance of bridging the gap between theoretical and practical knowledge among the students in the agriculture sector. The institute allows students to learn the technical aspects of farming while getting a hands-on experience in the fields.

Dr. Senthil Kumar also invited all of us to visit GPS Institute and encouraged us to contribute to the field of agriculture.

- Shreya J, 4<sup>th</sup> Semester

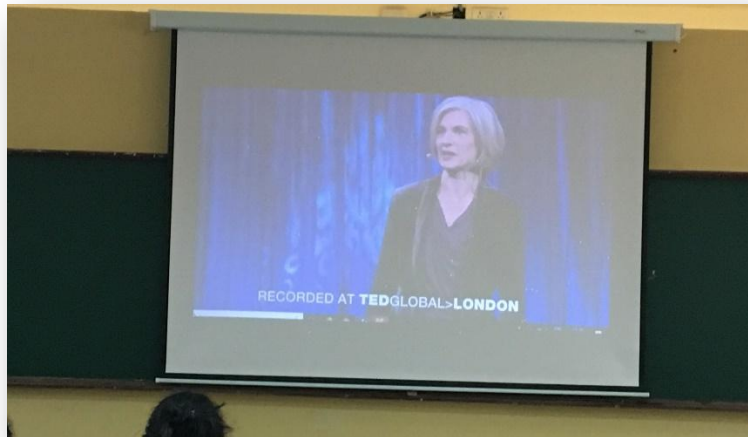
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## Sammelana – Guest Lectures and Workshops

### · Ideas That Matter - TED Talks



Mar, 01



#### **CRISPR-CAS9**

Dr. Jennifer Doudna, a biochemist at the University of California, Berkeley, helped make one of the most monumental discoveries in biology: an easy way to alter, add or remove any organism's DNA. Crispr is a family of DNA sequences in bacteria that contain snippets of DNA from viruses that have attacked the bacterium; Cas9 which acts as a pair of molecular scissors and degrades the virus. The interaction between RNA, DNA and Cas9 forms a complex to find complementary sites. This technology has successfully been used to cure Cystic Fibrosis, Sickle Cell Anaemia and Huntington's disease.

#### **World in a Drop of Blood**

Dr. Terry Pearson, a microbiologist and biochemist, introduced the idea of a single, near standalone diagnostic test. He said that by harnessing the specificity of antibodies and using sophisticated instruments like mass spectrometers, the team has been able to develop an accurate measurement of multiple "biomarker proteins" in single drops of blood. This allows people to sample small amounts of blood at home, without the need for visits to a clinic, and to send the samples by mail to a central lab. This enables the lab to monitor the changes in a variety of biomarkers that are indicators of fitness, infections, stress, cardiovascular health, gut health and cancer.

#### **3D Bioprinting is Medicines' Next Frontier**

Dr. Sam Wadsworth explains about a future full of bio printed human airways and organs. Dr Wadsworth co-founded a biotechnology company that utilizes a unique bio printing technology which has the potential to reform how we treat disease and the ageing process. He talks about how 3D printing can replace the failure of the drug pipeline, and about a future where human tissues can be provided on demand, organ transplantation doesn't fail because it is the host's body cells that are cultivated into scaffolds. 3D bio printing is beneficial and ethical as drugs are tested on bio printed artificial tissues and not animals.

- Nainika R, 6<sup>th</sup> Semester

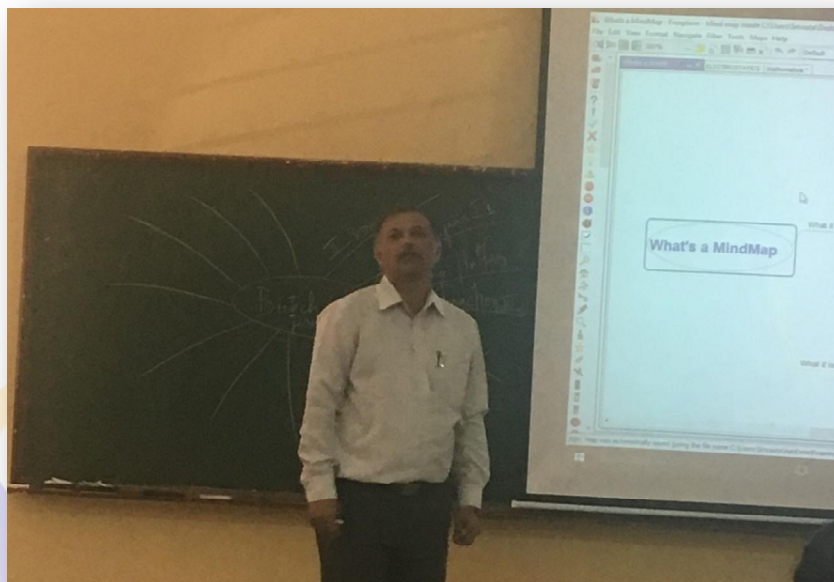
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## Sammelana – Guest Lectures and Workshops

· Mind Map – A Talk by Dr. Srivatsa Krishnamurthy



Mar, 01



On 2nd March 2018, Professor Srivatsa Krishnamurthy was invited to address the students on how to create mind maps. He started with a very interesting abbreviation that he found while he was reading a book; p2c2e – which he said stood for process 2 complicated 2 remember. By using a mind map, he stressed that it becomes p2e2e: process too easy to remember. A mind map relates concepts with creativity while breaking some rules. It can be used for making a summary of a chapter to better understand it, and make references.

While creating a mind map, hierarchy is an important note to consider. Then come all the keywords along with it. He asked us to avoid writing sentences because the brain apparently cannot remember sentences and prefers just words. This can be related to how phone numbers are broken down into parts to recollect them better.

Once this is done, a messy and unorganized raw mind map is ready. He insisted we learn to organize it (always useful during business, note and decision making), and to be sure to have at most 4 nodes and not more as that would reduce clarity of thought. Mind maps help in improving memory, retention, understanding, and provide a quick summary, reducing verbal overload (which is why one forgets). This can help during an important exam when time is limited, making it harder to read up on the class notes. This is a very good method to connect things and recollect better.

- Akshay Udayashankar, 6<sup>th</sup> Semester

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## Sammelana – Guest Lectures and Workshops

### · An Industrial Visit to Bhat Biotech



Apr, 04



The students of the 6<sup>th</sup> semester who opted for Health Diagnostics and Biosensors elective were given the opportunity to visit Bhat Biotech India (P) Limited. They specialize in the design development, manufacture and marketing of Biotechnology based diagnostic test devices for various types of tests like Pregnancy, HIV, Hepatitis, Swine Flu (H1N1), TB, Cardiac Markers and ELISA'S used in the analysis of body fluids in human. Apart from having a preview of their labs and the different facilities that they have access to, we were also educated on the need of converting molecular diagnostics to point of care diagnostics.

Bhat Biotech India develops a blood glucose screening sensor marketed towards diabetes patients, and we were given an insight into the changes they made in their product and how it competes with the existing ones in the market. Another product they develop is the urine strips which help to semi-quantify the amount of Glucose, ketone, pH, blood etc. The plastic strips have several different reagent areas affixed and it does not require any additional equipment to produce results.

The results are obtained by direct comparison of the test strips with the colour blocks printed. This overall learning experience was very helpful in understanding the time and difficulty in bringing an idea to fruition.

- Nainika R, 6<sup>th</sup> Semester

## Sammelana – Guest Lectures and Workshops

### · The Akshaya Patra Foundation - A Trip to Iskcon Temple



Feb, 03



As students of Biotechnology, it is necessary for us to know how our small lab experiments or simple activities done at home can be converted to a large-scale manufacturing unit. Keeping this in mind, the 4th Semester students of the Department of Biotechnology, PES University were taken to the Centralized Kitchen of The Akshaya Patra Foundation, based in the ISKCON Temple.

The Akshaya Patra Foundation (TAPF) is an initiative of ISKCON Bangalore that works towards providing underprivileged school children (mostly in rural schools) with mid-day meals, and thus support their education. Their vision statement is: "No child in India shall be deprived of education because of hunger".

On arriving at the ISKCON Temple premises, we were taken to the Akshaya Patra kitchen. There we saw the various machines used for various cooking processes. There were a series of large vessels with 5000L capacity which are used to make Sambar. The guide then led us through the area where they cook rice in large steam cookers. Cooking rice only takes about 15 to 20 minutes, and Sambar takes around 4 to 5 hours. We then saw the Pre-Processing Area, which was where many employees engaged in the work which mainly consisted of washing, peeling and cutting the vegetables that were required for the various dishes.

Lastly, we were shown the loading-unloading area where the lunch for children is loaded onto a conveyor belt and then packed into trucks to provide for the various schools across the city with the nutritious food made by TAPF's kitchens. Even though everything was explained in a short span of time, all of us enjoyed seeing and learning about how large-scale industries run. Overall our visit to The ISKCON Temple and The Akshaya Patra Foundation kitchen was wonderful, as it quenched our thirst for knowledge.

- Archana Gopalakrishnan, 4<sup>th</sup> Semester

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## Sammelana – Guest Lectures and Workshops

· The Dance of the Molecules – Visit to CeNSE at IISc



Mar, 08



Nanotechnology is an idea that most people simply didn't believe. Everything we were taught seemed very theoretical.

This was until we were taken on a visit to the Centre for Nano Science and Engineering (CeNSE) at IISc, Bangalore. Richard Feynman was right after all. There is plenty of room at the bottom.

We visited the National Nanofabrication Centre, Micro and Nano Characterization Facility, MEMS and IC Packaging facility and the Computational Nanoengineering laboratory along with a guide who patiently explained to us their one of a kind features. CeNSE housed state of the art facilities, and the interdisciplinary research on nanoscale scale was very intriguing. The men and women in impeccably clean attire, behind the glass walls inspired us to take up this field of research and innovation.

- Raveen Armstrong, 6<sup>th</sup> Semester

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## Sammelana – Guest Lectures and Workshops

· India Pharma and India Medical Device 2018 – BIEC Visit



Feb, 15



The Global Conference on Pharma Industry and Medical Devices took place in Bengaluru on 15th February with the theme, 'Driving NextGen Pharmaceuticals'. The event is a positive step towards the development of Future Drugs.

Union Minister for Chemicals and Fertilizers, Shri Ananthkumar inaugurated the three-day event and addressed the distinguished gathering in the presence of dignitaries such as Union Minister for Health and Family Welfare, Shri J.P. Nadda, Chief Minister of Karnataka, Shri Siddaramaiah and Shri Mansukh L. Mandaviya, Minister of State for Chemicals and Fertilizers and Road Transport and Highways, Shipping, Government of India.

India Pharma and India Medical Device 2018 saw roundtable of pharma and medical devices CEOs with Shri Ananthkumar, to discuss Government policy and challenges facing the Industry. The event will bring key stakeholders of the pharma and medical devices sectors under one roof, with hundreds of delegates including 50 Hosted Delegates from other Nations.

India Pharma and India Medical Device Awards was announced to honor excellence and innovation in the field of pharmaceuticals and medical devices.

For three days, the event hosted Technical sessions built around themes like Discovering Innovative Medicines in India and Making India a Part of Global Supply Chain in Medical Devices.

- Arjun S Pejathaya, 6<sup>th</sup> Semester and Sagar Shivayogi Balikai, 4<sup>th</sup> Semester

August 2018

## Sammelana – Guest Lectures and Workshops

- Checkpoint Blockade Immunotherapy - An Address by Prof. U A Ramagopal



Prof. U.A. Ramagopal (PPISR, Bangalore) gave a guest lecture in the Jeeva Srujana club on 26th March 2018. He briefed us on how molecules and their bonds are studied through macromolecular crystallography. X ray diffraction is used to study the molecular structures as its wavelength matched that of the molecule size ( $10\text{\AA}$ ). With recent advances in technology, diffraction patterns can be computed to study the structure, as it was also what changed the face of biology with the DNA model.

He went on to talk about the immune system and importance of immunotherapy. One possibility in this field is the manipulation of co-stimulatory signals. In his lab, they work on blocking CTLA4 in T cells as a means of checkpoint blockage. This can be used in treating or reducing autoimmunity, cancer and organ transplant complications. Immunotherapy can be a good option, provided you can afford it, for patients where chemotherapy and radiation therapy doesn't help.

He is working on developing economically viable methods for immunotherapy. Jeeva Srujana wishes the best of luck to him and his team.

- Akshay Udayashankar, 6<sup>th</sup> Semester



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## Sammelana – Guest Lectures and Workshops

- Plant Tissue Culture Methods and Applications - An Address by Dr. Leela Reddy



Apr, 06



Dr. Leela Reddy has numerous years of experience as a scientific investigator at Monsanto Research Centre, leading and managing various R&D activities like Avesthagen. She has many publications in peer-reviewed journals, national and international conferences and abstracts presented at multiple symposiums. Dr. Leela Reddy started her talk by going through the basics of plant tissue culture and paying respect to those scientists who discovered the field.

She imparted her knowledge to us about the techniques and skill required to work in this field along with the different properties of the plant that make it suitable for plant tissue culture. She even elaborated upon the growing need for plant tissue culture and its various applications. It was a very interactive session ending with a lot of our classmates being rewarded for their right answers.

Her talk made us see the practical aspects of our coursework and helped elevate our understanding of the subject.

- Nainika R, 6<sup>th</sup> Semester

## Sammelana – Guest Lectures and Workshops

- Gene Editing in the Plant Kingdom - A Talk by Dr. Shivaprakash



Mar, 22



Dr. Shivaprakash N is a pioneer in the field of Genetically Modified Plants. He received his PhD from Jawaharlal Nehru Institute and has been associated with Monsanto for the past 20 years. His research has been concerned with novel products which can be materialized using gene mutation technology in plants. He emphasized the importance of Plant Transformation using gene editing.

Through his talk, he highlighted the recent development in the field such as the methods which have been developed to remove the antibiotic resistance gene in the transgenic plants. We found out that homologous recombination is a prerequisite for gene editing. He also made us aware on the role of melanin, mitochondrial cells and super-oxides in Cancer Research. He greatly appreciated the CRISPR Cas9 System and the various portals it has unlocked in creating transgenic plants.

- Tushar Kaushik, 6<sup>th</sup> Semester

## Sammelana – Guest Lectures and Workshops

· Genelon Institute of Life Sciences Pvt Ltd - A Talk by Dr. Raghu N



Mar, 15



Founded in 2011, Genelon Institute of Life Sciences Pvt Ltd is a research-intensive biotechnology firm whose prime focus includes bio-therapeutics research, cell and molecular biology, molecular diagnostics, and agricultural sciences. The institution also provides industrial oriented training programs to guide and nurture scientists towards the necessary skills required to excel in the field of research. Their vision is to deliver services to create a better, more sustainable way of life; to provide tremendous value by being at the cutting edge of biomedical research and technology, and to address brewing challenges.

In the workshop conducted by them on animal cell culture on the campus premises, students had the privilege of learning new and improved methods of performing basic molecular biology and animal cell culture techniques. It not only broadened the student's minds and horizons but also emphasized on the fact that irrespective of how seemingly large the problem might appear; the first step is always to have a dream and the will to work towards it.

Dr. Raghu also showed the students his company's innovation – a new and improved PCR which is significantly lighter and more cost-effective than its current counterparts available. He also showed them the multiple features it offers and shined a light on a new enzyme he found for the same reaction. Overall, the workshop was indeed insightful and encouraging for the students.

- Vishakha Ramamurthy, 6<sup>th</sup> Semester

August 2018

## Sammelana – Guest Lectures and Workshops

· Molecular Dynamics and Simulation - A Workshop by Mr. Vivek Chandramohan



The In-Silico Drug Design hands-on workshop on Molecular Dynamics and Simulation was conducted on the 20th of March 2018. The workshop was conducted by Mr. Vivek Chandramohan from Siddaganga Institute of Technology, Tumakuru.

Mr. Vivek Chandramohan explained his project, which involved testing for Parkinson's Disease on mice, and animal testing of in-silico created drugs. He taught us the applications and the requirements for Molecular Dynamic Simulation. Throughout the workshop we used tools like Discovery Studio for generating amino acids, Desmond, VMD and Gromacs for Simulation, Visualisation and Modelling. We learnt how to find out the activity of a protein by adding water and solvate molecules, and finding out the Solvent Accessible Surface Area for the given molecule.

- Arjun S Pejathaya, 6<sup>th</sup> Semester

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## Sammelana – Guest Lectures and Workshops

### · Skills Worth Learning – A Workshop on Animal Cell Culture



Mar, 14 and 15



Having only dealt with bacterial, fungal and plant cells, the animal cell culture workshop conducted by Genelon Institute of Life Sciences was an opportunity that none of us wanted to miss.

The two-day workshop involved dividing the participants into two batches. One batch was tasked with DNA extraction from bacteria, while the other batch had to extract DNA from blood. Over the course of two days we learnt to perform PCR and how to analyze its results, we observed HeLa cell lines and learnt about MTT assay. Apart from this, by interacting with the scientists, we learnt the demands and requirements of the industry, and it was overwhelming to know that we were being taught by one of the upcoming companies in the industry. By the end of day two we had learnt and gained a lot from this workshop and we now eagerly wait for more such workshops.

- M S Vidya, 6<sup>th</sup> Semester

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## Sammelana – Guest Lectures and Workshops

- The Growing Need for an Accurate Diagnosis – An Address by Dr. Ponnappa K C



Apr, 26



Dr. Ponnappa K C, a distinguished scientist, addressed the students of the Health Diagnostics elective. He spoke about the importance and value of understanding basic concepts accurately, as these act as stepping stones to better understanding and higher learning. The session was very interactive, with Dr. Ponnappa quizzing the students, keeping them on their feet and constantly trying to understand old concepts with a newer and fresh perspective.

The students learnt the key concepts of important and upcoming techniques such as real time PCR and Flow Cytometry. The session was very helpful to the students, as they understood the value and use of such techniques in real life scenarios, and how they can be troubleshot.

- Vishakha Ramamurthy, 6<sup>th</sup> Semester

## Sammelana – Guest Lectures and Workshops



### · E-NOSE

Jan, 17

Being one of the first guest lecturers of the Semester, Mrs. Lavanya's lecture kick-started our Biosensors course. Having only learnt the basics of biosensors, this insightful talk catapulted our class into the vast field of biosensors and its potential applications.

Mrs. Lavanya's demonstration of our very own E-Nose in our department gave us the eagerly awaited introduction to E-sensing and sensor array technology. Through this demonstration, we learnt about the sample delivery system, detection system and computing system of the E-Nose. After the demonstration, Mrs. Lavanya spoke about her work, which involved the application of E-Nose to assess the fertility of soil, which has helped, and is still helping farmers get quicker and better soil analysis results.

All in all this guest lecture left us wanting to know more, and inspired us to explore the creative applications of E-Nose.

- M S Vidya, 6<sup>th</sup> Semester

### · Manufacturing with Atoms - Nano for Youth Programme at IISc Bangalore

Mar, 22

It was a program organized to provide a glimpse into the past, present and future of nanotechnology. The brief introduction was handled by Prof. S.M Shivaprasad (Director, Karnataka State Higher Education council, Karnataka) followed by the current advancements in the field of nanotechnology by Dr.S. Krishna Prasad (Scientist, CeNSE Bangalore), Prof. S. Swaminathan (Director, Center for Nanotechnology & advanced Biomaterials, Sastra University) & Prof. Suresh Das (Executive Vice president, Kerala State Council for Science, Technology and Environment).

The big story of small things' by Prof. Shivaprasad makes you realize that the initial hurdles have been overcome with regard to nanotechnology, and now it is our turn to take advantage of the properties of nanomaterials. Rollable displays (curved displays that can be bent in any direction) and nanotechnology in tissue engineering were handled by Dr. Prasad and Prof. Swaminathan respectively. They stressed upon the impact and the need for interdisciplinary specialization to take full advantage of nanotechnology. Dr. Suresh Das elaborated on how nature is the best muse for scientific research, especially nanotechnology.

The question and answer session emphasized that the future and impact of nanotechnology rests in our hands and what we do with it is entirely up to us! Passion and curiosity of the speakers were also a takeaway lesson from the session. All in all, a day well spent!

- Neha Prasanna, 6<sup>th</sup> Semester

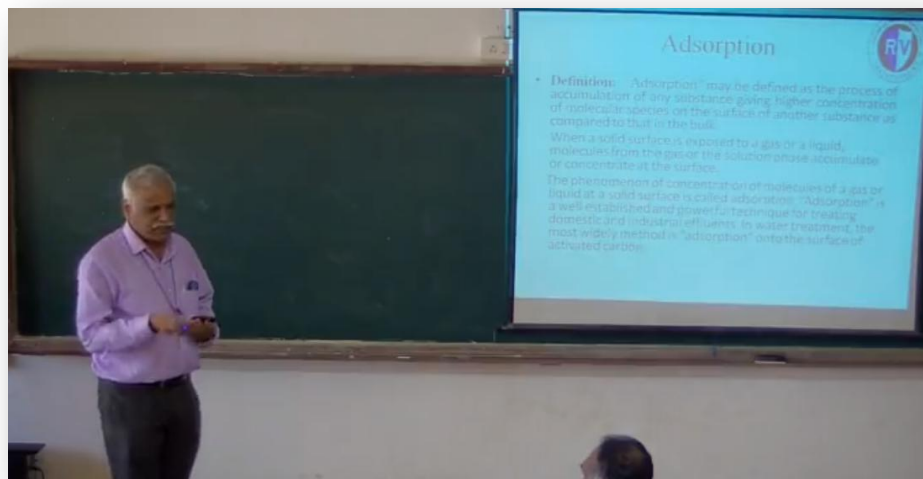
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## Sammelana – Guest Lectures and Workshops

· A Look at Adsorption Studies – A Talk by Prof. Muralidhar



Mar, 15



Prof. Muralidhar of R V College of Engineering delivered a guest lecture for the students of the 4<sup>th</sup> Semester on the subject of Adsorption studies as a part of the Mass Transfer course.

The lecture gave students a detailed picture of the process of adsorption, delving into the mathematical laws that govern this process. It developed into a discussion on Langmuir and Freundlich isotherms, which are commonly used in the analysis and design of adsorption processes as well as equipment.

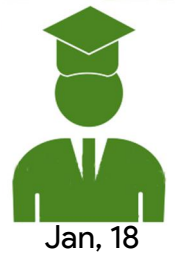
Prof. Muralidhar concluded by elucidating the role of adsorption studies in industries, primarily to purify fluids from impure feed.

- Ashrit Mangalwedhekar, 4<sup>th</sup> Semester



## Sangama – Alumni Networking

### · From PES to Stanford - Thanmayi Ranganath's Journey



Thanmayi Ranganath was one of our alumni (batch 2006-2010). During her years in PESIT, she was a bright student and achieved a couple of fellowships by doing internships in Hyderabad. After graduation, she gave her GRE test, applied to numerous universities in the USA, and finally got admitted to UCLA. She is now the head of her lab at Stanford University of Medicine. The laboratory's main focus is on immunology.

She spoke to us about how the system there is challenging at first, but hard work and the ability to make connections and reach out helps you move forward in the field. She emphasized the importance of finding a good mentor and a good lab to work in. She urged us to approach students already working in a lab we are interested in to get some feedback before we actually approach the professor.

She also spoke about the options after we finish our post-graduation. She said that finding a job after we have completed your post-graduation may seem like a herculean task in the limited time given, but it is not impossible. She urged us to just apply to as many places as possible, and not to give up. She also spoke about how it is much better to take up a job in academia rather than in an industry after the completion of our post-graduation, because it involves hands on research. Industries do not offer a proper job security. She also advised us to tailor our resume according to the job we are applying to.

- Siddhi V Kamath, 6<sup>th</sup> Semester

### · Confusion is the First Step to Clarity - An Address by Megha Suswaram

Feb, 01

Megha Suswaram (Batch 2009-2013), graduate student in the Edwards Laboratory in the Quantitative and Systems Biology Department at UC Merced delivered an eye-opening talk regarding her PhD work involving mathematical modeling of the combined effects of natural and sexual selection on evolutionary speciation. She encouraged the students to find a problem statement that interests them and then advised them to wholeheartedly dedicate themselves towards solving the chosen problem statement. She patiently answered the various doubts voiced by the students regarding GRE preparation and pursuing postgraduate degrees abroad as well.

- Archana Gopalakrishnan, 4<sup>th</sup> Semester

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## Sangama – Alumni Networking

· Next Big Innovation Labs - Pooja Venkatesh's Solutions to Today's Challenges



Mar, 22



Pooja Venkatesh (batch 2008) co-founded a startup company called Next Big Innovation Labs (NBIL) in 2016. The company's vision is to create Organs within a Laboratory using the cutting-edge technology of 3D Bioprinting and its sub products like 3D printed tissues. The labs work at the intersection of Biology and Engineering.

The company received a grant under the Idea to Proof of Concept grant (Idea2POC grant) from the Karnataka government to help achieve their long-term focus of solving the organ shortage for patients on transplant waiting lists. This grant helped NBIL by allowing them to make the prototype of the 3D bioprinter from scratch to improve printing accuracy.

She spoke about the array of products the company offers like 3D printed scaffolds, pre-surgical models and custom 3D bioprinters. NBIL has also developed 3D skin for cosmetic, pharmaceuticals and R&D companies. The startup helps reduce drug-testing cycles for pharma labs and they are working with surgeons to help them master their pre-surgical skills before they take up complex reconstruction surgeries. She gave us some insight on how these 3D bio-printed tissue layers can be used to help provide victims with burn injuries with alternate skin grafts. The bioprinters have HEPA filters and a UV lamp embedded inside the printer to maintain sterility. They have filed for a patent for unique process and are currently working with Mazumdar Shaw Centre for Translational Research to test novel material composites and patterns for the development of 3D bio-printed scaffolds for both in-vivo and in-vitro uses.

- Nainika R, 6<sup>th</sup> Semester

## Sangama – Alumni Networking

· Today's Curiosity is Tomorrow's Innovation - An Address by Shankar Suraj



Apr, 05



Our alumni, Shankar Suraj (currently pursuing M.Res at Imperial College, London) addressed the students of the sixth semester. He spoke to the students about the importance of basic concepts and theories, and how one must never let an opportunity to learn or work pass one by. Be it a simple in-house project at college, or a complex assignment at a certain prestigious institution – one must take them both in stride, as at the end of the day – they are good learning opportunities. He also spoke to the students about how critical it is to identify one's field or subject of interest, as it can be very crucial in going ahead with further studies. Having a broad mindset does help, but knowing your field of interest helps mould a more specific plan for the future.

- Vishakha Ramamurthy, 6<sup>th</sup> Semester

· An Overview of Basics of Biostatistics - A Talk by Suraj B

Mar, 24

A strong foundation is always essential to build an excellent structure. With the advent of technology today, research in various fields is also flourishing. And as such, one of the necessary tools every researcher must be aware of his knowledge of statistics. With the vast amount of data being generated, the need to analyze and interpret data in a significant manner for maximum contribution to the scientific community is a must. To deliver the overview of the basics of biostatistics, we had an alumnus of the department, Mr. Suraj B delivered a lecture encompassing the fundamentals in the field of biostatistics, covering the topics of measures of central tendency, measures of dispersion, correlation and regression, the science of probability and various distributions.

- Shivani C Hiremath, 8<sup>th</sup> Semester



Apr, 05

### · Design Thinking - A Session by Jai Kiran

Throughout the history of the world, mankind has always been looking for ways to solve complex problems in the most efficient ways. As we progressed, we were posed with more difficult predicaments to find solutions to. A new innovative method introduced for problem solving is known as 'Design Thinking'. Design thinking is basically used by designers to solve complex problems, and find desirable solutions for clients.

An alumnus of the department, Jai Kiran held a session with the students and faculty of the Biotechnology department at the weekly Jeeva Srujana club activity meeting discussing the elements of Design Thinking. The students were divided into groups, which included a mix of 6th semester and 4th semester students.

The first part of the session included an icebreaker for the members of the group where each one got to know the other through the popular game 'Two Truths & a Lie'. This interaction proved to be very useful as it made it easier for the students to work together as we discovered the methodologies in Design Thinking. We were then introduced to the various phases of the Design Thinking which are: Empathise, Define, Ideate, Prototype and Test. Each phase included a situation and a follow-up activity where the teams worked together to design an answer to the questions presented to them. Jai ensured that each activity was followed by a round of applause, as he lauded everyone for getting closer to designing a strategy to tackle the problem each team picked. Each student could be seen eagerly discussing with their peers and writing down ideas for their design.

At the end of the session, the entire department had a good understanding of the creative strategies designers use during the process of designing, and it for sure made us ready to face our problems with less difficulty.

- Shreya J, 4<sup>th</sup> Semester

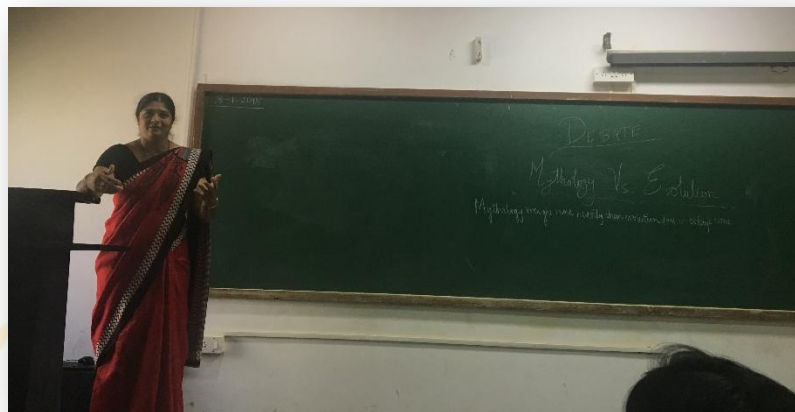
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## Spardha – Co-curricular Activities

### · Mythology vs. Evolution



Jan, 18



The debate on 'Mythology weighs more heavily than Evolution does in today's time' saw a lot of students and teachers going for and against this topic.

"Evolution" is a term used to refer to the premise that all forms of life on earth are related through common descent, that inheritable traits are passed on from parent organisms to their offspring, that some changes naturally arise when organisms have offspring, and that over time these changes have resulted in the variety of life that we see on earth today.

Mythology is the study and interpretation of sacred tales or fables of a culture which usually deal with the human condition, good, evil, and the gods.

The students and teachers who went for the topic presented points like the fact that mythology as the name says is a myth and there is no proof of such incidents ever occurring and that it was only used as a method to put across their beliefs. Their opponents contradicted these points using examples from the Dashavatara which can be seen as having some similarities to Charles Darwin's theory of evolution. Additionally, The Ramayana speaks of the Vanaras, an ape-like species with human intelligence that existed millions of years ago further validating their point.

- Nainika R, 6<sup>th</sup> Semester



# Prakalpa '18

Celebrating Creativity



Prakalpa is the annual technology fest of PES University that showcases the best projects undertaken by the students of the university every year. It was on the 10<sup>th</sup> of February. Each successive year, the projects showcased by each department highlights not only their best projects but also student projects which cover a wide range of topics and diverse fields.

The department also set up an industrial stall in association with PraanaPoorna, which is a community initiative. The day proved to be very encouraging, positive and filled with a lot of interactions and fun filled activities. The crowd not only learnt about the different innovations in the field of biotechnology, but also had the chance to understand certain basic concepts in the field.

The department is also the proud recipient of the **overall appreciation prize for best stall**.

The Department of Biotechnology showcased their three best projects –

1) Characterization of membrane modifying amphiphiles for nucleic acid delivery applications.

Student name: **Harshitha N**, bearing USN **1PI13BT014**

2) Development of glucose sensor

Student name: **Ramachandra L**, bearing USN **1PI13BT034**

3) Cloning and expression of *Pseudomonas aeruginosa* PA01 genes in *E coli* DH5 $\alpha$  for the detection of arsenic in contaminated water sample

Student name: **Jaishree S**, bearing USN **1PI13BT015** and **Sanjana B**, bearing USN **1PI13BT04**

Apart from these, the students showcased several in-house projects, along with stalls for souvenir and games that tested an individual's speed and spontaneity.

The student projects at display were as follows, with a brief description of each work:

(1) **Psychology tests, by Akshay Udayashankar, Bagyashree and Gayathri**

(6<sup>th</sup> Semester)



The 6<sup>th</sup> Semester students had organised a game stall to test participants' and visitors' cognitive skills. They had four games which included: a pictorial round and a crossword for testing observation, a word search game and also a connect words game. This was organised such that it would include biotechnological related topics and still attract participants, which was a success.

## (2) Engine oil degradation by microbes, by Karishma Mehta and Saarika P B (6<sup>th</sup> Semester)

Spent engine oil is often disposed off into soil and water bodies, which leads to pollution and has harmful effects on the organisms habitating around them. To reduce the ill-effects caused by this, it should be treated chemically or biologically to remove harmful impurities. We tried to degrade the engine oil sample using isolated rhizosphere bacteria. The bioremediated oil was found to be polar, which lead us to study its biosurfactant production. Further studies are yet to be done on the degradation process and biosurfactant characterization.

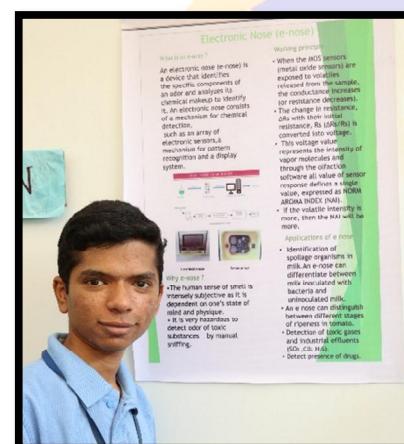
## (3) Biodiesel applications, by Rhiya Sharma (6<sup>th</sup> Semester)

Crude glycerol is the primary byproduct of biodiesel production, accounting for about 10 weight per cent of the biodiesel product obtained through transesterification of triglyceride compounds. The glycerol component was separated out from the product mixture by gravity separation method and characterized by UV/Vis spectrophotometer. Presence of glycerol was further analyzed by Fourier Transformation Infrared Spectroscopy (FTIR). Crude glycerol contains unreacted methanol, glycerol, biodiesel, sodium hydroxide and unreacted oil. Titrimetric analysis of thus purified glycerol yielded purity percentages for the respective acids considered, and it was concluded that phosphoric acid gives the highest purity over sulphuric and hydrochloric acid for the glycerol sample we intended to purify.

## (4) Hand-held Electronic nose (E-nose), by Sai Anirudh (6<sup>th</sup> Semester)

The project involved a handheld device used to detect the odor of samples. In this case, it was used specifically for tea samples (powdered). The device identifies specific components of an odor and analyzes its chemical makeup. It consists of an array of sensors, a mechanism for pattern recognition and a display system.

When the odor is exposed to sensors, a change in resistance is converted to voltage, which is fed to a software to produce an aroma index. The device was pre-trained with tea samples from all over India and the aroma index values were stored in databases. The odor of tea sample known can be used to detect the quality of the sample.





**(5) Miniature crime scene, by Malvika Ramani**

(4<sup>th</sup> Semester)



A crime scene with clues related to all the projects of our department was made. There were multiple answers and visitors to the stall had to link all the projects to come up with a plausible story. The people who managed to link the most number of projects won the prize.

**(6) Biotech: The future, by Deepa and Ashwini**

(6<sup>th</sup> Semester)



A globe was designed and made by students of the 6<sup>th</sup> Semester, as a glimpse of how biotechnology has grown from being a humble stream of science to one of its biggest giants. The globe showcased milestones in the field and techniques used then and now.

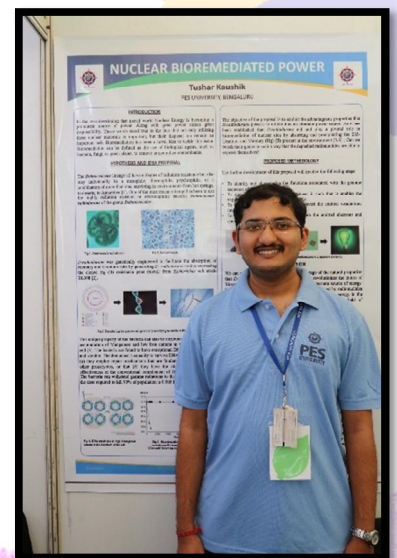
**(7) The concept of vertical gardening, by Nagaraj, Kavya and Hema Chandrika  
(6<sup>th</sup> Semester)**



A vertical garden is a perfect solution to introduce greenery to urban lifestyle, which is crunched by space. It creates a refreshing green corner which uplifts the entire ambience and quality of life. Besides its beauty, it has a powerful impact on human life - reduces stress, improves the visual beauty, enhances indoor air quality, improves mental health, increases ability to refocus attention, etc. Plants create a positive influence on biodiversity, micro-climate, building heat efficiency, and have a tremendous impact on air quality; especially with respect to humidity and dust content. The most preferred plants used in vertical gardening are mondo grass, common ivy, lavender flowers, geranium flowers, spinach, onion, chili, basil and almost any herbs.

**(8) Nuclear bioremediated power, by Tushar Kaushik  
(6<sup>th</sup> Semester)**

The project involved a hypothetical model to generate electricity from bacteria which have been used for nuclear bioremediation process using genetic engineering technology and chemical engineering processes.



**(9) Artificial leaf from silk proteins, by Nainika R, Sadhya Achanta, and Siddhi Kamath**

(6<sup>th</sup> Semester)



This leaf was made with the intention of it being a biomimic of an actual leaf. The sericin proteins extracted from the silk worm cocoons stabilises chloroplast, and it was isolated from natural leaves. This allowed an artificial medium for the conversion of carbon dioxide to oxygen. These leaves have a wide spectrum of applications, ranging from producing oxygen in both indoor and outdoor environments, and in the field of space research. Additionally, they don't need any soil or special nutrients that a natural plant would require for growth.

**(10) Coelomocytes from Perionyx excavates used to investigate their antimicrobial, antifungal and antithrombotic potential, by Vinod Kumar, Varsha Kamath, and Raveen Armstrong**

(6<sup>th</sup> Semester)



Coelomocytes are integral components of the earthworm's system. These cells provide humoral and innate immunity to the earthworm and play crucial roles in several physiological processes. We extracted coelomocytes from *Perionyx excavates* by subjecting it to adverse chemical stress using an extrusion buffer. These cells were subjected to a series of tests to investigate their antimicrobial, antifungal and

antithrombotic potential. We believe that this could be a huge breakthrough in the field of medicine and in purification of water sources. The research conducted gave positive results, thereby showing great promise in replacing the current chemical drugs with biopharmaceutical alternatives of Animal Cell origin. No harm was caused to any organism, and only the coelomocytes of the Earthworms were exploited for research purposes.

**(11) Microbial fuel cells (generation of power from waste), by Ramya P, Lekhashree C and Rakshitha C S**

(4<sup>th</sup> Semester)

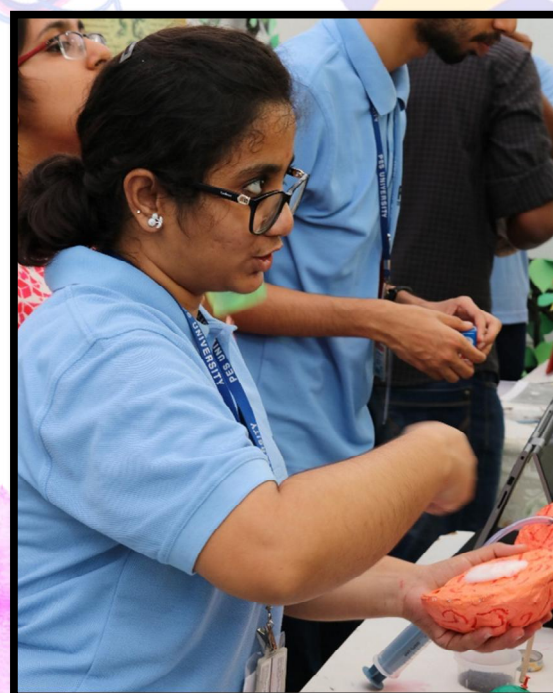


Our aim was to enhance the performance of MFC using degradable biomass and to make it cost effective, ecofriendly and easy to use. MFC is an alternate solution with dual benefits of bioelectricity generation and waste management. It is a self-sustaining technology that produces electricity from a wide range of organic wastes and renewable biomass through metabolism of microorganisms.

**(12) Sustained drug delivery with a targeted drug delivery approach, by Akhila Parthasarathy and Keerthana Gosala**

(6<sup>th</sup> Semester)

The work focused on demonstrating targeted drug delivery. We showed how liposomes could be used as drug vehicles to cross the blood brain barrier for gliomas.



**(13) Concept of Bio-tree house, by Vidya M S, Anukriti Sinha, Anusha Prakash, Bhavana Annapragada, Neethu C S, and Divya Mahesh**

**(6<sup>th</sup> Semester)**



Our project was called “The biohouse”, drawing inspiration from a project titled “fabtreehab”. The basic concept was that of a house next to a tree, which was genetically modified to have bioluminescent properties.

**(14) Generation of electricity from plants and microbes, by Eshani Nandi, Sneha B and Shreya H**

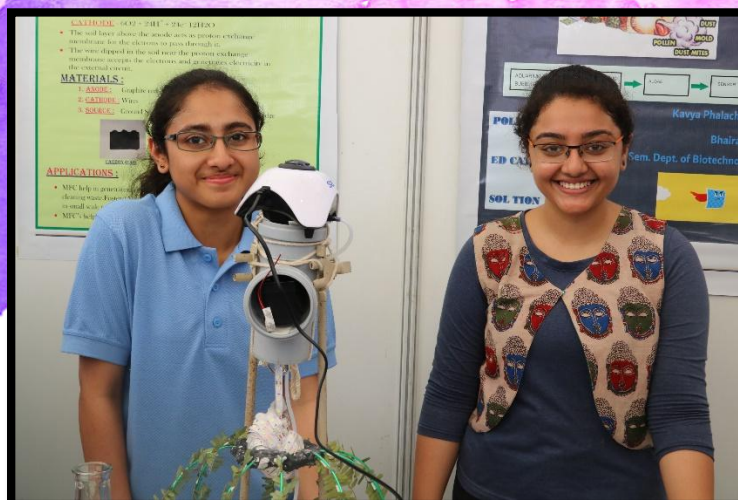
**(6<sup>th</sup> Semester)**



Generating electricity from plants is based on cooperation of plants and micro-organisms to generate in situ-electricity. Energy is captured from the root zone, by so called elector-chemical bacteria. This is a renewable and clean form of generating electricity.

**(15) Bio-Air purifier, by Kavya Phalachandra and Bhairavi B K**

(4<sup>th</sup> Semester)



Indoor air pollution is a growing problem in our society. To tackle this issue, we came up with an innovative air purifier which would do the needful, along with being an environmentally friendly and a cheaper option. To go about this idea, we planned to incorporate components such as aquarium air bubbler, photocatalytic filter (having a titanium dioxide catalyst combined with a deodoriser), sensors, LED lights and algae. We planned on using a wild strain of algae, which can be extracted from any stagnant water body.

**(16) Concept of docking, by Arjun S Pejathaya**

(6<sup>th</sup> Semester)



Docking is a method which predicts the preferred orientation of one molecule to a second when bound to each other to form a stable complex. Knowledge of the preferred orientation in turn may be used to predict the strength of association or binding affinity between two molecules. In the project, the Human glioma pathogenesis-related protein 1 (GLIPR1) was docked with Dipraglurant, which is a drug under development for Parkinson's disease. The binding affinities and other factors were considered while considering this as a possible hit for this disease.

**(17) Characterization of membrane modifying amphiphiles for nucleic acid delivery applications, by Harshitha N**

In this study, cationic lipids having a varying degree of unsaturation and asymmetry were synthesized specifically for transfection in planarian cells in order to develop a transgenic variety of planaria for augmenting research in regenerative medicine. Liposomes were prepared with the synthesized cationic lipids and helper lipids and were hypothesized to yield higher transfection efficiency in planaria. The current study reiterates the potential of hydrophobic tail modification of the lipid leading to customized response.



**(18) Development of a glucose sensor, by Ramachandra L**



Amperometric measurement is one of the ways of measuring blood glucose level. The conductivity is also varied by other factors like resistance of electrode, input voltage, temperature etc. In order to measure only glucose these variables should be made constant. Electrode used for measuring glucose is made of graphene. The error between electrodes is reduced to 10 to 15mv. After reducing this error, the test is carried out using different concentration of glucose in reaction mixture on the electrode and the product

conductivity is measured. Programming of the device includes programming of individual components which include adc, eeprom, etc.

**(19) Cloning and expression of Pseudomonas aeruginosa PA01 genes in E coli DH5α for the detection of arsenic in a contaminated water sample, by Jaishree S and Sanjana B; presented by Vinolia Melisha D'mello (6<sup>th</sup> Semester)**

A large population in various parts of the world use portable water contaminated with arsenic. Whole cell biosensor has genetically engineered genes in bacteria which are capable of sensing the presence of the analyte, coupled with a reporter gene like GFP. Here, the gene sequences selected and were amplified and cloned into E.coli and pBluescript cloning vectors, which can



easily detect the presence of arsenic in the contaminated water sample. The clones developed could measure the arsenic between 10ppb-100ppb effectively. The quantification of arsenic can be done by Atomic Absorption Spectrophotometry.

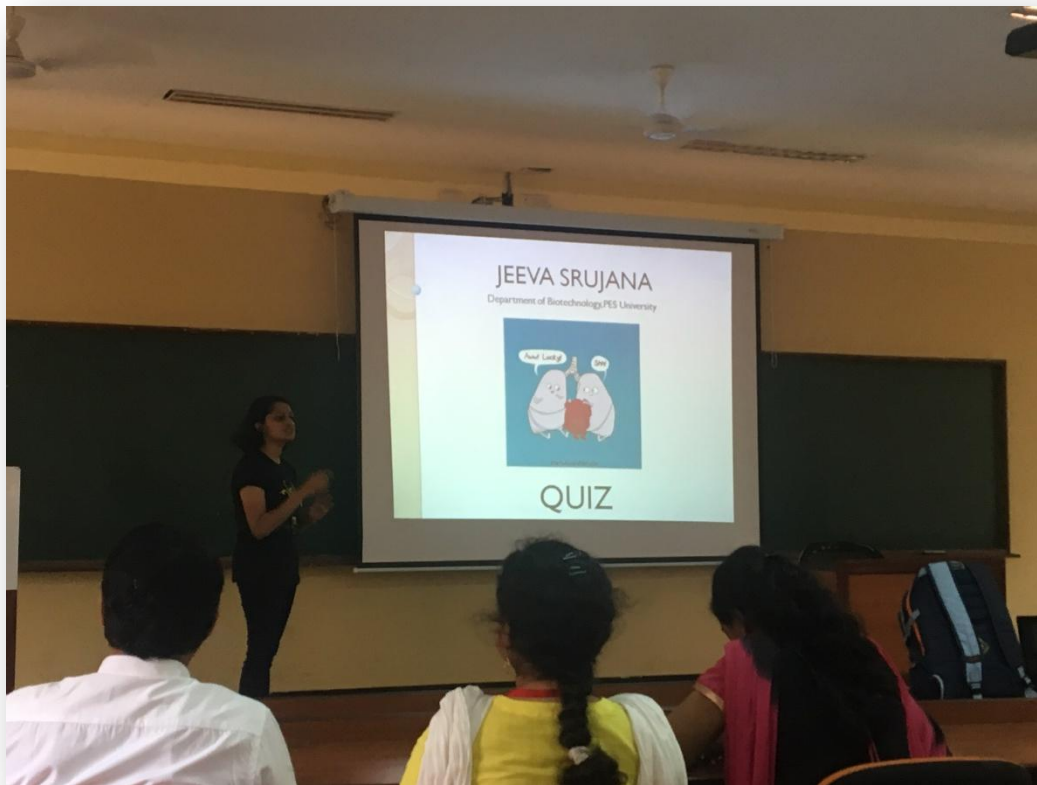
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## Spardha – Co-curricular Activities

· Can You Answer Them All? - A Quiz



Apr, 10



A lot of excitement and an air of competition could be sensed when the department was split into groups of 3 for a quiz. It consisted of 3 rounds each round with an increasing level of difficulty resulting in an elimination. The first round was a general knowledge round where we were tested on the current affairs and recent innovations of the biotechnology field. The qualifiers moved on to the second round where participants were tested on famous books and movies that were related to the field. The finalists took part in the third round which was a twist on Pictionary. Here they were asked to connect a set of figures to reach the correct answer. A tie breaker question determined the winner of the quiz.

The winners are

1st place – Karishma Mehta, Karthik B.S and Abhilash Herakal (6<sup>th</sup> Semester)

2nd place – Kanya Murali, Sadhya Achanta and Siddhi V Kamath (6<sup>th</sup> Semester)

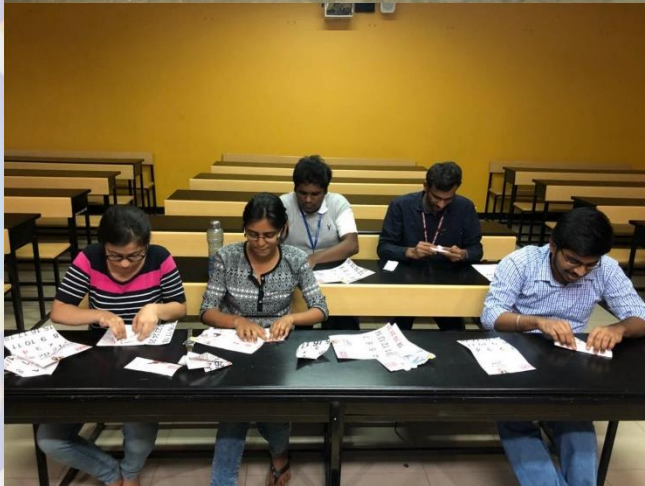
3rd place – Anukriti Sinha, Divya Mahesh and M.S Vidya (6<sup>th</sup> Semester)

- Nainika R, 6<sup>th</sup> Semester



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## Sambhrama – Extended Week Days



Extended Week day activities were conducted every week on Tuesday from 3:45 PM – 5:30 PM. Some of the events like Treasure Hunt, Carrom, One Minute Games, Antakshari and Rangoli were organized. Students from various departments participated in all the activities and won prizes and certificates.

- Arjun S Pejathaya (6<sup>th</sup> Semester)

## Student Achievements



1. Shivani C Hiremath, Sanju Maria and Shreya Chengappa under the guidance Mythri R, Dr. Seema Tharannum and Dr. V Krishnamurthy have successfully published a paper on “Strain Improvement of Selected Bacteria using Physical Mutagen for Bioremediation of Hexavalent Chromium – A Comparative Study” in the International Journal of Advances in Science, Engineering and Technology (IJASEAT).
2. Bhairavi B K and Kavya Phalachandra of the 4<sup>th</sup> semester were part of the team that won the Mann Hummel Challenge organized at PES University.
3. Varsha Kamath, Raveen Armstrong and Vinod Kumar D of the 6<sup>th</sup> semester presented a poster at the 4<sup>th</sup> Annual Research Symposium, and were awarded the first place.
4. Sadhya Achanta and Keerthana Gosala of the 6<sup>th</sup> semester completed a summer internship at the Centre for Cellular and Molecular Biology, Hyderabad, as part of their annual summer fellowship program, during the months of June and July, 2018.
5. Siddhi Kamath of the 6<sup>th</sup> semester completed a summer internship at the Indian Institute of Technology, Madras, during the months of June and July, 2018.
6. Karishma Mehta of the 6<sup>th</sup> semester completed a summer internship at the National University Singapore, during the months of June and July, 2018.
7. Neha Prasanna of the 6<sup>th</sup> semester completed a summer internship at the Indian Institute of Science, Bangalore, as part of the JNCASR summer fellowship program, during the months of June and July, 2018.
8. Vinod Kumar D, Varsha Kamath and Akshay Udayshankar of the 6<sup>th</sup> semester completed a summer internship at VBU Shantiniketan, Kolkata; Indian Institute of Science, Bangalore; and JNU, New Delhi; respectively, as part of the IAS annual summer fellowship program, during the months of June and July, 2018.
9. Tushar Kaushik, Bhavana Annapragada and C S Neethu, of the 6<sup>th</sup> semester completed a summer internship at Arizona State University, at the School

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of Biological and Health Systems Engineering, during the months of June and July, 2018.

10. Akhila Parthasarathy of the 6<sup>th</sup> semester completed a summer internship at the Indian Institute of Science, Bangalore, as part of the BEST summer fellowship program, during the months of June and July, 2018.
11. Raveen Armstrong and Ashwini A of the 6<sup>th</sup> semester completed a summer internship at the Indian Institute of Science, Bangalore, during the months of June and July, 2018.
12. Kavya Phalachandra, Ananya Buddhiraju and Sushma Ram of the 4<sup>th</sup> semester completed a summer internship at the Indian Institute of Science, Bangalore, during the months of June and July, 2018.
13. Sanjana Srinivas, Suresh Akshaya and Shreyaa S of the 4<sup>th</sup> semester completed a summer internship at the National Institute of Mental Health and NeuroSciences, Bangalore, over a duration of a month.
14. Shreya J of the 4<sup>th</sup> semester completed a summer internship at the Clarkson University, Potsdam, New York, over a duration of 9 weeks.



· Biomimetics- Lessons from Nature

New technologies are developing every day. It's not enough for an innovation to simply work; its efficiency- how well it can minimize resource utilization while maximizing productivity, contributes to how valuable it is. In other words, we need to be able to fine-tune our technology, selecting and perfecting what we need and getting rid of what we do not. This statement should ring a bell for many of us, especially students of biology, for nature optimizes itself to do just that by the process of evolution. Biomimetics is an interdisciplinary field involving the analysis of structural and functional aspects of living organisms to solve real-world problems. One of the earliest examples of biomimetics is the development of Velcro by George De Mestral, who modelled it after the hook-like structures on burrs after he noticed how well they stuck onto his dog's fur. Today, the research sphere is filled with such innovations. Researchers have created a more efficient LED by mimicking the internal structure of firefly lanterns. Inspired by how the tiny Namib Desert Beetle collects water droplets from fog, scientists at MIT have produced a new material that can control and capture small volumes of water. Biomatrix, a company based in San Diego, has created SampleMatrix, a sugary coat modelled after the carbohydrate coats secreted by Tardigrades that enable them to lay dormant for centuries, even while preserving their DNA and proteins. SampleMatrix has wide applications in the long-term storage of biological materials, especially vaccines.

Biomimetics holds great promise. Whether it guides us from birds to planes or from termite mounds to self-cooling towers, it holds in its potential a valuable lesson- when presented with a difficult question, step back and look around; the answer might have been in front of you all along.

- Sandhya Ramachandran (4<sup>th</sup> Semester)

## Student Articles



### · World Mosquito Program

Mortein, Goodnight, All Out and any other mosquito killers are all out, it is now time for a genus of bacteria called Wolbachia.

Wolbachia are bacteria that live within insect cells, like butterflies, dragonflies, moths and those persistent jerks, mosquitoes. This parasite invades the host cell and spreads through the body tissues by messing with its cell division. They can infect many different types of organs but are notable for their infection of the host's reproductive organs. So in female mosquitoes, they wriggle their way into the eggs and thus pass into the future generation and when they infect the male mosquitoes, they render them infertile.

Okay but what is this World Mosquito Program, you ask? The World Mosquito Program formerly known as, Eliminate Dengue is a non profit initiative that aims to protect the global community from mosquito borne diseases like dengue, chikangunya, zika, etc. Wolbachia will reduce the ability of insects to become infected with the viruses responsible for the above mentioned diseases and if mosquitoes cannot become infected with viruses, they cannot transmit them between people. When a male mosquito that carries Wolbachia mates with a female without the bacteria then that female's eggs don't hatch because the infected males are sterile. Wolbachia infected female mosquitoes will produce normal numbers of offspring that carry Wolbachia. Initially, this reproductive effect will be very small, but over successive cycles of reproduction and production of new generations the number of infected individuals will increase. This project raises about a million infected male mosquitoes a week and releases them into the wild, male mosquitoes don't bite, so they're harmless to humans.

The program will be extended into different parts of the world and someday we might see the end of mosquito born diseases and the day will arrive when a mosquito bite will leave nothing more than an itchy bump.

- M S Vidya (6<sup>th</sup> Semester)

## Student Articles



### · Nature's antifreeze inspires revolutionary bacteria cryopreservation technique

The survival mechanisms of polar fish have led scientists at the University of Warwick to develop of a revolutionary approach to 'freeze' bacteria. The new technique could radically improve the work to store and transport human tissue.

Researchers from the Department of Chemistry and Warwick Medical School have established a way to cryopreserve (or 'freeze') a broad range of bacteria using synthetic reproductions of the natural antifreeze proteins found in polar organisms.

They found that adding the protein mimics slows ice crystal growth and stops them destroying the bacteria cells.

The traditional approach to preserve bacteria used in nearly every laboratory worldwide is to add glycerol to the bacteria to reduce cold-induced damage during freezing. However, not all the bacteria recover after thawing and the glycerol needs to be removed from the bacteria to enable their growth and usefulness.

The Warwick team, led by Professor Matthew I. Gibson, has developed a new method for cryopreservation, inspired by the process by which organisms known as extremophiles, survive in some of the coldest regions on Earth. The group has a particular interest in polar fish species which produce antifreeze proteins. The research team has demonstrated that synthetic polymers which mimic the protein from these fish are effective in doing the same job. By combining two polymers to slow ice growth during cryopreservation, the researchers were able to recover more bacteria after freezing than using conventional methods.

They also used fewer total additives, in some cases using just 1 % of weight (compared to 20 % typically used in traditional methods).

The team believes this will transform how micro-organisms are cryopreserved and will build on their previous research into storing human cells.

- Shreyaa S (4<sup>th</sup> Semester)

August 2018

## Sahaaya – Community Development Program

· Exploring Biotechnology – A visit by the students of Venkat International Public School



A workshop for the 12<sup>th</sup> standard students of Venkat International School was organized in Department of Biotechnology, PES University, from 14<sup>th</sup> May to 19<sup>th</sup> May 2018. The purpose of the week-long workshop was to offer mini projects to the students as a window to the world of Biotechnology. They were familiarized with the basic techniques in different fields of Biotechnology such as Microbiology, Biochemistry, Molecular Biology, Immunology and Bioinformatics. Each student received the opportunity to carry out experiments based on the particular topic allotted to them. Supervisors were present throughout with the students demonstrating the techniques and methods. Instruments and equipments common to a Biotechnology laboratory were used for the various projects which enthused the students.

There was absolute and dedicated participation by all the students. They showed inquisitiveness and interest at each step and carried out all the tasks with utmost diligence. On the last day i.e. 19<sup>th</sup> May, each student presented the project that they worked upon. The presentations went very smoothly with some of the students presenting par excellence. All the supervisors were highly impressed with the students' presentations as well as their involvement and ability to grasp the concepts. It was a wonderful experience and teachers in Department of Biotechnology look forward to more such prospects.

- Ms. Angira Devi Bhuyan

## Faculty Development Program

### · The DNA of Biology – Workshop on Real Time PCR

Mar, 01



A workshop on Real Time PCR was conducted by Dr. K C Ponnappa, Senior Scientist, Thermo Fisher Scientific. Dr. Ponnappa highlighted the features and advantages of using a real time PCR, and its wide range of applications in the field of life sciences. The functioning and working chemistries behind the machine were also elucidated.

### · An Insight into the World of Drug Design – Workshop on Docking

Aug, 01

Dr. Prashantha Karunakar conducted a one-day Faculty Development Program on Molecular Docking, which is an emerging important concept in Biotechnology. Molecular Docking is a key aspect which allows one to efficiently use bioinformatics tools for the prediction and analysis of various topics such as drug discovery.

### · A Break from Work – Resort Trip

Jul, 30



Faculty members of the department visited Vana Resorts during the month of July. This retreat not only served as rejuvenation, but also helped the faculty bond and become stronger as a team.

### · Learning about Research Protocols – A workshop by Springer Nature

Jan, 17

A workshop on “Discovering Nature Journals and Experiments: Springer/Nature Protocol” was conducted by Mr. Rajaneesh, Licensing manager, Springer/Nature, Southern India during the month of January. This session proved to be enlightening and shed light on a lot of important and necessary topics in Biotechnology and science.





Syncorp Clinecare technologies (P) Ltd. is a full-service Contract Research Organization and they serve Pharma/Biotech companies. It has its headquarters at Bangalore and two more business units at Hyderabad and Bhubaneswar.

Syncorp helps local and international companies develop their health care products, to bring them to the patients and to the market, as economically and as quickly as possible. The students of the BiSEP Program attended a one-day hands-on workshop on Clinical Research protocol training and CDM.

The first session was conducted by Dr. Anam Khan with a Medical device protocol named as "VA06-BOLT". The protocol format and the essential contents which are included in a systematic protocol along with the documentation were explained to the students. The session was made informative through discussions on protocol formation and submission procedure.

The second session started with the hands-on training on CRF, students participated individually to prepare their own format "CRF", on the clinical trial named as "A prospective, randomized, double blind, parallel group, placebo controlled clinical study to evaluate the EFFICACY and SAFETY of CGA-7 on the risk factor obesity".

- Dr. Seema Tharannum

· The BiSEP Open House



Biotechnology Skill Enhancement Programme (BiSEP) is a Post Graduate Diploma program under Department of IT & BT, Government of Karnataka. It provides biotech industry-oriented skill upgrading training to graduates and post-graduate students. Students of BiSEP from Bangalore region participated in the open house session on 6th February conducted for interaction with members of industry and academia involved in the program.



The Biotechnology Skill Enhancement Programme aims to Impart industry-oriented skill-upgrading training, Enhance employability in biotech sector, Train and mentor students/faculty from different districts of Karnataka, Nurture the local talent and create an ecosystem of entrepreneurship and growth of biotech sector and to create research environment that foster excellent R&D in host institutions to address challenges existing in areas of Agriculture, Health, Energy,

Environment and other sectors.



May, 02



At Home is the annual farewell ceremony for final year students, conducted in the college. A plethora of beautiful performances were conducted as the students reminisced their fun experiences in college.

The event saw a series of performances by Shravan U M, Suhas Gotla, Apoorva Kamath, Dr. Jhinuk Chatterjee and many others. Ms. Shwetha Harish, Dr. Dinesh M S and Dr. Prashantha Karunakar enacted a skit for the students. Dr. Shanti awarded all the students a Memento and wished them luck for their students.



remain so forever.

The entire event was filled with Nostalgia. Although this serves as a farewell, it never really is goodbye. Once you're a part of the department, you

- Arjun S Pejathaya and Vishakha Ramamurthy (6<sup>th</sup> Semester)

August 2018

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