E-Abstract Book

ONE DAY SEMINAR ON BIOLOGICAL AND PHYSICAL SCIENCE

ORGANIZED BY

DEPARTMENT OF ZOOLOGY, BOTANY, PHYSIOLOGY, PHYSICS, CHEMISTRY, MATHEMATICS

&

IQAC, CITY COLLEGE, KOLKATA

102/1 RAJA RAMMOHAN SARANI, KOLKATA-700009

INDIA

29TH MARCH 2023

PROGRAMME SCHEDULE

Time	**Programme Details**
10:30 am	**Registration**
10:45 am – 11:00 am	**Inauguration** **Welcome Address**: Dr. Sital Prasad Chattopadhyay Principal, City College **Inaugural Speech:** Dr. Arnab Chaudhury Coordinator IQAC, City College Dr. Mahitosh Gayen, Vice-Principal, City College
	Session - 1
11:00 am – 12:00 noon	**Lecture 1:** **Title : Molecules to Materials** **Speaker:** Dr. Suman Kalyan Samanta Assistant Professor Department of Chemistry Indian Institute of Technology, Kharagpur **Chairperson :** Mr. Masiur Rahaman Sardar
12:00 noon – 1:00 pm	**Lecture 2**: **Title : Snake Venom, Cancer and Nanotechnology** **Speaker**: Prof. Antony Gomes Ex Emeritus Professor, Department of Physiology Calcutta University **Chairperson** : Dr. Rupanjan Mukhopadhyay
1:00 pm – 2:00 pm	**Lecture 3**: **Title : The Concept, Scope and Role of Ethnobotany in Indian Society**. **Speaker**: Dr. Prabir Ranjan Sur Retired Scientist, Botanical Survey of India. Kolkata **Chairperson** : Dr. Sujita Datta Ghosh
2:00 pm – 3:00 pm	**Poster Session and tea break**
	Session - 2
3:00 pm – 4:15 pm	**Lectures by the students from all the Science departments** (total 6 lectures of 10 mins each)

	Chair – HOD from respective departments
4:15 pm – 4:30 pm -	**Vote of Thanks**: Dr. Arkadeep Mitra, Convenor, NAAC Steering Committee, City College

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PATRON:

Dr. Mahitosh Gayen, Vice-Principal, City College
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POSTER SESSION

Dr. Shreyasi Dutta, Ms. Rituparna Das, Dr. Amitava Pal, Md. Mustakim Sk., Dr. Arindam Midya, Smt. Dona Banerjee, Dr. Indranil Roy.

TECHNICAL ARRANGEMENT

Dr. Saiful Anam Mir, Dr. Anshuman Nandy

Invited Lecture-1

Molecules to Materials

Dr. Suman Kalyan Samanta

Assistant Professor
Department of Chemistry
Indian Institute of Technology, Kharagpur

Abstract. Modern chemistry has established fascinating reactions which lead to value-added multi-functional products that are widely applicable in various aspects of mankind. Beginning with the basic building blocks the nature has created diversity of molecules that governs human life as well as the materials utility around us. The modern chemistry has taken a quantum leap of innovation and development that bridge molecules to materials for cutting age applications. In one hand, a different state of mater such as the meta stable gels are in aid to the modern agriculture, while in the other hand, the solutions funnel the sunlight pretty much the same way the leaves do for the plants. However, the modern age is abundant with various smart devices including the smart phones, smart watches, OLED televisions etc. The heart and soul of such devices include transistors and light-emitting displays. The source of energy to these appliances are preferred to be renewable rather than the fossil fuels. The organic solar cells are catching up the gaps to become main-stream energy sources in near future. Therefore, this talk aims to make the young minds wonder about the chemistry, the synthesized molecules, the generated materials from their and the developed products for the modern age utility.

Invited Lecture-2

Snake Venom, Cancer and Nanotechnology

Prof. Antony Gomes

Ex Emeritus Professor,
Department of Physiology
Calcutta University

Abstract:

Snake-bite, a neglected tropical disease declared by W.H.O and a major socio-medical problem in tropical countries including India. Every year more than 20,000 people die in India due to snake-bite, though the exact figure is not known. In India, there are 300 varieties of snakes, among 50 are venomous and five (Naja naja, Naja Kaouthia, Vipera russelli, Echis carinatus, Bungarus caeruleus) are medically important. Snake venom is the secretion of the venom gland composed of lethal poisons like neurotoxins, cardiotoxins, hemorrhagins, nephrotoxins, toxic enzymes (PLA2) and many more substances. The snake venom toxins target the major vital organs of the human body and produces death (if not treated) within 5-20 hrs depending on the snake species, amount of venom injected. The snake venom antidote (ASVS) is the only therapeutic measure against snake bite developed in 1894 by Dr Albert Calmette at Pasteur Institute, Paris. The ASVS has its own limitations (cost, storage, expiry, side effects, ineffectiveness, hospitalization, etc).

The concept venom to drug has been mentioned in folk-traditional. Tribal medicine system and in Ayurveda. Cancer the second highest killer disease of the world. New anti-cancer drug clues have been ventured from several natural resources including Snake venom. From Calcutta University, we have reported that several snake venom toxins (drCT1, NKCT1, BFCT1, etc) possess anti-cancer activity in cell line and animal models. We have also reported that using nanotechnology (using nanogold particles), the toxicity of the toxins has been reduced and the efficacy has been increased. More intensive research ventured are essential to establish newer anti cancer drugs using snake venom toxins, The present lecture will enlightened the research finding from Dept of Physiology, Calcutta University, to encourage the students to join in this kind of research ventures in the near future..

Invited Lecture-3

The Concept, Scope and role of Ethnobotany in Indian Society

Dr. Prabir Ranjan Sur

Retired Scientist,
Botanical Survey of India.
Kolkata

Synopsis: Ethnobotany is the study of how people of a particular culture and region make use of indigenous (native) plants. Plants provide food, medicine, shelter, dyes, fibers, oils, resins, gums, soaps, waxes, latex, tannins, and even contribute to the air we breathe. The aim of ethnobotanists is to explore how these plants are used as food, clothing, shelter, fodder, fuel, furniture and how medicinal use of such plants is associated to other characteristics of the plant species.The term ethnobotany was suggested by John Harshberger in 1896 to delimit a specific field of botany and to describe plant uses. Ethnobotanical studies deal with various subgroups of plant kingdom like algae, fungi, bryophytes, pteridophytes, lichens, taxonomy and have been designated accordingly as ethno-algology, ethno-mycology, ethno-bryology, ethno-pteridology, ethnolichenology. Ethnobotany is at once a vital key to preserving the diversity of plants as well as to understanding and interpreting the knowledge by which we are, and will be, enabled to deal with them effectively and sustainably throughout the world. Thus ethnobotany is the science of survival".

Student's Lecture-1

Asynthetic Fission - A new era in cytology

Gourav Sengupta and Ishita Chakraborty

Department of Zoology, City College, Kolkata

Abstract:

Cell division is a phenomenon essential for organic growth and development. Cellular differentiation follows a proper cycle known as the cell cycle. Majorly, three kinds of cell division are priorly known viz. Amitosis, Mitosis and Meiosis. Despite these conventional processes another unique kind of cellular proliferation exists, coined as Asynthetic fission. Monitoring of 'palm skin' model of superficial epithelial cells (SECs) in zebrafish larvae reveals rapid cellular proliferation without genomic replication. EdU assays, DAPI intensity assay and Hydroxyurea test conclude exhibition of reduced genome size by these differentiating SECs. Speculation can be made that this frugal yet flexible mode of proliferation might also occur in contexts other than zebrafish skin expansion.

Student's Lecture-2

CRISPR-CAS9: A REVOLUTION IN GENE EDITING.

Arghya Kanungo

Department of Botany, City College, Kolkata

Abstract

Gene editing or genome editing is one of the pioneering technologies in the field of biotechnology. The recent discovery of the CRISPR-CAS9 gene scissors can be the most game changing molecular tool of the century. The CRISPR (Clustered regularly interspaced short palindromic repeats) and CAS (CRISPR associated protein) system which already serves an important role in the bacterial immune system against exogenous genetic material has fanned the fires of hopes, curiosity and controversy for scientists. Dr. Jennifer Doudna and Dr. Emmanuelle Charpentier were the first to propose that the bacterial CRISPR-CAS9 system could be used as a programable molecular tool kit and molecular scissors for genome editing in humans and other animal species following which they won the noble prize in chemistry in 2020. The CRISPR-CAS9 holds revolutionary potential in the fields of medicine as well as agriculture and has made gene editing possible in the matter of weeks but uncertainties still remain in the field and some recent reports have risen concern about the wrong use of the technology and bioethics. However, we remain hopeful that it unique advantages will be used in the development of life sciences and medicine.

Keywords: molecular scissors, gene editing, molecular tool kit, CRISPR-CAS9.

Student's Lecture-3

CARDIOVASCULAR DISEASES

Sagarika Pal

Department of Physiology, City College, Kolkata

Cardiovascular diseases (CVD) are a class of diseases that involve the heart or blood vessels .CVD includes coronary artery diseases (CAD) such as angina and myocardial infarction (commonly known as a heart attack). Other CVDs include stroke, heart failure, rheumatic heart disease, cardiomyopathy, abnormal heart rhythms, congenital heart disease, valvular heart disease, carditis, aortic aneurysms, peripheral artery disease, thromboembolic disease, and venous thrombosis.

Student's Lecture-4

Science and Technology

Soumyadip Bhattacharya

Department of Physics, City College, Kolkata

The Telegram bot created by me is an innovative and interactive tool that helps students learn about chemical elements and physical elementary particles. The bot serves as a comprehensive source of information that provides students with an easy-to-understand explanation of various scientific concepts related to chemistry and physics.

Users can interact with the bot by sending commands that trigger specific responses. For instance, the bot can provide information on the properties, structure, and common uses of chemical elements. It can also explain the different types of particles that make up atoms and the subatomic particles that compose them.

This bot is especially useful for students who are struggling to understand complex scientific concepts or who simply want to refresh their knowledge. By providing accurate and relevant information in a user- friendly format, the bot can help students improve their understanding of chemistry and physics, and ultimately, perform better in their studies.

Student's Lecture-5

A GLIMPSE OF SIXTEENTH LETTER OF GREEK ALPHABET

Sudipta Sanyal, Anwesha Mondal, Raja Ballav

Department of Mathematics (Semester – VI)

City College, Kolkata

In this presentation we want to discuss about the invention, nature and also its importance of PI in the field of mathematics as well as in our daily life. Pi is a mathematical constant that represents the ratio of the circumference of a circle to its diameter. It is an irrational number means that its decimal representation goes on infinitely without repeating. The value of pi is used approximately 3.14 or 22/7 in real situations. But it has been calculated to trillions of digits using supercomputers. Pi is used extensively in mathematics, physics, engineering, and other sciences to solve many problems. The ancient Egyptians, Babylonians and Chinese all had approximations for pi, but it was not the same produced by Archimedes who first calculated a nearly accurate approximation of pi. Nowadays, Pi Day is celebrated on March 14th due to the first three digits 3,1,4 has come in the decimal expansion of pi and it is a honour of pi in a sense.

Student's Lecture-6

Rethinking future with Carbon Nanotubes

Ryan Datta

Dept. of Chemistry (Semester V1) City College, Kolkata

Carbon nanotubes (CNTs) are one of the wonders of modern science discovered. CNTs have been regarded as the stiffest and the strongest material ever developed and gained considerable interest in research because of their unique atomic structure, dimension and attractive properties. In the past decade, researchers made several attempts and efforts

exploiting the exceptional properties of CNTs and their potential applications. Nowadays the carbon nanotubes-derived products have smeared into our life step by step, and before long, they will function as essential components for technological innovations. CNTs are remarkable objects that look set to revolutionize the technological landscape in the near future. Tomorrow's society will be shaped by nanotube applications, just as silicon-based technologies dominate society today. A recent direction of research has been to try to gain further understanding by the use of computational methods and models which appeared with the advancement of computer technology. In this presentation, a summary of carbon nanotubes, their properties and their applications in nanomaterials, have been discussed.

Poster 1:

Taxonomy: Data sources

Rohit Das

Department of Botany, City College, Kolkata

At the beginning, taxonomical studies were done based on gross morphology only. But nowadays taxonomical work includes different data sources like cytology, evolutionary relationship, Palynology, chemistry, molecular biology data etc. Cytological data like- chromosome number, chromosome size etc. have taxonomical value. Presence of different chemicals like flavonoid, aromatic compound, fatty acids also important for taxonomical work(e.g.- Malvic acid exist in the members of Malvaceae family). Different Palynological evidence like pollen shape and aperture and sculpturing helps in taxonomical studies (e.g.- Massive exine and thin intine present in angiospermic pollen). And for numerical taxonomy taxonomical work done by some numerical techniques. Thus, taxonomy is not only the one of the most important part of biology science but also an interesting one.

Poster 2:

Green Chemistry in Organic Synthesis

Soumya Shanta Sahu, Shaurjadipto Basu, Manisha Paul

Department of Chemistry, City College, Kolkata

Green Chemistry is a relatively new emerging field that strives to work at the molecular level to achieve sustainability. The field has received widespread interest in the past decade due to its ability to harness chemical innovation to meet environmental and economic goals simultaneously. Thus, green chemistry is an approach to the design, manufacture, and use of chemical products that intentionally reduces or eliminates chemical hazards. It focuses on the reduction, recycling, or elimination of the use of toxic and hazardous chemicals in production processes by finding creative, alternative routes for making the desired products that minimise the impact on the environment. Sustainable economic growth requires safe,

sustainable resources for industrial production. The delights and difficulties of green chemistry in organic synthesis will be discussed in this poster presentation.

Poster 3:

ANCIENT SAGES OR SCIENTISTS?

Ruchisha Das, Disharee Sen, Debleena Rout, Samriddhi Singh, Subhajit Nandy, Souvik Das and Dipjit Pal Chowdhury

Department of Zoology, City College, Kolkata

ABSTRACT:

Bharat was the most advanced nation on the globe during the Vedic Time. The land of great sages (or should we call them ancient scientists?) who had contributed a lot in the field of science and medicine. Today, we all have a notion that every invention was done by the western scientists! But actually, thousands of years ago, during the golden era of India, the Indian Sages had such knowledge, thought and invention that today being in the modern era, we cannot even imagine. Today's modern technology is just the re-invention or innovation based on ancient information. In the Vedic Age, Bharat was known and lauded for the exhibition of scientific prowess and innovations. Revered sages are known for engaging and circulating discourses of scientific importance, which was ignored and sidelined by the hegemony of western science. A majority of discoveries usually credited to people from the West and other European countries can be traced back to harboring origins and traces from the Vedic age. Our sages and their scientific innovations have been systematically erased and obliterated from the annals of history. We look at four sages cum scientists and the discoveries they are known for: Sushruta (for being the pioneer of surgery), Agastya (for discovering electricity and battery), Bharadwaj (for working on aeronautics), Bhaskaracharya (an unheard mathematics genius). This work is an attempt to represent and remind ourselves about the uncelebrated voices from our motherland. Through this work, we aim to initiate a chain of discussions and deliberations about the neglected facets of our scientific history and create awareness to rectify them.

Poster 4:

GLOBAL WARMING - A THREAT TO MANGROVES OF INDIA, PROBABLE REMEDIES

Md. Shamim, Soham Banerjee, Soumyadwip Santra and Animesh Santra

Department of Zoology, City College, Kolkata

Abstract:

Continuous increase of greenhouse gases in our atmosphere is a major threat, causing global warming which increases the earth's temperature every day. This has adverse economic and ecological effects. Once a highly diversified mangrove ecosystem, the Sundarban, West Bengal and Bhitarkanika, Odisha, are losing their biodiversity at an alarming rate due to direct and indirect effects of global warming (salinity invasion, shoreline erosion, shifting of mud flats, increased turbidity, temperature, tidal amplitude etc.) which also includes the increased frequency of natural disasters hitting the coastline disturbing human population. Increasing sea level often contaminates the nearby aquacultures, harming cultivated aquatic population, thus affecting human livelihood. These adverse circumstances are forcing the natives to takeup riskier means of earning (eg. Honey collection in restricted areas) which in turn increased the frequency of human wildlife interaction, often resulting in causalities of both. Immediate and honest conservation strategies are the need of the hour if we are to save these diverse but vulnerable ecosystems. Implementations of mangrove reforestation, with habitat restoration, replacement of fertilizer usage with organic farming are only a few sustainable solutions among others. However, no such solution will be enough until humans are cautious regarding the same.

Poster 5:

HYPERSENSITIVITY - UNDESIRABLE REACTION

Pratiksha Chakraborty, Anasua Rooj, Naini Mukherjee, Sharbani Pal, Shrabanti Pal, Sayani Bharati and Ananya Sengupta

Department of Zoology, City College, Kolkata

Abstract:

Hypersensitivity is a type of immune response that occurs when the body over reacts to an antigen. There are four main types of hypersensitivity reactions: Type-I, Type-II, Type-III and Type-IV. In this poster we provide an overview of each type of hypersensitivity reaction and present examples of their associated diseases. Type-I Hypersensitivity is an immediate reaction upon exposure to antigen and is IgE mediated. Anaphylaxis is a severe form of this kind of reaction which can lead to a life-threatening condition. Type-II Hypersensitivity is IgG or IgM mediated which involves the destruction of the target cells and tissues. Haemolytic anaemia is an example of this kind of reaction which occurs when antibodies bind to and destroy our red blood cells. Type-III Hypersensitivity is mediated by immune complex deposition leading to subsequent inflammation and is associated with various autoimmune diseases. Rheumatoid arthritis is an example of this kind of reaction that occurs when immune complexes accumulate in the joints and cause inflammation. Type-IV Hypersensitivity is also called delayed type of hypersensitivity reaction which is mediated by T cells. Poison ivy induced contact dermatitis is an example of this kind of reaction that occurs when T cells recognize the antigen and initiate an inflammatory response. In brief, hypersensitivity reactions resulting from exaggerated and inappropriate immune response, can cause variety of diseases including simple allergic reactions to severe life- threatening conditions.

Poster 6:

WILDLIFE CORRIDORS - ROAD TO SAFETY

Anirban Mukherjee, Aritra Bhattacharya, Arindam Mudi, Gourav Sengupta, Koyel Ghosh and Swarnadwip Mukherjee

Department of Zoology, City College, Kolkata

Abstract:

Wildlife corridors, used by various species to migrate, breed and feed, are increasingly becoming relevant tools for wildlife conservation. Rapid increase in industrial and infrastructural development, especially around forests, has resulted in widespread habitat fragmentation and isolation. Added to this, the growing development (for tourism, linear infrastructure etc.) around protected areas, and the altered facto boundaries of these, have exacerbated this need. There is a no 'hard' statutory recognition afforded in India to wildlife corridors in spite of their established relevance in ecological conservation. Nor is there a strict prohibition on development within, and around important corridors in India. Even so, wildlife corridors have found passing mention in certain conservation law and guidelines framed there under, which seek to protect wildlife habitat and reduce human – wildlife conflict. These extant legal spaces have largely proved ineffective in the protection and conservation of corridors; and corridor protection and management continue to be a dormant legal space in India. The relevance of wildlife corridors has been challenged by the unavailability of adequate data to support their usage. Their usefulness in maintaining and conserving biodiversity has led conservationists to come up with various other concepts like "stepping stones" and "wildlife bridges" that essentially perform the same role. However, long term monitoring of the efficacy of wildlife corridors is still pending and is the need of the hour.

Poster 7:

INDUSTRIAL QUININE PRODUCTION

Krishnendu Dasgupta, Rituparna Bhar.

Department of Botany (Semester VI) City College, Kolkata

Abstract

Quinine is a very important drug to mankind.lt is an anti malarial drug obtained from the thick bark of different species of Chincona. The bark of Chinchona is a mixture of alkaloids. Traditionally the alkaloids are isolated by the extraction and sequential precipitation.First, the Cinchona bark is extracted under basic conditions (CaO, NaOH) to an organic aromatic solvent (e.g., toluene) at elevated temperatures. Then, it is reextracted with an excess of sulfuric acid to form soluble bisulfates. On partial neutralization and cooling, quinine sulfate is separated. It is the least soluble Cinchona alkaloid sulfate. On the other hand, cinchonine is insoluble in diethyl ether. Tartaric acid may be used to separate insoluble salt of cinchonidine from quinidine.This medication is used alone or with other medication to treat malaria caused by mosquitobites in countries where malaria is common**.**

Key Words- Chinchona,Quinine Extraction & Isolation,Uses in pharmacology.

Poster 8:

Prevalence and Molecular Characterization of Adenovirus in West Bengal, India

Students of Department of Physiology (H) 6th Semester
City College, Kolkata

Abstract:
Adenovirus is a common respiratory pathogen that can cause severe respiratory illnesses, particularly in children and immunocompromised individuals.
Detection: Adenovirus PCR testing
Symptoms: flu-like
Treatment: No approved antivirus medicines. Maybe manageable with rest

Poster 9:

GLIMPSES ON THE SIGNIFICANCE OF BIOREMEDIATION

Souvik Pan, Disha Halder, Trisha Ghosh, Pinky Mandal .

Department of Botany (SEM VI), City College, Kolkata

Abstract:

Bioremediation is a branch of biotechnology that employs the use of living organisms, like microbes and bacteria to decontaminate affected areas. It is used in the removal of contaminants, pollutants, and toxins from soil, water, and other environments. Bioremediation techniques can be classified as (i) in situ techniques, which treat polluted sites directly &
(ii) ex situ techniques which are applied to excavated materials. In situ may describe the way a measurement is taken, that is, in the same place the phenomenon is occurring without isolating it from other systems or altering the original conditions of the test. The opposite of in situ is ex situ. Bioremediation helps clean up polluted environments, including soils, groundwater, and marine environments. Such systems can include bacteria, fungi, algae, and plant species. They are capable of metabolizing, immobilizing, or absorbing toxic compounds from their environment. Bioremediation is nature's self healing process by which the decontamination of environment is done. It is a fruitful and attractive option for recovering and solving the polluted environment of Earth.
KEYWORDS : Bioremediation, Biotechnology, Microbes and Bacteria, Environment, Nature,

Poster 10:

SUSTAINABLE HYDROPONIC TECHNOLOGY FOR URBAN FARMING

Md. Azmatullah, Snigdhodeb Sinha, Amrit Ray, Ishika Ghoshal, Snehasis Das, Deep Mondal, Barun Ghoshal, and Mitu Mondal

Department of Botany (Semester II), City College, Kolkata

Abstract

Hydroponics is the practice of growing plants in nutrient rich water without soil. It allows faster growth and higher yields than traditional soil-based growing systems. Hydroponically grown crops can be just as nutritious as those grown in soil. Several hydroponic systems such as deep water culture, nutrient film technique, aeroponics and drip irrigation system are used for farming. This system is independent of weather conditions and reduces water usage which helps in elimination of synthetic fertilizers and pesticides. An automated hydroponic system using a smart solar powered plant can monitor and control pH level, temperature, water level, light intensity and voltage of the water pump. Due to increase in global population and growing urbanization, food production has become challenging. Recent Global Climate Change has had a significant negative impact on traditional farming system. Hydroponics, on the other hand, is a promising technology that can contribute to a more sustainable, climate-smart and resilient farming system and eventual food security for all.

Key Words – Hydroponics, Urbanization, Climate Change , Climate Smart, Food Security

Poster 11:

GLIMPSES ON THE SIGNIFICANCE OF PLANT

Devansh Kar, Devakash Kar, Rohit das and Mukti Singh

Department of Botany (Semester IV), City College, Kolkata

Abstract

Plants are extremely important in the lives of animals including human and microbes and provideseveral direct and indirect ecological, economic and aesthetic services. Ecological services are essential for continuance of life as they regulate the earth's atmosphere, climate, hydrologic and biogeochemical cycles and also support additional life supporting functions through recycling of nutrients, retarding erosion, protecting water sheds, buffering pollutants, purifying the atmosphere. Living organisms depend upon plants to meet basic needs as food, fodder, fuel, fiber, beverage,s helter, health care and several other commodities. Aesthetic values include stimulus for literacyand artistic expression throughout human history. Every part of a plant is equally important in our life or in nature. Needs are growing rapidly because of a growing world population, increasing incomes and urbanization. The capability of plants to satisfy these needs is a global concern.

Key Words – Plant, Ecological Service, Economic Service. Aesthetic Service, Population

Poster 12:

Diverse Detection methodologies of COVID-19 Virus

Soumyadip Biswas, Arundhati Chakrabarti, Samiran Khanra

Dept. of Chemistry (Semester – VI), City College, Kolkata

Abstract:

The lethal coronavirus caused by Severe Acute Respiratory Syndrome (SARS-CoV-2) virus has affected around 29 million people all the world. Several diagnostic processes have been developed for SARS-CoV-2 detection. The Real Time Polymer Chain Reaction (RT-PCR) is a gold standard among all these methods. Rapid, simple, economical and sensitive diagnostic tests are needed to detect and manage infectious diseases at the earliest possible time. The diagnostic regimen with multi-step procedures requires additional time, instruments and reagents, as well as skilled personnel to perform the diagnostic procedure. Spectroscopic methods are novel as well as versatile as they can provide rapid, precise, and comparatively inexpensive reagent-free protocols of detecting viral and bacterial infections and observing

their structural change with the surrounding environment. We hope that proper inexpensive method and rapid diagnosis of this new virus will help to enable the development of proper antiviral medicines to combat SERS-CoV-2 like virus epidemic in the coming years and in the future.

Poster 13:

PLANT PROPAGATION
DON'T HATE, PROPAGATE

Ahana Chandra, Sreeparna Maity, Prateek Tiwari

Botany Department, (Semester-IV) City College

Abstract:

Plant propagation is the process of increasing the number of plants of a particular species or cultivar. There are two primary forms of plant propagation: sexual and asexual. In nature, propagation of plants most often involves sexual reproduction, or the production of viable seeds.

Techniques for vegetative propagation include -

Air or ground layering, Division, Grafting, Micropropagation, Striking or cuttings.

Plant propagation allows for plants to be grown to a size suitable for transplanting in less time than from seed. Also, certain plants produce seeds that are sterile or have poor viability, which makes sexual propagation difficult or impossible.

Poster 14:

Astrochemistry: Chemistry from the Big Bang to Life

Sibsankar Palit [1,2], Shaswata Paul [1], Mahadev Paik [1], Soumik Mandal [1]

[1] Department of Chemistry, City College, Kolkata
[2] LIFE- To & Beyond

From the synthesis of the first atoms in the universe to stellar nucleosynthesis and the formation of complex celestial and living systems, it can be said that chemistry originated in space. Studying molecules in space demands a multidisciplinary approach that would focus on the mechanisms of their formation along with their detection and destruction. The bibliographic outlook (figure) below visually illustrates the interconnections among differentdomains, methods, and topics with the field of astrochemistry.

To date, scientists have detected around 250 molecules in the ISM. Further, observation anddetection of more complex molecules will help us understand the relation between the originof life and molecules in space with extrapolated applications to solve other scientific problems. Therefore, this descriptive work aims to give an overview of the rich chemical information spread throughout space, while trying to draw a link with the origin of life on earth and other worlds.

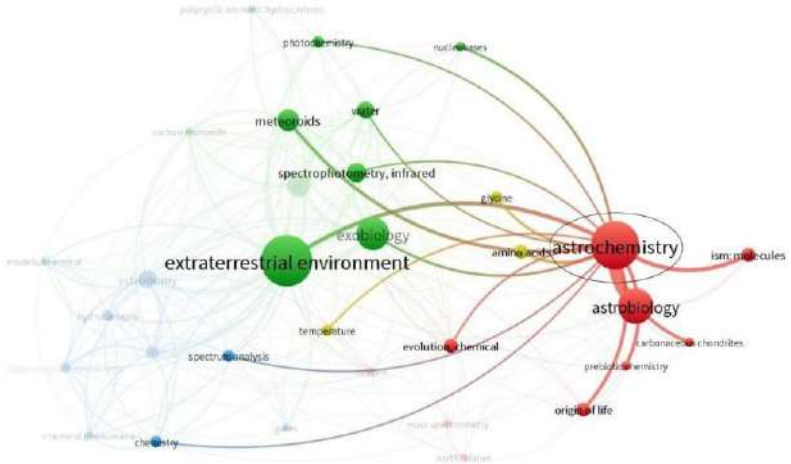

Figure: The bibliographic network draws the links among the field of Astrochemistry and different domains, methods, and topics related to the study.

Created using VOSviewer bibliographic software (v. 1.6.19) using 52 PubMed-indexed literature (published between 1986-2023) related to Astrochemistry and Astrobiology. **Note:** The coloured circles denote the extent of evidence for the topic of interest. The stronger the link between two items, the thicker the line that is used to display the link in the visualization.

Abbreviations:

ISM: Interstellar Medium

Poster 15:

Light Cone and its effect over causality

Srinjoy Banerjee, Rajdeep Bose, Anupam Panja

Department of Physics, City College, Kolkata

Light cone is a kind of semi fiction concept which have most of the theoretical evidence rather than experimental so what we need to do is to understand Relativity. To understand Relativity easily, we take at least three examples, and we derive the idea of length contraction and time dilation. Like: let a car is parked in a parking lot A boy see the car parked from left to right direction another boy standing in the opposite see the car parked from right to left direction i.e. position is relative.

The postulates of special theory of relativity:

(1) The Principle of Relativity; The laws of physics apply in all inertial reference systems.

(2) The universal speed of light; The speed of light in vacuum is the same for all inertial observers, regardless of the motion of the source.

Taking all these concepts we try to understand the Minkowski space, concept of space like and time like intervals, and then finally we came to the concept of light cone and the concept of time travelling.

Poster 16:

Artificial Photosynthesis: Sustainable Production of Green Hydrogen

Subhroneel Das, Rounak Saha, Goutam Patra, Rakesh Chakraborty

Department of Chemistry, City College, Kolkata

The depletion of fossil fuels and the accompanying drastic pollution of the environment has attracted considerable attraction toward finding green and sustainable alternatives. One of the most challenging issues of society is finding a replacement for these fossil fuels with a clean, affordable, inexhaustible, and renewable form of energy which is why intense research has been devoted to this topic in recent times. Some existing alternatives such as windmills and hydroelectric power plants are widely used but have the disadvantage of providing the converted energy in the form of electricity since it is difficult to store and transport. The only

inexhaustible form of energy available is solar power. In fact, fossil resources have stored sunlight emitted by the sun millions of years ago and converted by plants into high-energy chemicals. Solar-driven water splitting provides a leading approach to storing abundant solar energy, producing hydrogen as a clean and sustainable energy carrier in the process. Photocatalysts play an important role in this process as they allow solar hydrogen to be competitive with fossil-fuel-derived hydrogen on a levelized cost basis. This work focuses on plausible challenges and highlights the key underlying solutions to overcome the limitations and obstacles. It sheds light on how it is possible to employ the fundamental principles of natural photosynthesis clubbed with the tools of both chemical and material science to design and prepare a suitable method to produce green hydrogen via artificial photosynthesis.

Poster 17:

HYDRAULIC BRAKE SYSTEM

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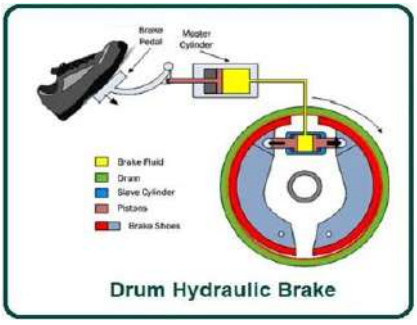
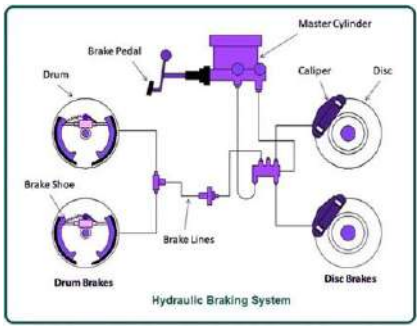
HYDRAULIC BRAKING SYSTEM: A hydraulic brake system is a braking mechanism that uses brake fluid to transmit force into the system. The fluid transfers pressure from the control mechanism to the braking mechanism. Hydraulic braking systems are widely used in low -speed four-wheelers such as the Tata Ace. It works with the drum type, while the disc type is used in almost all cars.





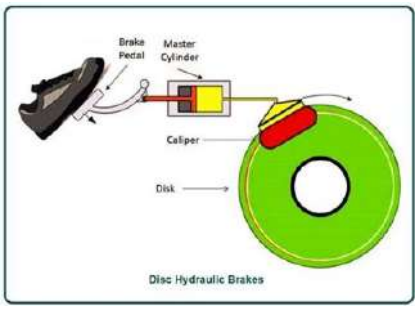
Hydraulic brake parts: 1. Brake Calipers 2. Brake Hardware 3. Brake Pads & Shoes 4. Brake Rotors 5. Hydraulic Brake Valves & Switches 6.Master Cylinders

Types of hydraulic brakes:

Drum Hydraulic Brake: hydraulic brakes mounted on the drum.

Disc Hydraulic Brakes: disc-type hydraulic brake.

Mechanical Brakes	**Hydraulic Brakes**
Brakes are less powerful	Brakes are more powerful
Eternal Lubrication required	No Eternal Lubrication required
More efforts are required to an operator to apply brake	Less effort is required for an operator to apply brake.
Less costly, friction losses are more	Costlier, friction losses are less



Poster 18:

MAGLEV TRAIN

Soumyajit Roy
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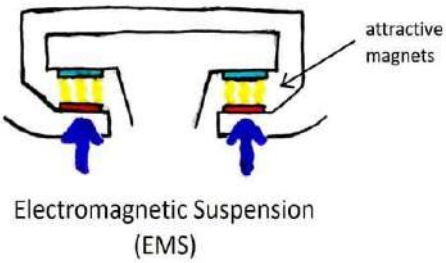
MAGLEV TRAIN: Maglev train is a transportation system that uses two sets of electromagnets: one set to repel and push the train up & another set to move the elevated train. This system is used to reduce friction highly. There are three countries in the world that currently use Maglev train: China, Japan and South Korea.

WORKING PRINCIPLE: Maglev train do not have wheels or rails. There are three parts to achieving maglev functionality: Levitation, Propulsion and guidance.

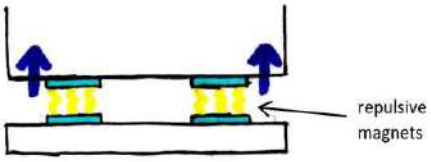
(I) LEVITATION: - Levitation is the ability for the train to stay suspended above the track. There are two important types of levitation technology

(A)Electromagnetic Suspension (EMS)
(B) Electrodynamic Suspension (EDS)

PROPULSION: - Propulsion is the force that drives the train forward. Maglev uses an electric linear motor to achieve propulsion.



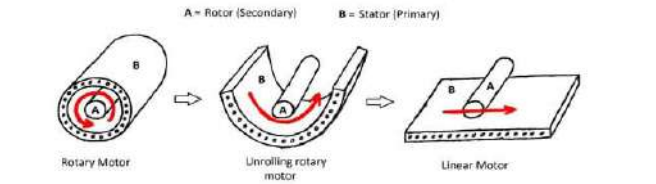
Electromagnetic Suspension (EMS)

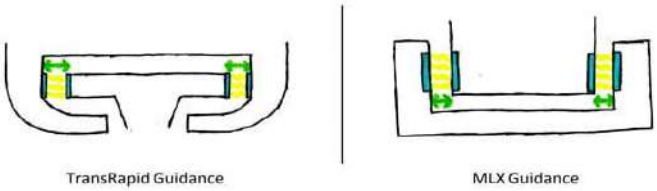


Electrodynamic Suspension (EDS)

GUIDANCE: - Guidance is what keeps the train centered over the guideway. For high speed Maglev, repulsive magnetic forces are used to achieve this.

BENEFITS OF MAGLEV: -The most obvious attraction of Maglev trains is that they can travel faster than traditional rail trains. The only commercial high-speed maglev, the Shanghai Maglev, is now fastest train.





Poster 19:

Lipoprotein

Shreyosee Saha, Saheli Barua

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Lipoprotein: A lipoprotein is a biochemical assembly that contains both protein and lipids, bound to the protein, which allow facts to move through the human plasma

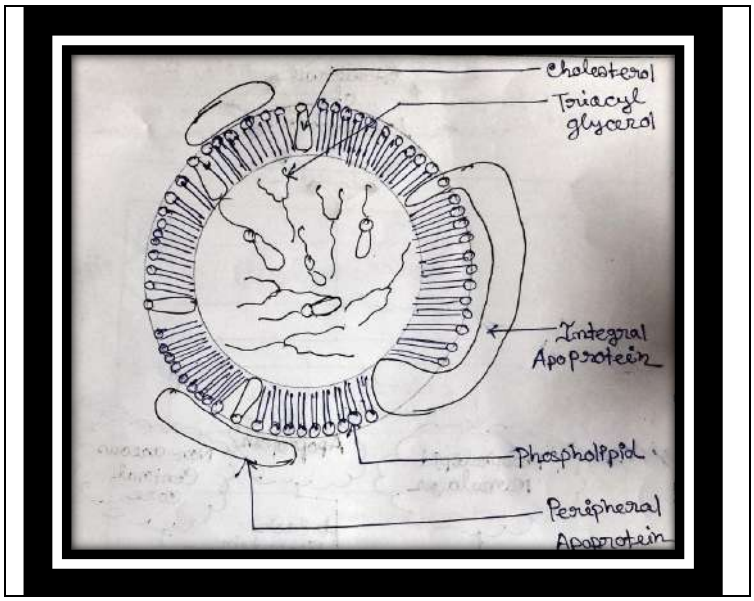


Fig: Structure of lipoprotein

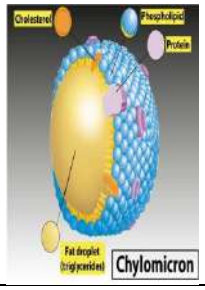
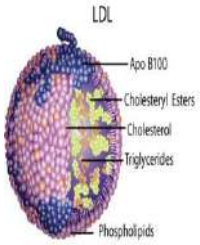
<u>Classification of lipoprotein</u> :-
There are four types of lipoproteins in human blood-

i. **Chylomicrons**
ii. **VLDL**
iii. **LDL**
iv. **HDL**

(+)Anode

Fig :-Electrophoresis of plasma(Serum) lipoprotein

Information about Chylomicrons, VLDL, LDL, HDL are as Followed :-

	Chylomicrons	VLDL	LDL	HDL
Source	**Intestine**	**Liver (Intestine)**	**VLDL**	
Density (g./ml)	**<1.006**	**0.9-1.006**	**1-1.06**	**1.06-1.2**
Diameter (nm)	**75-1200**	**10.86 X 10^6**	**2.3 X 10^6**	
Protein Content	**1.5-2.5**	**5-10**	**20-25**	**50-55**
TGA Content	**85**	**50**	**7-10**	**3-54**
Free Cholesterol	**1-3**	**5-10**	**7-10**	**3-4**
pictures				

Function of lipoprotein

Clinical Aspect

- **Bad Cholesterol**
- **Normal range of LDL in Human body- Below 130 d/l**
- **Good Cholesterol normal range :**
  - **Men - Above 40 mg/dl**
  - **Female - Above 50 mg/dl**

Poster 20

GOLDEN RATIO-THE ASTONISHING NUMBER

Anirban Mondal, Sourav Dey, Subhamay Sarkar, Tanaya Chakraborty

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City College, Kolkata

In the poster, we have discussed the origin of Golden Ratio and its availability. It attracted theattention of most Greek mathematicians because of the frequent use of this number in Geometry. In 5 th Century BC mathematician Hippasus discovered that the golden ratio was neither a whole number nor a fraction. In fact, it is an irrational number. The Greeks had observed that the golden ratio provided the most aesthetically pleasing proportion of sides of a rectangle, a notion that was enhanced during the Renaissance. For example, the work of the Italian polymath Leonardo da Vinci and the publication of De divina proportione (1509; Divine Proportion), written by the Italian mathematician Luca Pacioli and illustrated by Leonardo. In this poster we have cited several cases in nature and man-made where Golden ratio is found. Such few example are- the painting of Monalisa, in the figure of cyclone, Taj Mahal etc.

Poster 21:

Cryptography: The Science Of Secure Information

Akash Bag, Kshudiram Pradhan, Papan Mandal, Rittik Pal, Saham Hazra
Department of Mathematics (Semester- IV)
City College, Kolkata

In this Poster we have discussed about Cryptography and its versatile applications in real world. The primary motive of cryptography is to ensure the Confidentiality, Integrity and Authenticity of information. In other words, cryptography aims to protect information from unauthorized access or interception, prevent tampering with the data, and provide a way to verify that the data is legitimate and unchanged. Cryptography achieves these goals by using various techniques and mathematical algorithms to transform data or messages into an unintelligible form, which can only be read or understood by those who have the appropriate key or password. This process of transforming data is called encryption and it can be securely transmitted over insecure communication channels, without the risk of it being intercepted by unauthorized parties. The recipient uses the appropriate key or password to decrypt and recover the original message.

Poster 22:

ZERO, THE HERO

Bhashkar Karrmakar, Sail Huda, Sk Anisha, Ruchira Sarkar, Pinaki Nandy, Abhiroop Mazumder

Department of Mathematics (Semester- II)
City College, Kolkata

In this poster we want to discuss the invention, nature and advantages of zero in the field of mathematics. All infinite processes in mathematics pivot and dance around the notion of zero. With zero, the entire number system comes into crucial play. Zero as a concept has been around since ancient times, popping up in Babylonian and Mayan inscriptions, when it was used to calculate the passage of the seasons. When zero is added to a number or subtracted

from a number, the number remains unchanged and a number multiplied by zero becomes zero. Hence it fulfills a central role in mathematics as the additive identity of the integers, real numbers, and many other algebraic structures like group theory. As a digit, 0 is used as a placeholder in place value systems. In fact, it stands for an absence in real situations but its importance in our lives is enormous.

Poster 23:

RED LISTED SPECIES

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Abstract:

An endangered species is any species that is facing immediate risk of extinction. Because of several reasons like loss of habitat, loss of genetic variation or sudden environmental changes, anthropogenic disturbances, their number in the wild have reduced very significantly and their very existence is at severe risk. These species, which are at the verge of extinction and need immediate conservation attempts are enrolled as RED LISTED SPECIES for the conservation purpose. Here we discuss about few such species from around the globe (cited in Red Data Book, maintained by IUCN), which need serious attention in terms of conservation to prevent them from extinction.

Ganges Shark or Bull Shark (Glyphis gangeticus) found in Mayanmar, India, Pakistan is listed as critically endangered as their population number is decreased to nearly 250 in the wild. The main reason behind their population decline are over fishing, habitat destruction and environmental pollution. Axolotl Larva (Amystoma maxicanum), found in lake Xochimilco and lake Chalco in Mexico City is also a critically endangered animal as only near 1000 animals are left in these lakes. Their number decreased drastically because of poor water quality, introduction of invasive species. Yangtze Giant Soft Shell Turtle also called Shanghai Soft Shell Turtle or Swinhoe's Soft Shell Turtle (Rafetus swinhoei), once found in Vietnam and China is another red listed critically endangered animal. There is only one male and one female animal left. Over hunting for meat and pollution are major threats to their

survival. Uncontrolled burning of grasslands, hunting and use of pesticides had caused decline in Bengal Florican (Houbaropsis bengalensis) population to nearly 1000 in India, Cambodia and Nepal which is listed as a critically endangered species. Red Panda (Ailurus fulgens), found mainly in South-eastern China and Western Himalayas is also another critically endangered animal. Their number in the wild is reduced to less than 10000 mainly because of competition with domestic life livestock, deforestation and over hunting. Serious conservation efforts are in practice to increase their number and prevent these animals from extinction in near future.