

NATIONAL CONFERENCE ON 'NOVEL PROGRESSIONS IN SCIENCE AND TECHNOLOGY-2022'

The science faculty of St. Bede's College organized a two-day National Conference on 'Novel Progressions in Science and Technology-2022' on 28th and 29th November, 2022. The objective of the conference was to provide a common platform for the exchange of new ideas, applications and research experiences, establish business or research relations and find global partners for future collaborations.



The banner features a blue geometric background. At the top left is the St. Bede's College crest. To its right, the text reads: "St. Bede's College, Shimla organises Two Day National Conference on Novel Progressions in Science and Technology-2022 (28-29 November, 2022)". On the right side, there is a logo for the 75th anniversary of India's independence, "75 आज़ादी का अमृत महोत्सव". Below the main text, it says "Our sponsors" followed by five logos: Haryana Scientific Sheet Metal Works, OBEXO Scientific, International Scientific & Surgical, S.J.V.N. (एसजीवीएन), and Promark (MARK OF PROFICIENCY).

Day 1

Day one started with the welcome of the chief guest Dr. Shashikant Sharma, member HP Private Institutions Regulatory Commission, by Ms. Preeti Kaundal, Assistant Professor, Department of Botany St. Bede's College, Shimla. This was followed by a brief introduction for the conference by Dr. Maheshwar Singh Thakur Assistant Professor, Department of Chemistry, St. Bede's College, Shimla. **The abstract book was released by the chief guest and then he addressed the audience.** He appreciated and congratulated the Principal of St. Bede's College and organizing committee for organizing this National Conference. He emphasized on the importance of innovative research to be undertaken at college and university level, which can prove beneficial for the upliftment of the society.





Technical Session I

Speaker: Dr. Lakhveer Singh, Associate Professor and Head, Department of Chemistry, Sardar Patel University, Mandi.

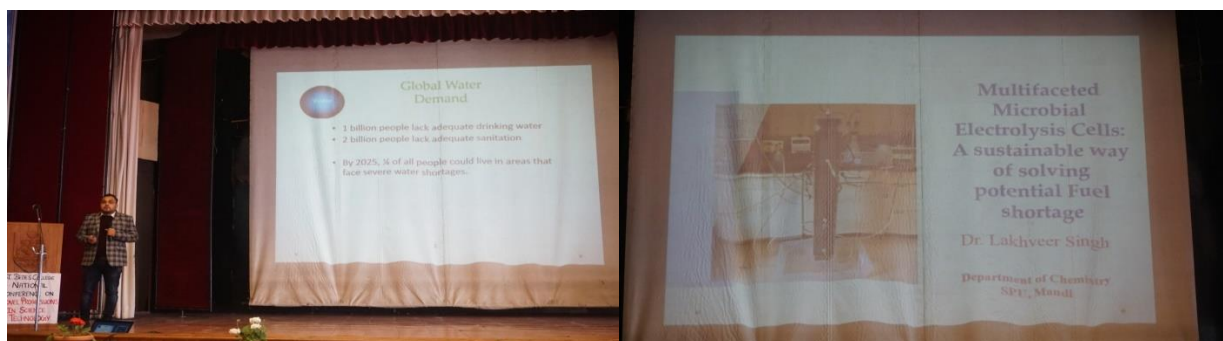
Topic: “Multifaceted Microbial Electrolysis Cells: A Sustainable way of solving potential fuel shortage”

Chairperson: Dr. Sandeep Chauhan, Department of Chemistry, HPU, Shimla.

Rapporteur: Ms. Shivani Chauhan



The speaker started with an introduction of microbial electrolysis cells and their need. He said that the global water demand is increasing and about 1 billion people are devoid of adequate supply of drinking water facility every year. The major cause of this problem is due to more pressure on climate change and excessive exploitation of fossil fuels. Energy demand/year is about 13,500 GW and energy needed/year is about 27,000 GW. Thus, putting more pressure on the environment to fulfill this need is creating many problems. The solution for the above-mentioned problem can be solved by the use of waste water and the organic matter present in it for the production of renewable energy. The strategy relies upon the use of electro-active bacteria for the use of solid-state electrodes for oxidizing different compounds and can be used for synthesis of chemicals, bioremediation of polluted matrices, treatment of contaminants and more. Microbial Electrochemical Technologies (MET's) have been employed to produce many useful compounds like nitrogen gas, hydrogen peroxide, single cell protein, acetate etc. Therefore, MEC's can be used as a cost-effective operational system to produce valuable products. Hybrid MEC allow introduction of some substances like chloroform though in very less amount (0.02%) to inhibit the production of acetone again as an end product by the presence of some Homoacetogens (Hydrogen Scavengers) which thereby lowers the amount of hydrogen production. Major challenge faced here is the internal resistance and scaling up for more and more production of hydrogen. To solve this problem the impact of electrode spacing was also studied with right amount of buffer concentration, mixing conditions and electrode surface area ratio on MEC. Future work is going on for machine learning assisted optimization of process parameters for effective catalyst synthesis. The floor was open for audience discussion.



Technical Session II

Speaker: Prof. Ashish Arora, Department of Mathematical Sciences, I.K. Gujral Punjab Technical University

Topic: “Life and work of S. Ramanujan”

Chairperson: Dr. Kanu Mehta, Department of Mathematics, St. Bede’s College, Shimla.

Rapporteur: Ms. Poonam Thakur



Prof. Ashish Arora delivered his talk on the contribution of Srinivasa Iyengar Ramanujan in the field of Mathematics. He started his talk on the early life and work of Ramanujan. He spoke about the childhood, education and mentioned various stories about him and his interest in mathematics. Prof. Ashish explained about discoveries of Ramanujan which is till now a

mystery for the mathematical society of India as well as for the world. He emphasized that the work of Ramanujan was based on his intuition by mentioning famous quote “An equation for me has no meaning unless it expresses a thought of God”. Ramanujan had his college education from Cambridge University despite his failure in India. Speaker mentioned the contribution of Prof. G.H. Hardy in Ramanujan’s carrier. He familiarized the audience with the work of Ramanujan including Magic square, Goldbach’s Conjecture and highly composite numbers etc. He also mentioned that Ramanujan work was published in twenty research papers, five research articles, five short notes and three books. He summed up his talk by mentioning that Ramanujan is famously known as “The man who knew Infinity”.

Technical Session III

Speaker: Prof. Pradeep Kumar, Professor, Dean Academics, Central university of Himachal Pradesh, Dharamshala.

Topic: “Green House Technology”

Chairman: Prof. Sunil Thakur, Department of Animal Sciences, Central university of Himachal Pradesh, Dharamshala.

Rapporteur: Ms. Nivedita Bhardwaj



The speaker started his presentation on Green House Technology. He enlightened the audience with the importance of green house technology and it's importance in agriculture aiming at high yield and better quality of crops. Off season production, use of least pesticides, easier plant protection and weed free cultivation are the real benefits of the green house technology. He mentioned about the prospects of protected cultivation. He specified that crops like cut flowers, vegetables, fruits can be grown in green house and gave the tips for doing cultivation in green house. He also discussed about recent techniques that has emerged in this field like soil less plantation, hydroponics, aeroponics and vegetable grafting. Later he took the queries of listeners and cleared their doubts.

Oral Presentation Session

Technical session III was followed by the oral presentations. Sixteen participants presented their research papers in this session highlighting their research work in different fields of science and technology.





Day 2

Day two started with the proceedings of the previous day and welcome address by Dr. Kusum.

Technical Session 4:

Speaker: Dr. Manoj Kumar Sharma, Assistant Professor, Crop Genetics and Informatics Group School of Biotechnology JNU, New Delhi

Topic: “Plant based Oral Vaccine against Anthrax. Recent Developments and Way forward”.

Chairperson: Dr. Sunil Kumar, Department of Chemistry, HP University, Shimla

Rapporteur: Ms. Shivani Chauhan



Dr. Manoj started his presentation by introducing plant molecular farming/genetically engineered Plants for the production of Industrial products. He explained that Plant Molecular Farming is a technique in which plant tissue cell cultures are used for the production of pharmaceutically important commercial valuable proteins. Here plant engineering is implemented by chloroplast transformation, nuclear transformation or host cell-virus based technique and by *Agrobacterium* mediated plant transformation. He reported that their team has developed plant-based anthrax vaccine with the help of genetic engineering of plant cell, giving protection against the disease called Anthrax caused by *Bacillus anthracis*. This is achieved through anthrax toxin protective antigen (PA). PA is the domain 4 component that interacted with host cells and the receptor that binds to PA was identified as Anthrax toxin receptor (ATR). PA gene is targeted and amplified and is used to produce vaccines against Anthrax. Later, the audience asked questions related to the topic.



Technical Session V

Speaker: Dr. Tarun Sharma, Assistant Professor, UIT, HPU, Shimla-5

Topic: “Silicon Photonics for Life Sciences and Medicine”

Chairperson: Dr. Balvir Patiyal, Assistant Professor, Department of Physics, Himachal Pradesh University Shimla.

Rapporteur: Ms. Reena Thakur



Dr. Tarun Sharma, the resource person of the session started his presentation on ‘Silicon Photonics for Life Sciences and Medicine’. The speaker explained the basics of integrated optic chip parts, hybrid plasmonic wave lights, nanophotonic platform and its hybridization control on chip grating coupler. He further elaborated upon the uses of optical biosensors in disease diagnostics, point of care medical devices, wearables, catheterized devices and smart pills. He elucidated that silicon photonics technology has captivated immense attention and research effort in the development of mobile and affordable devices which can be used in food safety, healthcare, environment monitoring etc. On the whole he stressed upon the fact that use of silicon photonics can improve our well being and quality of life. The session ended with an interactive session with the audience.

Poster Session

Technical session V was followed by the Poster Presentations. The participants displayed their poster based on various sub themes of the conference.





Valedictory

Dr. Shruti Gupta Assistant Professor Department of Biotechnology, St. Bede's College Shimla, welcomed the chief guest Prof. D. R. Thakur, Department of Biosciences, Himachal Pradesh University, Shimla for the valedictory session. Dr. Maheshwar Singh Thakur continued the session by giving a detailed account of the two-day National Conference.



The chief guest addressed the audience and emphasized that such conferences provide a platform not only to learn new aspects, others perspectives and latest information but are also a good way of networking. Such events also give a chance to individuals for interacting with experts coming from various specific fields.



The address of the chief guest was preceded by declaration of winners for oral and poster presentations. In the oral presentation, Mr. Bhagwati Prashad Sharma stood first and Ms. Shivani Chauhan stood second. In the poster presentation, Mr. Mohammad Parvez secured the first place and Miss Astha Dhawan secured the second place.









Thereafter the vote of thanks was delivered by Dr. Shruti Gupta. The conference came to an end with the National Anthem.

