The 1st International Seminar

of

Aghorekamini Prakashchandra Mahavidyalaya

(Bengai, Hooghly, West Bengal 712611)

Affiliated to the University of Burdwan

entitled "Tools in Sciences"

Organized by

The Department of Physics

Funded by

Science and Engineering Research Board (SERB), New Delhi, India

Short Report
on
The International Seminar entitled "Tools in Sciences"
held at AKPC Mahavidyalaya on June 25th, 2022

The Department of Physics, Aghorekamini Prakash chandra Mahavidyalaya organized a 1-Day International seminar on "Tools in Sciences" on 25th June, 2022.
It started at 11:00 AM and continued till 5:00 PM in which three keynote speakers and two contributory speakers were invited to present their works. The seminar was organized by Physics department in collaboration with Internal Quality Assurance Cell (IQAC) of the college. The funding for the same was received from DST-SERB under the scheme no. SRG/2019/002143.

Chronology of Events:

Welcoming the speakers:

At 11:00 AM the programme started with seminar convener Dr. Satyaki Kar inviting the principal and the speakers to the stage to grace the occasion. All the dignitaries are then greeted with bouquets by the Physics Hons. students. Then the honourable principal formally started the event with his welcome address.

Technical Morning Session:

The technical session started after the welcome address by the principal was over. In the morning session there were two keynote speeches scheduled to follow.

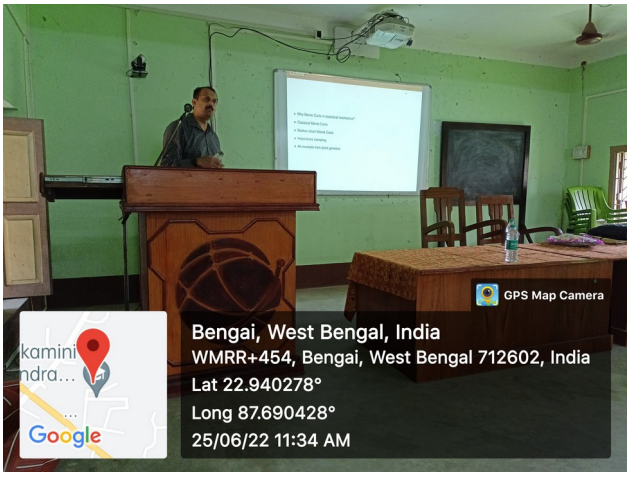
i > Keynote Speech by Dr. Vivekananda Roy

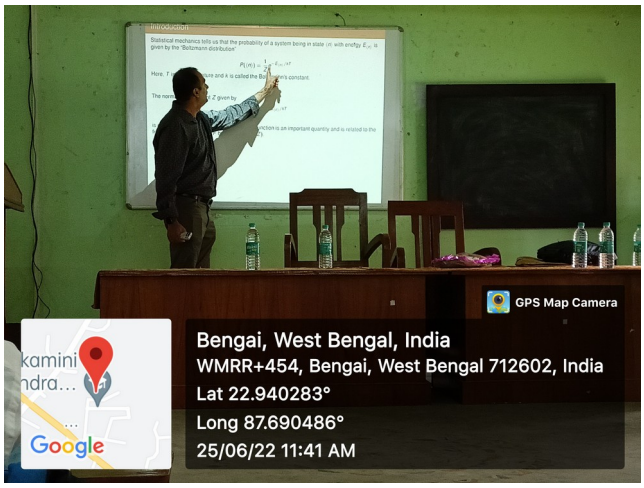
Dr. Vivekananda Roy, an Associate Professor from Department of Statistics at Iowa State University, USA was gracious enough to find some time from his academic visit to India to visit AKPC Mahavidyalaya and deliver a keynote speech in the seminar.

The title of his talk was **Monte Carlo Methods in Statistical Mechanics.**

The abstract of his talk is given below.

Abstract: We begin with discussing the need of Monte Carlo methods for tackling some statistical mechanical problems for which analytical solutions are not available. This is followed by descriptions of different Monte Carlo methods, namely, the classical Monte Carlo, the Markov chain Monte Carlo and the importance sampling methods. Some of these methods, originally developed in the context of statistical mechanical problems, are now widely used in diverse disciplines including statistics, machine learning etc. We plan to discuss some of these applications.





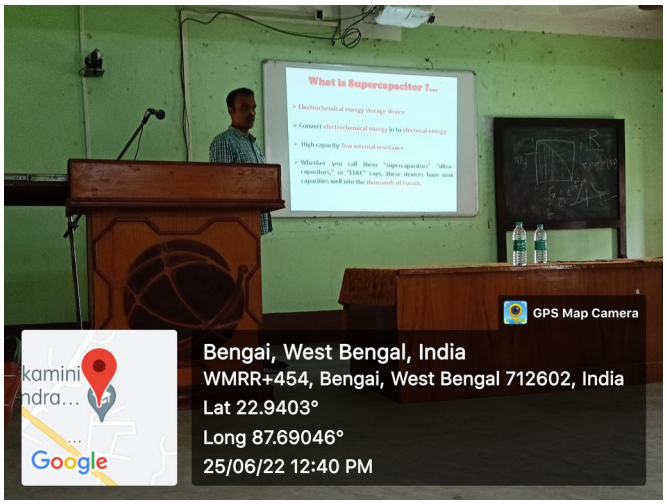
ii > Keynote Speech by Dr. Sukanta De

Next keynote speech was given by Dr. Sukanta De, an Assistant Professor from the Department of Physics at Presidency University, Kolkata.

The title of his talk was **Transparent Flexible Supercapacitors: Construction and Applications.**

The abstract of his talk is given below.

Abstract: Recent significant breakthroughs in modern wearable electronics and ever growing demand of portable flexible electronic devices, such as e-papers, bendable smart phones, displays, and transplantable medical devices, has greatly promoted the development of flexible, low-cost, and high performance energy storage systems. One of the greatest scientific and engineering challenges in the twenty first century is to develop such flexible energy storage devices. Among different energy storage devices, supercapacitors (SCs) are the ultimate choice because of their higher power density, cycle efficiency and charging discharging rates more than batteries. Electrode materials in SCs play a crucial role in its performance. This talk will focus largely on construction of Flexible Transparent Super capacitors, starting from the choice of electrode materials and their several applications.



Lunch Break and Poster Session:

The seminar had a lunch break between 1:00PM - 2:30 PM. During the same interval there was also a poster session where 10 participants presented their posters.

Poster Titles :

1. Optical properties and electric modulus spectroscopy of nanocrystalline Mn-doped CeO2 . (Dr. Arup Dhara, Burdwan Raj College).
2. Transparent Conductive Oxide Thin Films. (Mr. Basudeb Roy Chaudhury, Bijoy Krishna Girls' College).
3. Near duplicate image detection using Locality Sensitive Hashing. (Mr. A F M Shamsuzzaman, Raja Rammohun Roy Mahavidyalaya).
4. Charge transfer processes in ion-ion/ atom collisions at intermediate and high energies. (Dr Rakesh Samanta, Raja Rammohun Roy Mahavidyalaya).
5. Understanding the role of natural death in evolutionary dynamics: A combination of stability analysis and Monte Carlo study. (Dr. Sirshendu Bhattacharyya, Raja Rammohun Roy Mahavidyalaya).
6. Piezo Electric Transducer -a Tool for The Generation of Ultrasonic Waves.(Dr. Uday Khan, Rabindra Mahavidyalaya)
7. A Study on the Synthesis of Coumarins Using Ionic Liquid. (Dr. Tarun Ghosh, AKPC Mahavidyalaya).
8. Electrical Properties of TiO2-CeO2 nanocomposite material by mechanical alloying method. (Mr. Rajib K. Mandal, AKPC Mahavidyalaya).
9. Influences of Semiconductor Metal-oxide properties on Gas sensing characteristics. (Dr. Shampa Mondal, AKPC Mahavidyalaya).
10. Chiral anomaly dependent magnetoconductances in an irradiated Type-I Weyl Semimetal. (Mr. Rounak Sen, Research scholar, AKPC Mahavidyalaya).

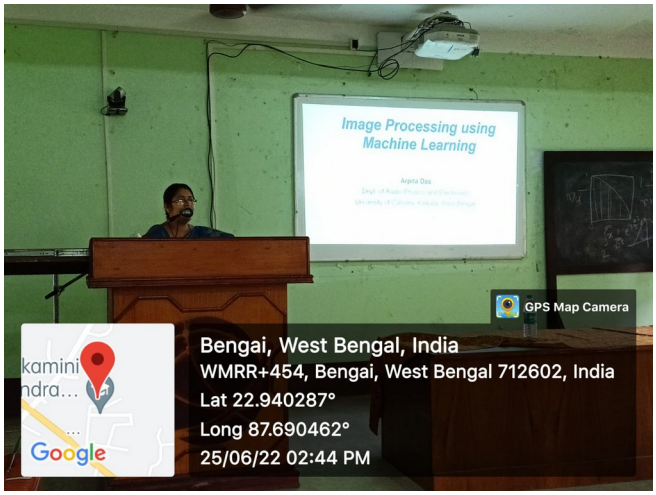
Technical Post-lunch Session:

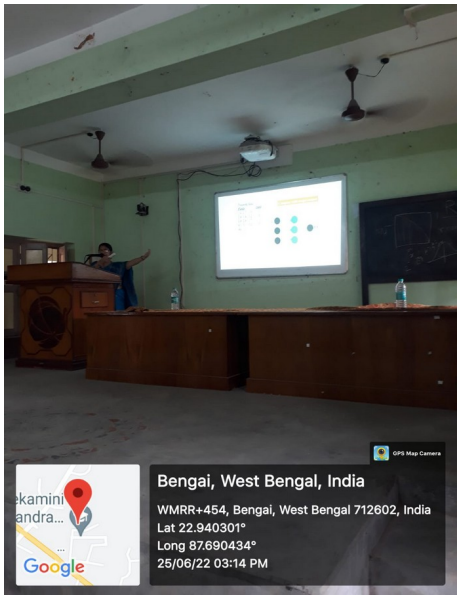
iii > Keynote Speech by Dr. Arpita Das

The first talk in the post lunch session was given by the keynote speaker Dr. Arpita Das, an Assistant Professor from the Department of Radiophysics and Electronics, University of Calcutta. The title of the talk was **Image Processing using Machine Learning Algorithms.**

The abstract of her talk is given below.

Abstract: For increasing amount of data from different optical/infrared sources such as cameras, webcams, radar sensors, satellites, diagnostic imaging etc., a substantial number of images or videos of different nature can be used for different applications. For instance, the problem of high-performance target recognition, anomaly detection, computer assisted diagnosis/surgery etc. plays an important role in both military and civil domain. In the military field, image processing can be used for intelligence interpretation, target detection and battlefield surveillance. In the civil field, image processing can be used for face/figure print recognition, driver assistance systems, geological survey, medical diagnosis etc. However, it is still challenging to achieve high performance in image classification, automated target detection, pattern recognition, video tracking, etc. because of the complex scenarios of the real world applications (e.g., noise, poor visibility, occlusion, deformation, etc.). Recently, the advances in machine learning and computer vision algorithms show potential contributions in various practical applications. Deep neural network and other machine learning methodologies are commonly used in image and video processing, including segmentation, classification, recognition, etc.





iv > Contributory Speech by Dr. Somenath Jalal

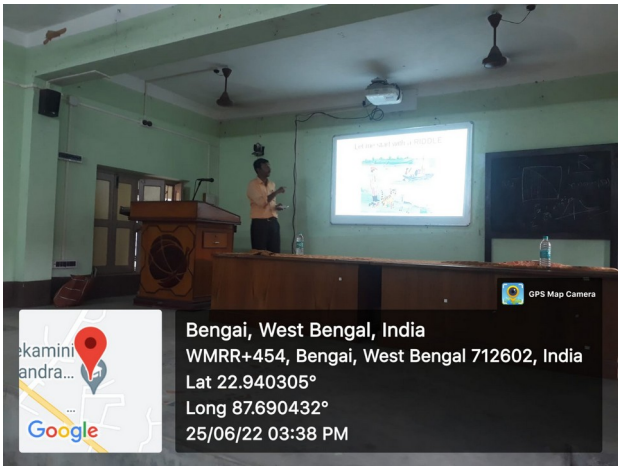
Thereafter, Dr. Somenath Jalal, as Assistant Professor in Physics from Netaji Mahavidyalaya, Hooghly presented a contributory lecture.

The title of his talk was **Understanding Physics problems numerically and solving them using SCILAB, a free Software.**

The abstract of his talk is given below.

Abstract: In the B.Sc Physics undergraduate curriculum, UGC has prescribed a Choices Based Credit System syllabus. Freshness of the syllabus is effective and encouraging to both teachers as well as students. A student has no choice but to learn computation tools in more than six courses namely Mathematical Physics I, II, III, Advanced mathematical Physics, Quantum Mechanics, Statistical Mechanics, Applied Dynamics, from Semester I to Semester VI in their undergrad studies. He/She has to learn the programming language C/C++ and/or use software like SCILAB. In this talk we shall discuss the formulation of Physics problems numerically and try to solve them using SCILAB. If time permits, we shall learn XCOS, a

graphical interface built within SCILAB to emulate some Physics experiments.



v > Contributory Speech by Dr. Papiya Dhara

The last talk of the day was delivered by the contributory speaker Dr. Papiya Dhara, an Assistant Professor of Physics from Adamas University, Kolkata.

The title of her talk was **Emerging Trends and Applications of Optical fiber sensors.**

The abstract of the talk is given below.

Abstract: The growth of the optoelectronics and fiber optic communications industries has revolutionized over the past years. The optoelectronics industry has brought about such products as compact disc players, laser printers, bar code scanners and laser pointers. The fiber optic communication industry has literally revolutionized the telecommunication industry by providing higher performance , more reliable telecommunication links with ever decreasing bandwidth cost. In parallel with these developments fiber optic sensor technology has been a major user of technology associated with the optoelectronic and fiber optic communication industry. Different types of extrinsic and intrinsic fiber sensor use an optical fiber to carry the light beam and the environmental effect impresses information. High performance interferometric fiber optic sensors using Mach-Zehnder and Michelson interferometers etc will be discussed. Photonic crystal fiber based liquid level sensor, Fiber Braggs Grating sensor, Surface plasmon based Optical fiber bio-sensor will be enlightened. Overwhelming commercial market, real time applications, job opportunity with optical fiber sensor domain expertise will be unfolded.

The participations:

There were 54 students and 12 faculty participants registered for the seminar while a total of 50 registered participants actually attended the event. In addition , there were many unregistered, local participants from the college, both student and faculties who also actively participated in the seminar.

Acknowledgements:

There were many agencies/ personalities without whose help the seminar could not have happened. At the foremost, acknowledgement should go to DST-SERB for fully funding this event under its Start-up Research Grant Scheme no. SRG/2019/002143. The acknowledgement goes to the college and the college Principal Dr. Paramartha Ghosh for his coopeartion and good wishes. Thanks should be given to the college's Internal Quality Assurance Cell (IQAC) and especially its convenor Dr. Ashis Kar for his through guidance for smooth functioning of the programme. Organizing the event became easier due to the active roles played by the seminar committee comprising of the Coordinators Dr. Shampa Mondal, Dr. Rajib Kumar Mandal and Mr. Surajit Guin and departmental Lab attendant Mr. Ambica Charan Das and Md. Ibrahim Hossain. This committee was grateful to college's Teacher Council Secretary, Mr. Prasenjit Bera for his valuable guidance in organizing this event. Thanks to all the five speakers who were gracious enough to attend the event as resource persons. Whole hearted thanks to the volunteers of this event – Dr. Sourav Halder from the Mathematics Department, Physics Hons. Students, especially 3rd and 1st year students and the J.R.F. Mr. Rounak Sen. Finally, thanks to all the participants without whose active participation the program would not succeed at all.

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Seminar Convener &
HOD, Physics Department.