64TH REUNION OF THE APPLIED PHYSICS ALUMNI ASSOCIATION

ALUMNI ANNUAL

APPLIED PHYSICS
ALUMNI ASSOCIATION
DEPARTMENT
ESTD 1925
UNIVERSITY OF CALCUTTA

POST CENTENARY YEAR

1925 ~ 2025

DEPARTMENT OF APPLIED PHYSICS
UNIVERSITY OF CALCUTTA

26 JANUARY 2025

APPLIED PHYSICS ALUMNI ANNUAL

64th REUNION
26 January 2025

CENTENARY SOUVENIR-2
POST CENTENARY YEAR
1925 – 2025

DEPARTMENT OF APPLIED PHYSICS
UNIVERSITY COLLEGE OF TECHNOLOGY
UNIVERSITY OF CALCUTTA

Obituary

THE APPLIED PHYSICS ALUMNI MEMBERS DEEPLY MOURN THE SAD DEMISE OF

Nirmalya Majumdar
1965 batch
Departed on 26 November 2024

Anu Bhattacharya
1970 batch
Departed on 26 May 2024

Arun Kumar Roy
1971 batch
Departed on 18 July 2024

Foreword

Let me begin by conveying my whole-hearted greetings to all who participated in the 64th Reunion of the past and present students, faculty, and staff of the Department of Applied Physics. This is a momentous year for all of us. We launched the centenary celebration with an inaugural function on January 24, 2024. Since then, several programs like symposia, lectures, and technology festivals have been organized as part of the centenary celebration.

Throughout these events, we reflected on the significant contributions of our founding member, Professor Phanindra Nath Ghosh, who developed the department from the ground up. The sprawling three-story building that houses the department today, complete with modern laboratories and classrooms, was once an open field when Dr. P. N. Ghosh was appointed to the prestigious position of "Sir Rashbehari Ghose Professor" of the Department of Applied Physics, which had not yet begun operations in 1920. In the same breath, I would recall the names of great men like Sir Ashutosh Mukherjee, Sir Taraknath Palit, and Sir Rashbehari Ghose, without whose sensible attitude, administrative prowess and generous contributions there would not have been any "Science College Campus" for nurturing the post-graduate education in science and technology in colonial India in those days.

The land where the Rajabazar Science College is situated once belonged to Sir Taraknath Palit. This property and his dwelling house at 36 Ballygaunj Circular Road along with 25 bigha land were donated to Calcutta University for housing the departments of post-graduate teaching and research in Science and Technology. In today's calculations, the contributions of these leading lawyers of the then Calcutta High Court, Sir Taraknath Palit, and Sir Rashbehari Ghose, would be not less than 100 crores of rupees!

The contributions of Sir Palit and Sir Ghose and the undaunted spirit and hard work of Sir Ashutosh Mukherjee enabled post-graduate education in science and technology to be initiated within this university.

With these words, I acknowledge our debt to these persons without their contributions we would not be who we are today.

Finally, I hope this occasion of coming together will create a cherished memory for all of us for the days to come.

Rabindranath Chakraborty (1965)
President, Applied Physics Alumni Association (APAA)

64Th Reunion And Centennial Celebration

We are passing an extraordinary time phase in the history of Applied Physics. And this is nothing other than the one-hundredth year of our alma mater.

A reunion gets a special feat when it becomes an integral part of the centennial jubilee. With the festivity of this 64th Reunion on this pleasant winter day of 26th January 2025 when the centennial celebration of the Applied Physics department that had started on 24th January of the last year comes to an end. The two successive annual reunions – 63rd and 64th – thus mark start and finish benchmarks for the year-long celebration whose spectrum of activities meticulously designed and successfully organised shall be fondly cherished.

The present compilation caringly titled Centenary Souvenir-2 is a logical continuation of the Souvenir published last year on the occasion of 63rd Reunion, although the nature of contents varies. It was our well thought objective that Souvenir-2 would cover the reports and records of centenary programmes of the last one year. Those are chronicled in the following pages with fidelity as the materials of the history of the department to be viewed in the coming years, near or far. Besides, there are a few interesting and relevant pieces under feature articles by the alumni as well as faculty members and library officials. We believe the matters as a whole will present a valuable collection to all concerned.

Hope the centennial celebration along with the essences of 63rd and 64th Reunion will be meaningful by means of maintaining its spirit and vision in years or decades to come.

Dr Anup Kumar Mandal (1972)
President
64th Reunion Committee,
Applied Physics Alumni Association (APAA)

Message From Head of the Department

The journey of Teaching and Learning at the Department of Applied Physics commenced a hundred years back in 1925. Meanwhile, this Applied Science department has excelled with three technological frontiers - Optics, Electrical, and Instrumentation. Since 2005, the entity of Applied Optics & Photonics has become a separate department. The remaining two departments are now at par with all AICTE-approved technological institutions offering undergraduate and postgraduate courses in Electrical Engineering and Instrumentation Engineering. From 2015, 10 + 2 students have been admitted with good ranks from the West Bengal Joint Entrance Examination. From 2027, our undergraduate programs will be evaluated for NBA accreditation. Along with undergraduate B. Tech. Programs, we also offer M. Tech. degree in Electrical as well as Instrumentation Engineering. M. Tech. programs for working professionals are also in our bucket. Another good news to share with you is that our placement cell is also functioning satisfactorily. The journey of a hundred years has matured us to emerge as full-fledged technological departments from applied science.

It's truly a privilege for me to write this foreword on the 64th Reunion commemorating the closing ceremony of the Centenary Celebration of our Applied Physics Department. As Head of the Department, I take this opportunity to extend my warm welcome to all of you. All of us commenced our journey as students from this department and accomplished our goals in various sectors of industries and academia. In every step of our journey, we always cherish the rich moments associated with those days as students and scholars. This Department has given us a lot in the form of knowledge and wisdom. We always perceive that strength especially when you the alumnus are with us. This year is more special for all of us as we have just completed a hundred years but are not yet 'old' at all. Every part of our department is still vibrant enough to do something new to contribute to society.

On this special day, I convey my heartfelt thanks and gratitude to all of you for being with us to celebrate this notable event. I do express my strong belief that you will always be with us in the future also. Without you, this three-storied building has no meaning. We are confident enough that with our rich history and strong determination we can create a bright future with excellence in Teaching, Learning, and Research. I hope this event will be a grand success and originate memorable moments with the family of Applied Physics for the years to come.

Dr. Chanchal Dey
Head, Department of Applied Physics

With the best compliments from

MR. ABHISHEK TIBREWAL,
MANAGING DIRECTOR

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Editorial Notes

At the outset we warmly recount the two publications we brought out on the Inauguration Day of Centenary Celebration on the January 24, 2024 with title and style as Centenary Volume and Centenary Souvenir. While the first one is proprietary book of our University of Calcutta on the strength of being the publishers (and of course this instils a feeling of pride deep into our minds with a sagacity of gratitude to the university), the Centenary Souvenir was our traditional Alumni Annual Journal but imparted with the relevance of centenary leitmotif. The present Souvenir, as we label it as Centenary Souvenir-2, remains the logical continuation of the last year's. But conscientiously its contents are designed differently though within frontier of centennial theme. The present survey in the ensuing pages is chiefly the meticulous compilation of records of events, that the faculty, students and alumni made happen during the year-long celebration. The account of the Centenary Celebrations bears evidence to the enthusiasm which was evoked on the occasion of the celebrations and deserves permanent record as a tribute to the efforts on this memorable occasion on the part of those who love this Department. Added to such effort is careful collection of caringarticles keeping faith upon the diction that Engineering and Technology are growing sciences.

Satyaban Roy
for Publication Group, 64th Reunion Committee,
Applied Physics Alumni Association (APAA)

CENTENARY SOUVENIR-2

Edited by Publication Group, 64th Reunion Committee
Published by Department of Applied Physics and Applied Physics Alumni Association
Cover Design by Prof Kaushik Das Sharma

January 26, 2025

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(2024-25)

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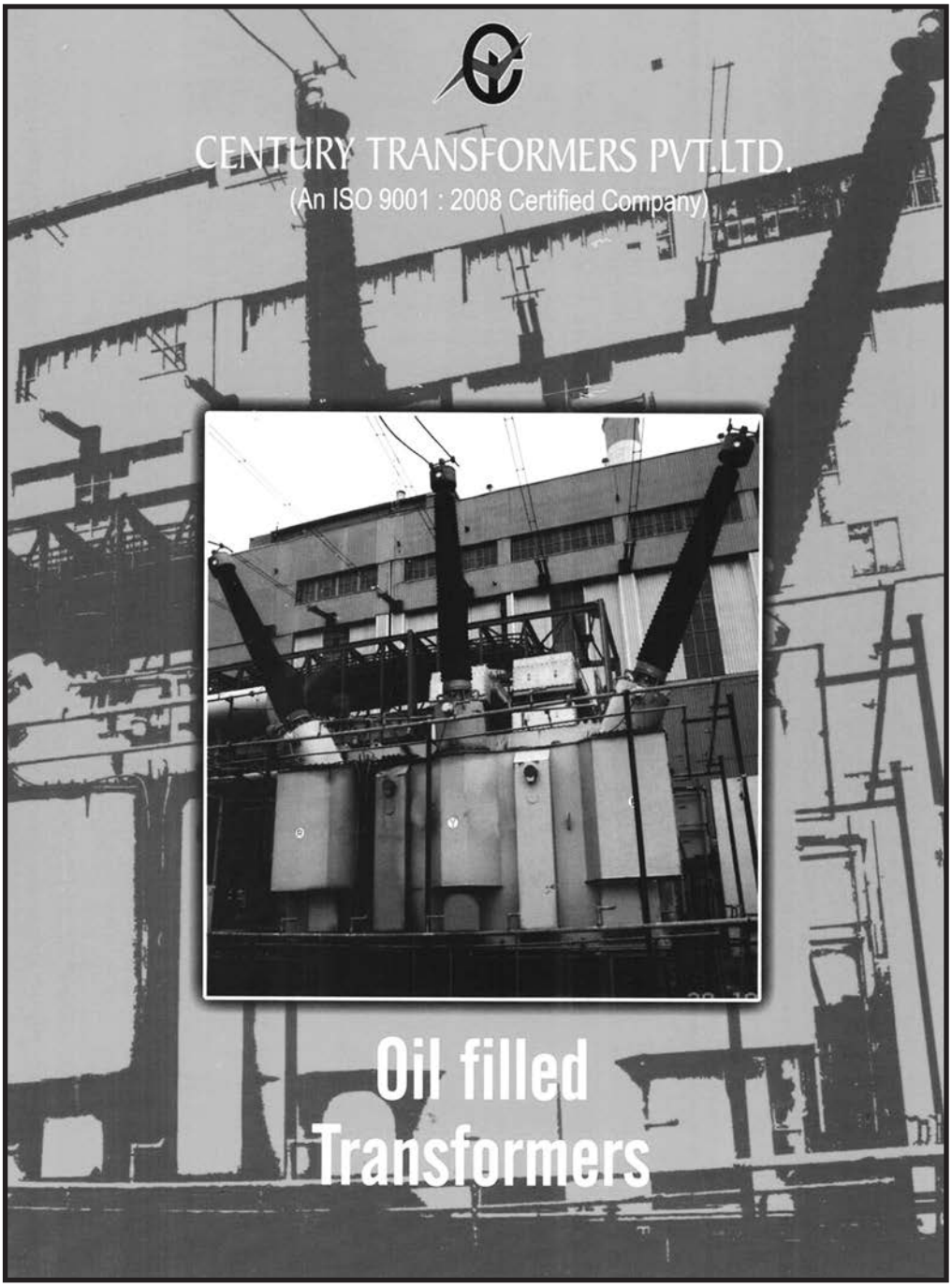
Saswata Banerjee (2001) • Tushar Kanti Datta (2001)
Sumi Pal (2001) • Neha Duary (2006) • Srimanti Roychoudhury (2008)
Sumangal Bhaumik (2015) • Uday Banerjee (1982)

Glimpse to Centenary Celebration

Event	Date	Venue
Centenary Celebration Opening Ceremony	Jan 24, 2024	Dhono Dhanya Auditorium, Alipore
International Conference CIEC24	Jan 25-28, 2024	Dhono Dhanya Auditorium, Alipore
63rd Reunion	Jan 28, 2024	Science College Campus, APC Rd
One Day Industry Symposium	Feb 25, 2024	Dhono Dhanya Auditorium, Alipore
Virtual Lecture on Robotics	April 27, 2024	Virtual
Reach out to the community (Blood Donation Camp)	May 3, 2024	Applied Physics Department
Tech Fest (PHYSIANTRIX)	Sep 7-8, 2024	Science College Campus, APC Rd
Two Day Symposium on Renewable Energy	Oct 26-27, 2024	Science College Campus, APC Rd
Centenary Celebration Closing Ceremony	Jan 25, 2025	Centenary Hall, CU, College St Campus
64th Reunion	Jan 26, 2025	Science College Campus, APC Rd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CONTENTS

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Inauguration

Centenary Celebration of the Department of Applied Physics

শতবর্ষ উদযাপনের প্রথম দিন

Inauguration Ceremony

January 24, 2024

Programme Schedule
Record Notes
Speeches of dignitaries
Panel Discussion

The inauguration ceremony of the centenary celebration of Calcutta University was held on January 24, 2024, at the well-decorated 'Dhonodhanyo' auditorium in Alipore, Kolkata in presence of academic luminaries of home and abroad. It was a pleasant climatic ambiance on a Wednesday of winter-end. There was no deviation from the prescheduled programme except minor rearrangements in the order of the events to suit the actual time of presence of some of the dignitaries. As such the actual order of the programme had been as follows:

Programme Schedule

09:00	Registration and Physical Networking
10:00	Opening Ceremony
10:15	Welcome Address by the HOD: **Prof Kaushik Das Sharma**
10:30	Felicitation to **Sri Somendranath Ghosh**, Grandson of Prof PN Ghosh.
10:45	PN Ghosh Milestone Lecture by Chief Guest: **Prof Wuqiang Yang**, Electrical Engineering Dept., University of Manchester, UK
11:00	Tea Break
11:30	Address by Special Guest: **Prof Sanghamitra Bandyopadhyay**, Director, Indian Statistical Institute, Kolkata
12:00	Panel Discussion on 'Future Technology Road Map'

Panelists:

Partha Sarathi Bhattacharyya, Former Chairman of Coal India Ltd, Currently Chairman of Peerless Group

Prof Mihaela Albu, Electrical Engineering Dept.Politehnica University of Bucharest

Prof Sanghamitra Bandyopadhyay, Director, Indian Statistical Institute, Kolkata

Arup Raha, Air Chief Marshal (Rtd), Chancellor, Assam University

Moderator: Prof Amitabha Dutta, Pro-VC, Jadavpur University

14:00 Lunch Break

15:30 Launching of the Centenary Volume and Address by Hon'ble Vice Chancellor, Calcutta University: **Prof Santa Dutta(De)**

16:00 Address by **Prof Debasis Das**, Registrar, Calcutta University

16:15 **Felicitation Ceremony:** Felicitation of the retired and present teachers and staff of the Department

17:00 Cultural Program by **Violin Brothers**

A Brief Account of the Inaugural Day Function

It all started with the flawless registration process followed by the professionalism exhibited in conducting the events on the stage.

After the ceremonious opening and spreading of flower petals by the dignitaries present, the warmth of remembrance of the introduction of technology education at the post-graduate level of the university was given by Professor Kaushik Das Sharma, Head of the Department. He recalled the footprints of university education in the early twentieth century when integrated teaching in electrical technology, measurement technology, communication technology, applied optics, instrumentation technology, etc. was the first in the country at the university level with the advent of Applied Physics in the premises of Calcutta University.

As a distinguished mark of respect to the memory of Prof P N Ghosh, the first Head of the Department and the first RB Ghose Chair Professor of Applied Physics, the grandson of the doyen Sri Somendranath Ghosh was invited on stage for a grand felicitation. In his brief address, he reminisced about the family aura centered on his grandfather and his time. Sri Ghosh expressed that he had been overwhelmed by the warmth of the Department that found out and reached his door afterthe passing of so many decades.

Professor Wuqiang Yang, Department of Electrical Engineering, University of Manchester was present as the Chief Guest. Much of his fluent commentary was fascinated by the city. He expressed without least of inhibition the contribution of Kolkata and India to global technological and engineering innovation. While delivering the PN Ghosh Milestone Lecture, he presented

adetailed account of the capacitive sensor being an electronic device to detect solid or liquid targets without physical contact by way of emission of electrical field from the sensing end of the sensor. His narrative lucidly explained how any target that can disrupt this electrical field can be detected by a capacitive sensor. His presentation was followed by a grand Q&A session.

Even the duration of the tea break had very pleasant and heartfelt interactionsamong faculty members, alumni, and guest dignitaries.

Padmashree Prof. Sanghamitra Bandyopadhyay, Director of the Indian Statistical Institute, was the Special Guest at the event. She explained the context of the integration of Science and Technology in the light of modern computational biology, bio-informatics, and machine learning while bringing out the essence of AI and ML.

One of the inauguration programmes was a very valuable Panel discussion on Future Technology Road Map. Shri Arup Raha, Former Air Chief Martial and the present Chancellor, Assam University, Professor Sanghamitra Bandyopadhyay, Director of the Indian Statistical Institute, Professor Mihaela Albu, Department of Electrical Engineering, University of Bucharest, and Shri Parthasarathi Bhattacharya, Former Chairman of State-owned Coal India Ltd and present Chairman of Peerless Group, participated in the event. Standing on the threshold of the Fourth Industrial Revolution, various aspects of the hopes and fears of the human species came up in this thoughtful discussion. Prof Amitabha Dutta, Pro-Vice Chancellor, Jadavpur University, was the Moderator with his apt coordination. He fixed the tune of the discussion centeringon the application of technology towards sustainable development without jeopardizing the potential of future generations in the context of tremendous technological progress that had taken place during the last fifty years. It was added that the roadmap would of course take into account the prospects and problems of the development of cyber-physical systems comprising AI and ML.

The end of the Panel discussion was followed by the grand lunch hour. A wide range of delicacies associated with the well-ordered arrangement of catering services filled the moments with grand togetherness.

The post-lunch session A valuable centenary volume published by the University of Calcutta – Hundred Years of the Department of Applied Physics was formally released by Professor Santa Dutta (De), the Vice-Chancellor, Calcutta University. In her speech, the Vice-Chancellor highlighted the bright position of Indian Science & Technology in general and Applied Physics in particular in the last 100 years on the science and technological map of home and abroad. She expressed her sincere initiative in the publication of

the Centenary Commemorating Volume by the onus of Calcutta University.

Former and current teachers and non-teaching staff of the Department of Applied Physics were felicitated. It was a matter of great honour to have the felicitations from the hand of veteran Professor and prolific author Dipak Chandra Patranabis, an Applied Physics Alumnus of 1958 and an eminent Professor of Instrumentation and Electronic Engineering at JU.

The list of former teachers felicitated on stage was:

- Prof. Kanti Bhusan Dutta (1960)
- Prof. Asit Kumar Datta (1963)
- Sri Rabindranath Chakraborty (1965)
- Prof. Samir Sarkar (1967)
- Prof. Samarjit Sengupta (1973)

It may be noted that some of the former faculty members could not be present for health indisposition mainly. Prof Samir Kr Basu (1949), however, could be present on the 63rd Reunion Day on 28 March 2024 for some time despite his mature aging. Prof Manas Kr Joardar (1961) sent a heart-touching message. The list scheduled for felicitations but could not attend:

- Prof. Samir KumarBasu (1949)
- Prof Manas Kumar Joardar (1961)
- Prof Balaram Bhattacharyya (1962)
- Sri Subodh Phaujdar (1966)
- Prof. Lakshminarayan Hazra (1967)
- Prof Gautam Sarkar (1971)
- Prof Sunit Kumar Sen (1973)
- Prof Satish Chandra Bera (1973)
- Prof. Ajay Ghosh (1974)
- Prof. Mina Shah (1976)
- Prof Kallol Bhattacharya (1984)

The list of present teachers felicitated on stage was:

- Prof Kaushik Das Sharma
- Prof Jitendranath Bera
- Prof Rajarshi Gupta
- Prof Sumana Chaudhuri
- Dr Amitava Biswas
- Dr Ujjwal Mondol
- Dr Binay Karmakar
- Sri Nirmal Murmu
- Sri Dipak Kumar Mandal

The present teachers who could not attend the program of felicitation:

- Prof Madhuchhanda Mitra
- Dr Chanchal De
- Dr Saurabh Pal

The former Non-teaching Staff who were present and felicitated:

- Ajoy Sarkar
- Haripada Nayak
- Rasbihari Giri
- Ananda Mohan Basu
- Dilip Kumar Sinharay

The present Non-teaching Staff who were felicitated:

- Swarup Raj
- Binay Biswas
- Sujay Das
- Swapan Jana
- Saumen Adak
- Arindam Das Mahapatra
- Pradip Mondal
- Biswajit Ghosh

The former non-teaching staff who could not attend are:

Amalesh Dasgupta, Krishna Kishore, Samiran Dutta, Sukamal Dasgupta, Umesh, Bhaskar Nag, Sibdas Bhattacharya,Saktipada Das, Nirmal Debnath.

The last part programme after the day-long techno-talk arrangement and felicitations brought a different flavour – the heart-touching performance of the famous 'Violin Brothers' concert was like the icing on the cake. They ventured into various genres, like pop, jazz, and fusion taking their Indian classical tunes to the stage of music being the concluding part of the inaugural day ceremony.

No kudos or admiration are enough for the scintillating performance and efficiency of the entire team of faculty, alumni, and students of Applied Physics behind so successful staging of the inauguration programme. The anchor of the entire programme Dr Taparati Gangopadhyay deserves special applause for her immaculate and untiring delivery during the whole day.

The leading dailies of the city including Times of India, Ei Samay, Anandabazar, Aajkal, Bartaman reflected the news of the inauguration in the following day.

Speeches by Dignitaries

Attached hereunder with a reconstruction from video/audio.

[Report prepared by Satyaban Roy]

Welcome Address at the Inaugural Ceremony

by Prof Kaushik Das Sharma

Head of the Department of Applied Physics, University of Calcutta

Mr. Arup Raha, Prof. WuqiangYang, Prof. Sanghamitra Bandopadhyay, Prof. Mihaela Albu, Prof. Amitabha Dutta, Prof. Dipak Chandra Patranabis, Prof. Samarjit Sengupta, Mr. Parthasarathy Bhattacharya, distinguished guests, dear alumni members, and my fellow faculty members, staff members of my department, and my dearest students of the department. A very good morning. It is with immense pleasure and profound gratitude that I extend a warm welcome to each one of you gathered here today as we celebrate a momentous occasion, the centenary of the Department of Applied Physics. This is a day of reflection, commemoration, and jubilation as we honour a century of academic excellence, innovation, and the collective achievements that have shaped the legacy of our department.

Applied Physics, is a name that resonates with a dream envisioned by the great visionary Prof. Phanindranath Ghosh in the early 20th century. During a time when modern physics was in its infancy, here was a man in a country facing subjugation who dared to contemplate the transformative potential of physics for the betterment of humanity. Over a century, we have embarked on a magnificent journey guided by the nurturing embrace of the University of Calcutta.

Today, that once-distant dream stands as a tangible reality. It is a mere coincidence that my tenure of headship coincides with this memorable lifetime event. As the head of the department, I am truly honoured to stand before you representing a community of scholars, researchers, students, and alumni

members who have contributed significantly to the growth and success of our department over the past 100 years.

Today, we not only celebrate the rich history of our department but also envision a future brimming with possibilities and continued excellence. As we delve into the festivities and reflections planned for today, let us take a moment to express our gratitude to all those who have played a pivotal role in the success story of the Applied Physics department. To the visionaries who laid the foundation, to the educators who imparted knowledge with zeal, to the students who persuaded excellence, and obviously to the alumni who have carried the torch of our legacy into the world, thank you for being integral to our journey.

This centenary celebration is not just a commemoration of the past, but a declaration of our commitment to the future. As we navigate the challenges and opportunities that lie ahead, let us reaffirm our dedication to academic brilliance, innovation, and societal impact. Once again, I extend my heartfelt welcome to each one of you.

May this celebration be a testament to the indomitable spirit of the Applied Physics Department and a catalyst for the continued pursuit of knowledge, excellence, and service to the nation.

Thank you.

***Dr. Kaushik Das Sharma**, an Applied Physics alumnus of the 1998 batch, is currently a Professor and Head, the Department of Applied Physics, at the University of Calcutta. He is a recipient of the Kanodia Research Scholarship in 2002 and the University Gold Medal in 2004 from the University of Calcutta. In 2016 he was invited to visit the University of Manchester, UK, and also invited to deliver a special lecture at the University of Southampton, UK. He was the recipient of the prestigious Teacher-Researcher Fellowship from the University of Paris-Est Creteil, France in 2019. Dr Das Sharma is a Senior Member of the IEEE (USA) and a Life Member of the Indian Science Congress Association. He has served/is serving in important positions, like Technical Program Chair, and Technical Committee Member, in several International Conference Committees all over the world. He is currently serving as Chair of the IEEE Joint CSS-IMS Kolkata Chapter. He is an Executive Committee Member of IEEE Kolkata Section and Member of IEEE India Council IAYP Sub-committee. He is also currently serving as Editor for IEEE Transactions of Vehicular Technology and Editor for Elsevier Engineering Applications of Artificial Intelligence. Dr Das Sharma's key research interests include fuzzy control, stochastic optimization, machine learning, robotics, and computational biology. Dr Das Sharma has authored/co-authored about 80 technical articles, including 50 international journal papers. He also published 3 books from Springer Nature.*

Inaugural Lecture by the Vice-Chancellor

Professor Santa Dutta (De)

[Since our Honourable Vice-Chancellor is busy with some emergent work at the College Street Main Campus, she asked me to read out his inaugural message, on this august occasion. I'm just reading out a message.

– Prof Kaushik Das Sharma]

Esteemed faculty members, distinguished guests, alumni members, and most importantly the brilliant young minds of the Department of Applied Physics.

Today we stand on the precipice of a historic moment, a moment that transcends time and space, uniting us in the celebration of a journey that spans a remarkable century.

As we gather here, it is with great honour and excitement that I officially inaugurate the centenary celebration of our beloved Department of Applied Physics. In 1925, when the legendary Professor P.N. Ghosh officially started teaching a postgraduate program in Applied Physics with only three students, he was assigned a single room along with a few outdated instruments and two motors for conducting classes in Electro-Technology. And now we are

celebrating the hundred years of the glorious journey of the Department of Applied Physics.

Throughout the past century, the Department of Applied Physics has undergone tremendous growth, embraced changes, and stayed true to its core mission of fostering innovation and academic exploration in the field of Electrical Technology, Measurement Science, and Applied Optics in particular. Our students, faculty, staff, and alumni have all played a pivotal role in shaping the Department's identity and in turn have been shaped by its intellectual culture. The centenary volume published by the University on this august occasion, a testament to our enduring commitment to education and scholarly pursuit, offers us a unique opportunity to celebrate our past achievements, acknowledge our present endeavours, and set our course for a brilliant future.

This milestone publication will be a reflection of Department's enduring values and its unwavering dedication to intellectual growth and societal betterment. Inaugurating the year-long event of the centenary celebration, I extend my heartfelt thanks for your continued support and for being an integral part of the Applied Physics family. Together, let us shape the next chapter of our remarkable journey, building upon the foundation of centuries' worth of academic excellence and innovation.

Thank you.
***Professor Santa Dutta (De)**, M.Sc., Ph.D*

Prof P N Ghosh Milestone Lecture

Capacitive Touch Sensors for Robots

By Professor Wuqiang Yang (FIEEE, FIET, FInstMC, CEng),
University of Manchester, UK

Touch sensing is important for a robot to interact with the external environment. Currently, most robots can handle a known object at a specific location and they are vulnerable to an unknown object and/or unknown environment. Touch sensors play an important role in the interaction between a robot hand and an unknown object because touch sensors can provide necessary information on touch detection and feedback control. Among various touch sensing techniques, capacitive sensors have gained popularity, due to their simple structure, high sensitivity, low power consumption, quick response, wide dynamic range, and low cost.

At the University of Manchester, the Joint Research Laboratory of Touch Sensors for Domestic Robots was established in 2019, working with a company in Beijing. In the past few years, we have developed various capacitive touch sensors with different structures and different materials for different purposes. In particular, we have made a unique design of a capacitive touch sensor as shown in Figure 1, which can sense in three different modes: (1) proximity sensing, (2) touch sensing for material identification, and (3) 3D force sensing. The sensor consists of an external conductive rubber layer, which can be used as an excitation electrode or detection electrode or as an external screen, a middle non-conductive rubber layer, and a rigid printed circuit board (PCB) with four sensing electrodes. Figure 2 shows that four sensing units can be combined to provide touchless proximity sensing. Figure 3 shows that the dome structure can perceive an applied external force in

varying directions and magnitudes. By measuring capacitance from the four electrodes, the external force can be measured in 3D.

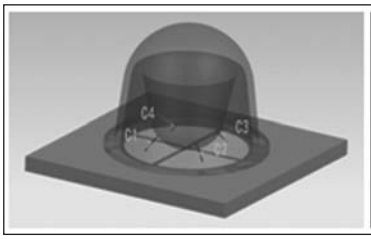

Figure 1

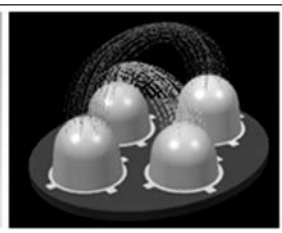

Figure 2

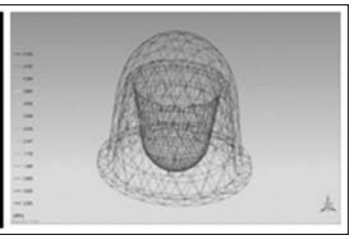

Figure 3

In recent years, capacitance-to-digital converter (CDC) chips have been developed rapidly, such as AD7150BRMZ from Analog Devices, FDC2212DNTT from Texas Instruments, and CPT112S-A02-GU from Silicon Labs. They are small in size and can measure very small capacitance, down to femtofarad. Their cost is also very low. Therefore, the CDC has gained popularity.

We have developed a digital-analogue hybrid chip as shown in Figure 4. It consists of a 24-bit high-speed and high-precision CDC, a 32-channel multiplexer, an ARM microcontroller, and a router, facilitating collaborative capacitance measurement across multiple chips as shown in Figure 5. In addition, it supports a 24-bit Address Event Representation (AER) for online neuromorphic computation, enabling efficient and low-power operation to implement artificial intelligence (AI) functions. This chip has been integrated with our capacitive touch sensor. For some specific applications like promptly responding to slipping, the signals from the touch sensor can undergo direct analysis and processing within the chip, rather than transmitting information to a host computer.

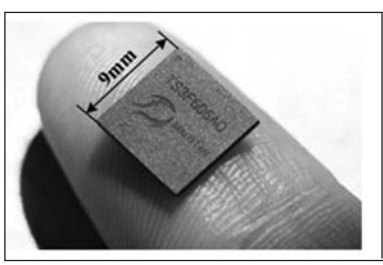

Figure 4

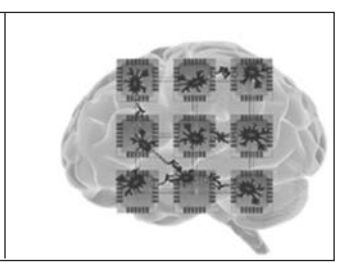

Figure 5

Two robots in our lab have been equipped with the developed capacitive touch sensors and the dedicated chip. Figure 6 shows a Ned2 robot from

Nioyo(France) and Figure 7 shows an UR5 from Universal Robots (The Netherlands). With capacitive touch sensing, both robots can catch up with either a hard heavy object or a soft light object. Figure 7 shows that the UR5 can catch up to either a glass cup full of water or a piece of tofu, which is similar to soft cheese. Without slipping sensing by the capacitive touch sensor, it is not possible to catch a piece of tofu by a robot.

Figure 6

Figure 7

The developed capacitive touch sensor and the dedicated chip are being considered for many other applications, such as intelligent functions for cars (e.g. automatic car wipers), consumer products, medical surgery, and elderly care. Also, it is possible to develop a very low-cost electrical capacitance tomography (ECT) device for industrial application.

[The transcript of the lecture could not be used because it was presented along with slide shows projected on a screen. The above is a brief account of the lecture sent by Prof Wuqiang Yang.]

Professor Wuqiang Yang *(FIEEE, FIET, FInst MC, CEng) graduated from Tsinghua University, Beijing, China. Since 1991, he has been working with UMIST and The University of Manchester, UK. His main research interests are electrical capacitance tomography (ECT), and touch sensors for robots. He has published more than 400 papers and two books with an h-index of 52. Professor Yang was an IEEE IMS Distinguished Lecturer from 2010 to 2016 to disseminate knowledge in ECT. He has been one of the key organizers of the IEEE International Conference on Imaging Systems and Techniques for many years. He received several national and international awards, including the 2021 IEEE IMS Best Application Award. He is an Associate Editor of IET Sci. Meas. and Technol. Currently, he is the Director of the Joint Research Laboratory of Touch Sensors for Domestic Robots at The University of Manchester.*

Panel Discussion on the "Future Technology Roadmap"

Introductory Speech by the Moderator

Prof Amitava Dutta

Pro Vice-Chancellor, Jadavpur University

Very good afternoon to all of you, distinguished panelists, and distinguished members present in the auditorium. It is my privilege to be here at the centenary celebration of the Department of Applied Physics, University of Calcutta, and I am really honoured to act as the moderator of this very important panel discussion session on the Future Technology Roadmap. As we all know, development is a part of human society, and it is probably in the last 50 years or so that humanity or human society has developed at a pace that we have never seen before.

And technology has played a very, very important part in this development. Earlier, development used to be measured by economic growth, but sometimes in the late 80s or early 90s, other indices came into being, and it is thought that not only the economic growth but the development in the field of education, in the field of health sector, should also be given due consideration to measure development. And therefore, new indices like the human development index were thought of.

But now, the situation has again turned in a different direction. Additionally, we are now talking about sustainable development, a development by which we are not hampering or jeopardizing the potential of our future generation. Now with this thought, we have formulated this panel discussion session in which we have on stage four very distinguished panelists who will share their thoughts on different areas of sustainability and another area on which everybody is talking now, and that is the cyber-physical systems consisting of artificial intelligence, machine learning, deep learning, etc.

We will also talk, and the panelists will also talk about the ethical aspects of this development. So, I would like to introduce the esteemed panelists who are here on the stage. We have Mr. Partha Sarathi Bhattacharyya, former Chairman, of Coal India Limited, and presently the Chairman of Peerless Finance, who will speak first.

Then Professor Mihaela Albu, from Polytechnia, University of Bucharest, Romania. My very good friend, Professor Sanghamitra Bandopadhyay will be the third speaker. She is the director of Indian Statistical Institute, Kolkata. And our fourth speaker will be Mr. Arup Raha, former Air Chief Marshal, and presently Chancellor of Assam University, Shilchar. I would like to give a brief introduction of the panelists. Sanghamitra has already been introduced, so I will talk about the other panellists who are here.

First, Mr. Partha Sarathi Bhattacharyya. He did his M.Scin Physics from Jadavpur University and then joined Coal India Limited as a management trainee in 1977. He gradually rose to become the Chairman of Coal India Limited in 2006, and continued till his retirement in February 2011.

He steered Coal India Limited to Miniratna in 2007, Navaratna in 2008, and finally Maharatna in 2011, a very unique feat in the career of any PSU as CMD. In November 2003, Mr. Bhattacharya took over the reins of Bharat Coal Limited, BCCL, and made it a success in less than two and a half years. Mr. Bhattacharya has been featured in a document published by Tata McGraw Hill in 2011 as one of the transformational leaders of corporate India.

He was also recognized by Forbes Magazine as a high achiever in 2010. Mr. Bhattacharya is currently the Chairman of Peerless Group Board and also a senior advisor or non-executive independent director of several reputed companies. Besides, he is a director on the board of Colonial Coal International Corporation Canada.

He is also the chairman of the scrutiny committee of the Ministry of Coal. (5:26) So, Mr. Partha Sarathi Bhattacharyya.

We also have Dr. Mihaela Albu.She is a professor of electrical engineering, National University of Science and Technology, Polytechnia, Bucharest, Romania. Mihaela graduated from the Power Engineering Department in the year 1987, the same year as I did my graduation, but she was ranked first nationwide among 800 power engineering graduates, which I was not. Her research interests encompass synchronized measurement for wide area measurement and control systems, smart metering, DC and hybrid microgrids, power quality, and others.She was a Fulbright fellow at Arizona State University in 2002, 2003, and again in 2010. She has been PI of more than 40 research projects funded by national and international research agencies

on measurement in smart grid topics. Dr. Albu is a senior member of IEEE and member of IEEE IMS TC39, instrumentation for the (6:38) power systems.

And then we have Mr. Arup Raha, former Air Chief Marshal who was the 24th chief of the air staff. He retired as the chief of air staff and chairman chiefs of staff committee in December 2016.

He was commissioned into the fighters stream of the IAF in December 1974 after completing training in the National Defence Academy and Air Force Academy. He has to his credit 3,400 hours of flying, mostly on fighter aircraft. He had commanded a MiG-29 squadron and two frontline air bases.

Having served in western and southwestern commands of the army as AOC Advanced HQS, he had contributed in joint operations immensely. He commanded two operational air commands and served as the VCAS before he was appointed as the chief of air staff. He was awarded Param Vishisht Seva Medal, Ati Vishisht Seva Medal, and Bayu Sena Medal by the President of India for his distinguished service.

In the discussion, which will be on the future technology roadmap, how the technology will feature in the coming days, in the coming years, in order to have the development in the society and for humanity.

Professor Amitava Dutta *is presently the Pro-Vice-Chancellor of Jadavpur University. He was a professor in the Department of Power Engineering at Jadavpur University. He graduated in Mechanical Engineering from Jadavpur University and did PhD from IIT Kharagpur. Professor Dutta was a Humboldt Fellow in 2000 and worked at the University of Erlangen-Nuremberg. His research interests include combustion, atomization, energy, thermodynamic modelling and the application of CFD in reacting flows, micro-fluids, and biological flows. Dr Dutta is a Fellow of the Indian National Academy of Engineering in the International Society of Energy Environment and Sustainability and West Bengal Academy of Science and Technology and a recipient of the Outstanding Teacher Award Shiksharatno of the Government of West Bengal. He has served as a Director Internal Quality Assurance Cell at Jadavpur University and held other administrative positions at the University.*

The First Speech at the Panel Discussion on the
"Future Technology Roadmap"

Challenges of Sustainability

Sri Parthasarathi Bhattacharyya
Ex-Chairman, Coal India Ltd.

[We will be discussing the future technology roadmap, and how the technology will feature in the coming days, in the coming years, to have the development in the society and for humanity. We will first invite Mr. Partha Sarathi Bhattacharyya and he will be talking about sustainable energy transition and technology support, which is a key area for the Department of Applied Physics as well. – Dr Taparati Gangopadhyay]

Good afternoon, Ladies and Gentlemen, the distinguished panellists here, distinguished guests in the audience, the alumni, and the students. It is indeed a great delight for me to be here today amongst you. Thanks to Professor Kaushik Das Sharma for inviting me to be here. In fact, I do have a little nice association with the Department of Applied Physics, though unfortunately, I was not a pass out from this institute. I did join after my B.Sc. Honours in 1971, way back, and I was there only for two months but had a very warm group of friends, that friendship with them still continues and some of them are here today. So, it is really a sort of nostalgic feeling to be associated with this celebration a very momentous occasion, I must say. So, with that, let me come to the subject.

Now, the key purpose of technology is to mitigate challenges of sustainability to human societies, how I view it. At least one of the major challenges, the major purpose is to mitigate challenges of sustainability to humans. Now

today, if you look at the challenges that are emerging and challenges that are actually not emerging, they are already there in a very big way.

One of them is global warming, which is leading to climate challenges and this is a major threat to societies globally. We are aware that there has been something like 28 conferences of parties for the last 28 years. Still then, we are grappling with the issue and we are nowhere near the target of achieving tolimit global warming to 1.5 degrees C above pre-industrial levels.

In fact, the last year, 2023 has been one of the highest in terms of emissions, in terms of being warm and if this continues, we are definitely going to miss the target, which is very critical for survival of the human society. This has been further accentuated by the wars, several wars which have started happening and even now are continuing.

In 2015, the UN adopted 17 Sustainability Development Goals (SDG) as the target to be attained by 2030. Where are we? I mean, number one was no poverty. I think we have made many more people poor by having this kind of war.

Very insensible kind of actions that we are taking, we are adopting something, we are doing something. Affordable and clean energy, that is number 7 SDG in the whole list. Reduced inequalities, number 10. Climate action, number 13. And partnership for goals. All these remain very far.

India, I would say, is apparently a better place than most nations in reaching the nationally determined contributions laid out in COP 21 in Paris, in 2015. The target for reduction in emission intensity by 2030, benchmarked to 2005, has been already achieved, and as a result, has been revised upwards. So that's definitely a very welcome solution.

However, India's dependence on fossil fuels will have to rise further. That is the underscore. And continue for a much longer term for the following reasons.

Reason 1, is the per capita energy consumption. It is just at 1250 to 1300 units per person per year. And that is one-third of the world average. One-fifth of China, which is a very comparable country as far as population is concerned. And maybe somewhere around one-eighth to one-tenth of the developed nations. So this has to rise.

As rises, we require energy to be produced in a far, on a faster mode. And what we find today is, this is a CEA study which has happened about two years back. It has clearly identified that even the growth of renewable energy from the current level of somewhere around 170 gigawatts to 500 gigawatts by 2030 will be far short of meeting the incremental energy requirement. And therefore, fossil fuel will have to continue. Coal consumption is hence projected to grow from the current level of 1 billion tons per annum to

somewhere around 1.3 billion tons by 2030. And further to around 1.5 billion tons per annum before it reaches a plateau.

This will make India the lone country to experience such a surge in fossil fuel. In fact, even by that time, China will start declining. But India will continue to rise. So, this is a situation that will not augur well for the country. Because this is likely to expose India to serious headwinds. The world by that time has started moving towards net zero.

Most of the advanced countries will do that. So, there will be a lot of headwinds for India to continue on this particular path. This will require India to turn to appropriate technology to mitigate the situation.

That brings in the requirement for technology support from the Indian perspective. Now, as you know, the net emission is basically A minus B. Where A is the gross emission and B is the absorption of the emissions.

Now, what technology will be required to minimize gross emissions and also maximize the absorption of emissions? Let me come to the second part first. Now, as the power stations keep on using coal and produce emissions and all that, there is definitely a need, felt need for absorption of that emission with some technology.

Now, that will bring us to carbon sequestration and storage or carbon sequestration and usage, and utilization. The technology for that still seems to be in the drawing board stage, not the development stage, and particularly cost-effective technology. That technology has to be available, made available in a cost-effective way.

When we look at that, this is an area where the advanced countries or I mean the developed nations have a big role to play. The call for them to contribute something like 100 billion dollars every year to make such technologies that will make net zero reach faster is becoming more and more important but not much is happening. In COP 28 there was some commitment to create a fund but that amount was, I think it was not even a billion dollars. It was less than that with 4-5 countries promising something. So, we are falling far short of that. And this is something where India will have to depend on the advanced countries for proper technology, and cost-effective technology and then use the same for reducing pollution.

One particular technology, something called FGD, i.e.,Flue-gas desulfurization, has been suggested to contain sulfur dioxide. But that may not be cost-effective. That is actually increasing the tariff of power and possibly better solutions are available.

The second point I would come to is on reducing the gross emissions. That

will require coal to be processed before being used. We are today actually in a very, I would say, a very different situation than the rest of the world. We don't process coal. We use coal on a run-off point basis, just as a point basis. This has to really go.

We have to find out good technologies which are available. It is not that it is not available for washing coal before being used in boilers. Now I must share with you that there have been some very interesting developments in this. One of the coal companies, Mahanadi Coalfields has set up a state-of-the-art modern washery which is for a throughput capacity of 10 million tons per annum. And that is producing washed coal with a yield of something like 85%, not more than 14 to 15% of the effects. It has minimized the use of water because water is recycled there. So that is one. Secondly, the power consumption is moderated, and quite optimized.

Most importantly, analysis of the washed coal in NIAS (National Institute of Advanced Studies), Tata Institute in Bangalore, has clearly shown that the washed coal contains not only less ash but more energy too. We have to address the problems of SO2, NO2 and Phosphorus. All are to be reduced somewhere between 20 to 40%. This will encourage people to use washed coal in a very big way.

But we have to really go fast on that. I must share with you one basic problem that remains. Rather it's a structural problem that comes in the way of going for coal washing in a big way.

As a coal producer, Coal India and its counterparties, the power sector, have been debating for quite some time as to who should bear the washing cost. Now there is no question of bearing the washing cost. The producer should wash as a part of best practice and the price of washed coal should be fixed accordingly taking the cost of washing into account. That is what it should be. When we analyse the trend of price movements with an increase in calorific value, it is a very interesting and illuminating thing to see that for every 1% increase in the gross calorific value, internationally, the price point increases by somewhere around 3% or maybe around 2.8 to 3.2%.

As a result, when you express the price in terms that the user understands, which is not rupees per ton, but rupees per GCal,there is a steady increase in price, even in rupees per GCal terms. And that is what provides the producer sufficient incentive to improve the quality of coal. This is significantly missing in the Indian context. In the Indian context, the power sector is the largest user of coal. So, they have a lot of say in deciding prices. So, Coal India is also a strong producer, but they can't fight the consumer too much. So, it is necessary for the consumer and the producer jointly to decide the price

stream. This happened in 2012, when we moved from useful heat value to gross calorific value-based pricing, the 17 grades, etc., have come.

The rupees per ton prices are such that when you express the price in rupees per Gcal, it is static, it is flat. In the entire range of power-grade coalfrom G9 to G14, 76% of coal is produced. And the power sector is the largest consumer.

In all these grades, the rupees per Gcal price is constant. So, that doesn't leave any incentive for the coal producer to put efforts to invest, and take measures to improve the coal quality. That is one problem on the producer's side.

More significantly or ironically I would say, the consumer has also failed to understand how this affects them. If the coal price at pit-head in rupees per Gcal is a flat straight line, the other components of cost at destination, one is your transport cost, railway transport cost, that's always expressed in rupees per ton. So, literally, the higher the heat value, the lower is the price.

It's a declining curve. Similarly, one of the important components of cess is your GST compensation cess, which is Rs 400 for every ton of coal, whether it is domestic or imported. So, when you translate it to rupees per Gcal, that also will slope down.

So, if you take all three together, the landed price of coal to the power station slows downwards, which means power stations pay a higher price for lower-grade coal and a lower price for higher-grade coal. This is a very perverse kind of situation. I am not sure why the power sector should actually live with this situation.

They had one reason to do that because earlier the rejects were about 20-25% or more. That means for every 100 tons of coal that you wash, the rejects will take away about 20% or 25% and that is actually loss of energy. So, they used to consider that to be a loss.But today, better technologies have come up. So, as a result, I think if we move in this direction, this will actually remove a major bottleneck going for large-scale washing.

May be I will end it within the 10 minutes or 15 minutes, whatever. And I will be happy to answer questions.

Thank you very much.

Partha Sarathi Bhattacharyya *was admitted to the B Tech course in Applied Physics in 1970 but discontinued, and later did an MSc (Physics) from Jadavpur University. He joined Coal India Ltd (CIL) as a Management Trainee in 1977, rose to become its Chairman in 2006, and continued till retirement in Feb 2011. He steered CIL through Miniratna in 2007, Navratna in 2008, and finally Maharatna in 2011 - a unique feat in the career of any PSU CMD*

In Nov 2003, Mr Bhattacharyya took over the reins of Bharat Coking Coal Ltd (BCCL) - a perennially loss-making CIL Subsidiary - as the CMD. In less than two and a half years, the company reported its maiden profit in 2005-06 that sustained. The implementation of the sale of coal through e-auction was first introduced by Mr Bhattacharyya in BCCL and extended later to all over CIL.

Mr. Bhattacharyya is currently the Chairman of the Peerless Group Board and also Senior Advisor or Non-Executive/Independent Director of several reputed companies like Haldia Petrochemicals, etc.

He has authored WHEN COAL TURNED GOLD, published by Penguin in Aug 2018. The Foreword to the book was written by none other than Shri Pranab Mukherjee, Former President of India. The book was chosen as the Editor's Pick among business books in 2018.

The Second Speech at the Panel Discussion on the "Future Technology Roadmap"

How the Power System Technology is Changing under Multiple Energy Vectors

Dr Mihaela Albu

Professor of Electrical Engineering
National University of Science and Technology,
Polytechnic, Bucharest, Romania

Thank you for being here. Thank you, Professor Das Sharma, for enabling me to be here. Well, the title of this international convention for me is interesting and it's related to what technologies will impact the energy system and will shape our world for the next 10 years.

So don't imagine that after my talk you'll go and invest in what I'm speaking about. But my aim is to give some guidelines, from my perspective, where the young graduates and post-graduates should invest their time and efforts if they want to be in line with what is happening in the power system in the next 10 years. As Mr. Bhattacharya already said, one key word is sustainability, and thank you for the presentation before.

In this translation of sustainability in the energy world, we have to solve the issues of energy in multiple energy sectors. So, we will not look separately at electricity, although I grew up as a power engineer in the largest coal-fired power plant in Romania many years ago. So, the issues are not only electricity but how to optimize the use and the generation of other energy sectors, whether those are thermal, renewable, hydrogen, and so on.

Once the issues are identified, the problem, that has to be solved somehow immediately, is to combine and to agree with the models used for so many

years in each separate field. And these models evolve. And just to take an example, it doesn't matter if we will still keep large power plants with generators with large inertia.

It's a fact that we use electricity from sources with finite inertia, which is mechanical inertia. But everything we use today is interfaced with the power converters and this has zero inertia. And then we add the generations, which has also zero inertia because everything is interfaced with power converters.

This means that our models, which were based on minutes or even seconds, power profiles, and control, they have to be revisited. How to revisit the models? Only real-time measurements can help in it which can be made possible only by taking the information from the real systems.

So, one area, that I think, will develop and change actually the power systems for the next 10 years is how we perform the measurements, and of course, how we further process the measurement values. In fact, we base our all knowledge on power systems, unlike in physics, on averages. We speak on average. It's not enough anymore in the new regime.

We have to go down to below one-second time resolution, maybe milliseconds, to perform an optimal control. Now, if I'm speaking about control, another area very much related is that in many applications, differentiating between protection and control and monitoring, as we call it in the control centers, will be much more difficult to do. It will be a kind of mixed.

And we see this mixture together with the invention of the phasor measurement units. This was the first synchronized measurement application for power systems, where this equipment, actually, was initially used for protection systems successfully. Then the standards and everything evolved towards a very good and very useful measurement system.

Now, another area, which I also see as developing very much, is DC technology. I know that Edison was defeated by DC many years ago, but now, fortunately, or unfortunately, most of the generation, most of the storage, and most of the electricity used, doesn't matter if it's computer, communication, or electric vehicles, is basically DC.

It's not mediated DC, it's DC network. But we have no sophisticated measurement system for DC. We have no definitions. Now there are standards to be developed in order to address the new measurement regime.

What does it mean? It's for the past 10 milliseconds, it's for the past one minute. What is the measurement time? What is the reporting time? And so on.

So, related to DC, also another emerging technology, which we might say has been there for some years already, is the vehicle-to-grid.

Let's say vehicle-to-grid technology. So, to use the electricity stored in

the batteries of electric vehicles to help the network, distributional network. Well, we see that this technology, although it was announced by the major producers of the electric cars, if you look at the projects worldwide, there are only a few projects with vehicle-to-grid technology.

And this, in my mind, is really prepared to be done in the next decade. And I will close with something more scientifically related. In order to pursue those achievements, or with this very fast pace of development, that is needed in power systems, will already start to use very much the technique of hardware-in-the-loop, power-in-the-loop simulations, so numerical simulations, which enable to direct link real-time, really real-time, with the to-be-tested device.

One example, as you know, is RTDS, is Opal, is Typhoon. From the last one, just to have an idea, they enable reading the digital inputs every 20, even better than, 20 nanoseconds, and also to perform one step of full simulation below 500 nanoseconds. So, this is what we need in order to answer to a very, very fast-changing power system, at least for the distribution, let's speak on distribution and the voltage, medium voltage port, which is created by us, the users.

Thank you.

Dr Mihaela Albu *is a professor of electrical engineering, graduated (1987) from the Power Engineering Department of the National University of Science and Technology Politehnica Bucharest, Romania, and holds a Ph.D. degree (1998) from the same university. She teaches courses on electrical measurements, signal processing, and Smart Grid topics at both graduate and undergraduate programs of UPB. Her research interests encompass synchronized measurements for wide area measurement and control systems; smart metering; DC and hybrid microgrids; power quality, IEEE and IEC standards in power (including contribution to the IEC TC8/JWG12: System aspects of electrical energy supply-Requirements for frequency measurement used to control DER and loads). Dr Albu was spending a leave at Arizona State University as a Fulbright Fellow 2002 – 2003 and in 2010. She has been P.I. of more than 40 research projects, funded by national and international research agencies, on measurements in smart grid topics. Dr. Albu is a Senior Member of the IEEE and a member of the IEEE IMS TC39, Instrumentation for the Power Systems. Mihaela Albu presented several tutorials at I2MTC (2010-2023) and has been invited to IMS DL (2017-2024) at events in R8 and R10.*

The Third Speech at the Panel Discussion on the
"Future Technology Roadmap"

Artificial intelligence and machine learning and how it is going to affect our lives

Dr Sanghamitra Bandyopadhyay

Director, Indian Statistical Institute

I have been asked to speak on artificial intelligence and machine learning and how it will affect our lives. I don't think anybody needs an explanation about AI because it's everywhere nowadays. And today, we are seeing an AI revolution, a machine learning revolution happening in front of our eyes, lives are changing in unimaginable ways.We had not thought that the changes would happen so fast, so quickly, and it's all-encompassing. So artificial intelligence, as you would all know, is an attempt to make computers intelligent, to think, to make it more human-like, the way we think. And that is how it started way back in the time of Turing. Alan Turing designed a test called the Turing test, which was if a computer passed that Turing test, it would be called intelligent.

So, it would have artificial intelligence. And what was this test? In this test, there was an interrogator who would ask questions in writing, and there was a computer and a human being. Either the computer will respond in writing, of course, or the human being will respond.The interrogator is not able to see who is responding. If at least, it was correct 30% of the time, the computer is believed to fool the interrogator into thinking that the human being has answered, then the computer would be called intelligent. And it has been a really difficult test to pass, not easy.

Some Turing-like tests have been passed, but it has also been a topic of intense criticism as well, the Turing test. But anyhow, it started somewhere sometime in the 1950s when the word artificial intelligence was coined. And then we've seen machine learning emerging.

Machine learning means where the machine can learn. Then, what is the difference? Well, machine learning is a part of artificial intelligence. But what is artificial intelligence is not machine learning. If one can understand that, then it would be easier to understand what is machine learning.

In artificial intelligence, for example, you can have rule-based systems. So, there's a doctor, for example, a doctor who makes an expert system. He says that if the patient has this and this and this conditions, then such and such tests are to be made. And if the result of that test is something, then the conclusion i.e., the diagnosis is the following. And then the medicines to be prescribed are the following. So those are rule-based systems.

The expert system encodes his or her knowledge into the computer. The computer can then, looking at the symptoms, logic it out and can find out rationally what the diagnosis is and what the possible medicines are. So, there is no learning going on here.The machine is not learning anything. That is artificial intelligence. Yes, expert systems were the first, almost, not exactly the first, but almost the first real-life applications of AI.

Then came machine learning. When we teach a child to learn colours, for example, and also the concept of a ball, a round sphere, a ball. We show certain round things and say that this is a ball. And we show, maybe we have shown a red ball and say this is the colour red and this is a ball. And we show a green object, also a green ball. We show that this is colour green and this is a ball. And we show something else, which is coloured blue, which is not a ball. And we teach the child that this is the colour blue.

Now, if we show the child a blue ball, it is not difficult for the child to say this is a blue ball. But remember that the child has never seen a blue ball before. That is where learning is coming in.

So, the child can infer, to deduce in his or her own mind that this is something, a blue ball, but the child has never been shown a blue ball before. That is what machine learning is about, where the machine is shown a set of examples. And from those examples, the machine will infer, will learn certain things.

Suppose it is shown examples of, in numbers of course, several patients who have, several human beings who have a certain type of disease, and several other human beings who do not have that type of disease. And

the computer is asked to distinguish. So, human beings will of course be represented through a set of numbers.

It could be many things. It could be for example, the genetic makeup of that person along with, let us say, the earning of that person, along with the height of the person, the weight of the person, a lot of things that can characterize a human being. So, that is what the computer shows.

The computer then actually can infer. If the computer is also told that this set of human beings has the disease and this set of human beings, let us say, 100 people, each human being is represented by a set of numbers and 100 people have the disease and 100 people do not have the disease. That is also told to the computer. And the computer can figure out through algorithms, which of course a human being writes, whether a person is diseased or not. The qualities like the earnings of the human being, the height of the human being, and the weight of the human being do not matter.

It is not important for this problem of classifying whether this person is diseased or not, but some genetic factors are important and it can figure out what is the difference between those genetic factors between these two populations. One is a diseased population; one is a normal population. And then when a new person walks in, if you give those genetic readings to the computer, for example, if there are two classes, the computer has learned to, learn a decision boundary between these two classes.

Now, if a new person walks in, the computer will look at those genetic markers or those genetic numbers, whichever way you want to see it, and will see which side of the line, these values are lying and will accordingly classify. Of course, the computer will make mistakes. It is not 100% correct, but very often it is found that it is doing a fairly good job of classifying.

So, this is what machine learning is. And now, you can see that neural networks are a very important class of classifiers. Neural networks have been there for ages now. Initially, when the neural network was developed, it was thought that this was going to solve all problems. That was a peak of AI research going on in the 1970s. And then it was realized that the neural network was unable to classify a very simple toy example. So, where the two points, suppose the two points of the same class are here, and the two other points of another class are here. It is unable to do the classification. Then there was a winter of AI research.

But then people overcame that problem. Once you face a problem, you look at it, and then you find solutions to that problem. And then it peaked.

And now, all of you must have heard of something called deep learning. It is essentially a neural network, which is in action. Why we were not able

to do it earlier because we did not have enough computing resources at our disposal. Now, with huge developments in hardware technology, we have computing resources, which are extremely powerful. And therefore, there is this resurgence, and deep learning has shown that it can bring about a huge, significant shift, and significant improvement in classification abilities. But then you must remember, everything comes with a price.

Currently, we are concerned about the global energy crisis due to its environmental impact. In the age of energy crunch, these computers are becoming very power-hungry. They use so much power.There was some study somewhere that it is equivalent to 10 different flights going from one end of the USA to the other end. So, for training such a computer, you have to train a deep learning system with millions and millions of data points, let us say images. You train the system with millions of information, show the system many many millions of images, and say that this is a cat, this is a dog, this is a horse, this is an elephant, and so on.

And then when you show it an image that you do not label, the system will tell you fairly accurately that this has a dog here, a cat there, etc. So, that is possible these days. And the classification performance is quite high, quite impressive.

But the energy that it takes is huge. Therefore, a lot of research is going on these days and in the future will be focused on how to reduce the energy requirements, and how to reduce the computation requirements. And there, many other computing paradigms will also become important in the days to come.

Not only that, but artificial intelligence and machine learning, nowadays, you've heard about something called large language models, and also of generative AI. You are seeing generative AI, where the AI system can generate images, paintings, text, generate poetry, which is not there anywhere. So, it's a new thing that has come up with learning through millions and millions of documents, how people speak, in what language, and what word one uses after another word, through those examples, it has been able to learn.And that is how we are now looking at these large language models. A direct application of it is the Chat GPT which is already in use by people. And it is also scary, the way things are moving.

There is a huge debate worldwide to stop AI research and to first put regulations in place, because now it is possible to see videos of events that have never happened and to listen to statements that have never been made by people. After all, that can be generated and put onto anybody's lips, although, this person has not said anything. This can create chaos, that can

create havoc. And in particular, in populations as large as ours, we have to be extremely careful how we use AI. And it is just like nuclear power.It depends on the hands and the brains that use it. AI will also depend on the hands and the brains that are using it. It can be used for the huge benefit of human beings in health care, agriculture, and many other areas like city planning, in smart grids, for example, anywhere that you can think of, there will be huge applications of AI, and robotics will come in a very big way, even in the ICUs. It is already coming into the hospitals, doing operations, flying flights, but other applications will be there for us to see.

At the same time, we have to be very careful how we use this technology. A lot of regulations have to be put in. And I will conclude on a lighter note.

Just a few weeks back, we were listening to a lecture by a person, who's actually used AI for agriculture. And so, a lot of sensors were put on the trees, it was a big thing that they were doing, a big project. They were supposed to collect a lot of data and then do the AI part, the machine learning part, and the artificial intelligence part to understand when to give what to the tree, etc.

There was an interference at that point in time, because some monkeys got very interested in the sensors that were put there, came and took a look, tasted it, and tried to bite it. So, the system actually collapsed. So, that is something that when mathematicians are doing their theory on paper, do not take into account the real-life problems which happen on the ground.

In one of my lectures, somebody was asking me that AI is doing everything and a lot of jobs are going away. So, what do we train for? I said you train to remove the monkeys.

So, that is what I think, it's on a lighter note, but the skill sets of tomorrow are very difficult to predict today, what will be required, how to train the human mind for the future, but maybe the most important training will be to be able to adapt and to learn whatever comes in. That is the main training that we would have to impart these days to the future generations.

Thank you very much.

Dr Sanghamitra Bandyopadhyay *is an Indian computer scientist specializing in computational biology. A professor at the Indian Statistical Institute, Kolkata, she is a Shanti Swarup Bhatnagar Prize winner in Engineering Science for 2010, Infosys Prize 2017 laureate in the Engineering and Computer Science category, and TWAS Prize winner for Engineering Sciences in 2018. Her research is mainly in the areas of evolutionary computation, pattern recognition, machine learning, and bioinformatics.*

Currently, she is the Director of the Indian Statistical Institute. She is on the Prime Minister's Science, Technology, and Innovation Advisory Council. In 2022, she was given the "Padma Shri" award for Science and Engineering by the Government of India.

Centenary Celebration

Signature of Ecstasy

[Emotions are spontaneous, boundless. The majestic moments of inaugural functions including the 63rd Reunion centering the centenary celebration of Applied Physics gave rise to such natural and impulsive emotions from the alumni folk irrespective of ages. How much can words express the spur of the moment? It is beyond physical storage except in the core of an individuals' heart. Still, we endeavoured (perhaps,not in vain) to organise few of the recollections from the words of messages in Alumni WhatsApp deemed to be the grand record of cheers and nostalgia. We believe these statements of emotions are the other side of recorded reports and elements of oral history – Publication Group]

Note of blessings and wishes

Dr. Malay Kr Sengupta (1950) / 23.01.2024

সকলে যা যা লিখছে ও লিখছেন, আমি সবই আগ্রহের সঙ্গে দেখছি ও খুবই ভালো লাগছে। শারীরিক অক্ষমতার জন্য নিজে আগামীকাল ২৪শে উপস্থিত থাকতে পারলাম না এই যা দুঃখ। তবে, আমার শুভেচ্ছা ও আশীর্বাদ সব ছোট ভাই বোনদের জন্য রইল। বিভাগীয় গ্রন্থাগারে যেসব অমুল্য বই আছে তার কথাও জানলাম। এগুলির সংরক্ষণ এখনই করা দরকার নিঃসন্দেহে। আগামীকালের সভা সর্বতোভাবে সফল হোক এই প্রার্থনা।

Note of blessings and wishes

Prof Manas Kr Joardar (1961) / 24.01.2024

আজ শতবার্ষিকী অনুষ্ঠানের শুভারম্ভ। দীর্ঘদিনের বহু প্রতীক্ষার, বহু পরিশ্রমের সফল ফসল সার্থক হোক, সুন্দরহোক!

Note of best wishes

Debiprasad Ghosh (1974) / 22.01.2024

আমাদের এ মিলনে আমাদের বৈভব শিক্ষা। সমন্বয়ের। অহং-এর প্রাচীর ভাঙ্গার। যাঁরা এ আনন্দ মিলনকেসুষ্ঠু রূপ দিতে অক্লান্ত পরিশ্রম করছেন, তাঁদের সকলের প্রতি ভালোবাসা শ্রদ্ধা জ্ঞাপন করলাম।

বিভাগের প্রতিস্নেহ ও কর্তব্যপূর্ণ বিভাগীয় প্রধান এবং পৌরহিত্যে যিনি অসীম যত্নে দিগদর্শন করছেন তাঁদেরকেও উপযুক্ত সম্মান জানালাম। শুরু হোক আমাদের আন্তরিক প্রচেষ্টা উদ্দিষ্ট যার অ্যাপ্লায়েড ফিজিক্স' এর ক্রমান্বয় পরিবর্ধন।

Heart murmurs in agony

Arundhati Bhattacharyya (1977) / 23.01.24

…I will not be able to make it even on the 28th. I am also eager to meet you all. Maybe next time.

Congratulating

Ratna Bandyopadhyay (1968) / 30.01.2024

Congratulations to the team, organizing committee, and all the past and present volunteers for the incredible success of this (once in a lifetime), Applied Physics of CU Centenary celebration and Reunion. It was a great success!!! With excitement and energy, came to attend this ceremony, definitely, the reminiscences will stay in the rest of my life. I am glad to meet our (Sirs KBD, AKD, SKB, and more senior Alumni, new and a few old friends of (only 4 of our 68 batch) other batches. Proud to be a part of this memorable event. 'When words fail, memories speak'. Cherishing every moment.

Congratulating

Prof Arun Kr Majumdar (1965) / 29.01.24

Congratulations to the team organising the Applied Physics Centenary Celebration. It was a grand success. Many of us who could join the events were impressed by the professional approach. Visit to the Department and meeting our beloved teacher Professor Kanti Dutta, I will cherish for years to come. I am sure our Department will rise to greater heights under the leadership of present teachers and students. All kudos to Professor Kaushik Das Sharma, current Head of the Department.

Taking the pledge

Prabir K Bhattacharyya (1970) / 29.01.2024

The whole gamut of activities of centenary celebrations, conferences, and the reunion has once again made us feel rejuvenated. Connecting with old friends, classmates, and respected teachershas brought back wonderful memories. We now should take a pledge to keep this association alive and carry it forward.

In wait for the next reunion

Anu Bhattacharyya (1970) / 29.01.2024

Thinking of 24th& 28th Jan. What fantastic memories we are carrying with us! Meeting our teachers, seniors, classmates, and all students/volunteers who were present on these days…Would like to thank each of you and wish you good health, success, and prosperity. With these good feelings, shall be waiting for the next reunion in the coming year.

Guru-Pranam

Amalendu Kumar (1973) / 28.01.1924

I had the fortune of being present when Samir Babu was entering the department. Before entering the first thing he did was bend down touch the ground and do Pranam. I was just floored. The first thing I did after he completed his Pranam was to touch SKB 's feet and did my Pranam. Heheld my hand and we escorted him to the office room, a chair was brought, and settled him on the chair.

Guru-Pranam

Amalendu Kumar (1973) / 28.01.1924

I was in 3rd year at that time and KBD taught us only for a few months but left an indelible mark on my life. I cannot forget him. So, I found him and the first thing I told him – Sir, I want to touch your feet. He was reluctant but still, I did my Pranam and exchanged a few ideas. I was immensely pleased that he remembered me and was asking why I was not giving posts of late in the group.

Feelings for teachers

Atish Chakrabarty (1976) / 30.01.2024

It was a momentous day for us to meet SKB Sir and Patranabis Sir who threw a tinge of glitters at our joyous celebration of the centennial. Truly felt the life in full circle seeing our AKD sir, KBD sir. The entire 2-Day Centennial celebration and Reunion made our days. Profoundly overwhelmed and grateful to the committed and dedicated organising team and a special thanks to RNC Sir for mentoring the team.

Elated

Dibyendu Nath (1986) / 30.01.2024

Seek a moment to applaud RNC Sir, Kaushik, Siddhartha-da, Ashish da, our

Debasish, and all the student volunteers for the incredible success of the recent event. The hard work and dedication put into planning and execution truly paid off, and it was evident in every aspect of the show. From the seamless organization to the engaging activities and impressive turnout, it was clear that attention to detail and passion for creating memorable experiences shone through. Not only did the event run smoothly, but the positive feedback and enthusiastic response from attendees further underscored the impact of organized efforts. Bringing people together and creating such a fantastic show is truly commendable.

AKD Sir speaks

Prof Asit K Datta (1963) / 29.01.2014

I think it was great to get a chance to meet Prof Samir Basu after so many years. I last met him at his house some 30 years ago. I was overwhelmed that he could recognise me at the first glance. For this chance I am grateful to Rabin and Kaushik

Ecstatic

Saswati Mukhopadhyay (1977) / 25.01.2024

কালকের অনুষ্ঠান দারুণ হয়েছে। এই WA গ্রুপে সবাই অকুণ্ঠ প্রশংসা ও উচ্ছ্বাস ঢেলে দিয়েছেন। আমিও তাতে শামিল। অর্গানাইজারদের অজস্র ধন্যবাদ ও অভিনন্দন জানাই। সবশেষে 'ভায়োলিন ব্রাদার্স'-এর কথা না বললে কথা অসম্পূর্ণ রয়ে যাবে। ভায়োলিন ব্রাদার্স যেন icing on the cake!! সুরের অপূর্ব মূর্ছনা আমাদের মুগ্ধ করে রেখেছিল। এই সিলেকশান যার, তাঁকে অজস্র ধন্যবাদ।

Lighting on day before Reunion

Sutanu (1985) / 27.01.2024

দারুন লাগছে। ডিপার্টমেন্টের দুর্গাপূজা মনে হচ্ছে... সত্যিই মর্মস্পর্শী আয়োজন।

Reminiscing Lab and Library

PG Shaw (1980) / 29.01.2024

Felt nostalgic in one of the oldest electrical machine labs with revered AKD sir and the heritage technical library of our country

Faculty Member speaks

Prof. Rajarshi Gupta (1995) / 29.01.2024

A perfect start to the centenary celebration with three back-to-back events in 5 days: inauguration, CIEC24, and reunion. My hearty congratulations

to the core team, volunteers, and all attendees. My deepest regards to two mentors, SSG and RNC Sirs, for their guidance. The emotions from all I witnessed yesterday are heart-touching.

Come January

Dwaipayan Bhattacharjee (1998) / 29.01.24

Loved that so many of us could come together. Although we made smaller groups among our batches...we did interact with a lot of seniors and juniors as well. Hope this year's celebration continues and we eagerly await the next event of the centenary year.

Together with son

Debashis Guha (1992) / 28.01.2024

Can't be happier. My Son and myself on the same bench and same classroom. This is a priceless gift to me. Applied Physics is not only an Institution that shaped me into what I am now, but also an Emotion. So many stories … meeting some of my friends after 29 years... the feeling is beggared describable. Thanks to Present Students, Organisers.

Ecstatic

Ashok Punjabi) (1979) / 24.01.2024

Oh, what a beautiful day it was today…. memories came floating by …. nostalgia setting in at every sight of a known face or the feel of the tap of a hand …. ki re Ashok Punjabi na…. that glow of recognition in the eyes …. the excitement of meeting each other after years …. thank you, Dr. Kaushik Das Sharma and the team, for organizing this event. The hard work of the team and the sleepless nights were visible in the precision of the events that unfolded with time …. It all started with the flawless registration process …. the professionalism exhibited in the conducting of the events on the stage and the efficiency of the stage management team …. Kudos to the leaders who have led the teams to make this 100 years celebration a memorable day for all of us …. once again, a standing ovation for the complete team behind this success.

শতবর্ষের স্বাক্ষর

পার্থপ্রিয় দে (১৯৭৭)

দীর্ঘ ২২ বছর কলকাতার বাইরে থাকার পরে কলকাতায় পাকাপাকিভাবে আমাকে চলে আসতে হয় অবসর গ্রহণের সূত্রে। তারপরেই ২০২৩ সালের পুনর্মিলন উৎসবে এসে প্রথম জানতে পারি আমাদের এই সমাগত শতবর্ষের কথা। এই জানাটুকুর মধ্যে দিয়ে অনুভব করি অন্য এক আবেশ। শতবর্ষের ক্ষণতো সব প্রাক্তনীর বা ছাত্র-সম্ভবার জীবনে আসা সম্ভব নয়। কিন্তু আমি হয়তবা সাক্ষী থাকতে চলেছি সেই উদযাপনের। আমাদের প্রিয় শিক্ষক RNC-র প্রাণখোলা আহ্বান ছিল সবার কাছে যোগদান করার জন্য, শতবর্ষের প্রস্তুতিসভায় অংশগ্রহণের জন্য। বহু প্রাক্তনীর মোবাইল ফোনে বারবার পৌঁছে যেতে থাকে তাঁর বার্তা। শুরু হয় আমাদের আসা-যাওয়া, সভা-আলোচনা। অগ্রজ প্রাক্তনী থেকে বিভাগীয় প্রধানসহ সাম্প্রতিক ফ্যাকাল্টি-সদস্যরাও সবার উৎসাহ ছিল প্রাণিত করার মতো। আমার সহ-প্রাক্তনী ও আমাদের অনুজ প্রাক্তনীরা যাঁরা এখন কর্মরত আসতে থাকেন। সর্বোপরি সাম্প্রতিক ছাত্ররাতো ছিলই। ভাবতে আশ্চর্য লাগলেও প্রাক্তন ও বর্তমানের মধ্যে সময়ের ব্যবধান ৫০ কিংবা ৬০ বছর। এমনকি আরও বেশি। আর সেই মিলনের সেতুটি হয়ে উঠল ফলিত পদার্থবিজ্ঞানের ঐতিহ্য ও আধুনিকতাকে ধারণ করে শতবর্ষ উদযাপনের মঞ্চ। তার পায়ে পায়ে একশ' বছরের জার্নি আর লেগাসি।

ব্যক্তিগতভাবে নিজেও কিছুটা দ্বন্দে-ধন্দে ছিলাম এই যজ্ঞে আমার ভূমিকা কী হওয়া উচিৎ। বহুবার আমাদের কার্যকরী সমিতির সভায় যোগদান করতে হয় বাস্তব উপস্থিতিতে কিংবা অনলাইনে। অনেকেই ছিলেন যাঁরা বিদেশ থেকে যোগদান করেন। সাংগঠনিক উদ্যোগ এবং ব্যক্তিগত স্বতঃস্ফূর্ততার মেলবন্ধনে সমৃদ্ধ হয়েছে শতবর্ষের তহবিল। সময় যতই এগিয়ে আসছিল আমরা ক্রমে সকলেই নিশ্চিন্ত হতে থাকি যে এই অনুষ্ঠান বর্ষব্যাপী এই উদযাপন আমরা সম্পন্ন করতে চলেছি। অনুষ্ঠানের উদ্বোধনের দিন ও পুনর্মিলন উৎসবের দিন আমরা অনেকেই মূলত মঞ্চ পরিচালনা ও অনুষ্ঠানের দেখভালের জন্য যুক্ত হই। এছাড়া সাংস্কৃতিক অনুষ্ঠানের জন্য একটা আলাদা দল নিরলস পরিশ্রম করতে থাকে। অবশেষে ঐ দু'টো দিন আমরা সবাই পরিকল্পিত সূচি অনুযায়ী অনুষ্ঠান সম্পন্ন করতে পারি। কিন্তু অনুষ্ঠানের সাড়া ছিল অভূতপূর্ব। পরবর্তী পর্যায়ক্রমে বহু অনুষ্ঠান (event) দীর্ঘ এক বছর ধরে চলতে থাকে। আর সেইসঙ্গে আমরা ঋদ্ধ হতে থাকি অনুষ্ঠানের বর্ষব্যাপী ধারাবাহিকতায়। ব্যক্তিগতভাবে সবচেয়ে বড় ব্যাপার যাদের সঙ্গে বিভিন্ন সময়ে কাজ করার অভিজ্ঞতা আমাকে সমৃদ্ধ করেছে তাঁরাও আমার

উপর বিশ্বাস রাখতে পেরেছেন। প্রতি মুহূর্তের সহযোগিতা মনে রাখার মত। যদিও কর্মক্ষেত্রে বিভিন্ন দল পরিচালনা করার অল্পবিস্তর অভিজ্ঞতা ছিল। কিন্তু এই ক্ষেত্রটা সম্পূর্ণ স্বতন্ত্র। অবশেষে বলতে পারি একালের ছাত্রমহলের সঙ্গে কাজ করতে পেরে আমি খুশি। এরা যে আমার সঙ্গে সাবলীলভাবে মিশতে পেরেছে এটা একটা বড় প্রাপ্তি।

অনেক প্রাক্তনী আজ আর আমাদের মধ্যে নেই। নেই আমাদের সময়ের অনেক শিক্ষক। অনেকে বয়সের প্রকোপে নিয়ন্ত্রিত যাপনের বাধকতায় আসতে পারেননি। তবু মনে ভাবি এ উদযাপনের সার্বিকতায় কোথাও-না-কোথাও তাঁরা ছিলেন মনে– মরমে স্মরণে উত্তরাধিকারে।

Centenary Celebrations

Newspaper Clippings

before inauguration day

আনন্দবাজার ২০ জানুয়ারি ২০২৪

শতবর্ষে পা

■ কলকাতা বিশ্ববিদ্যালয়ের প্রযুক্তি শাখার আদিপর্বে ফলিত পদার্থবিজ্ঞান বিভাগের প্রতিষ্ঠা ১৯২৫ সালে। আগামী ২৪ জানুয়ারি থেকে এই বিভাগ ও তার প্রাক্তনী সমিতির যৌথ উদ্যোগে হতে চলেছে শতবার্ষিকী অনুষ্ঠানমালা। প্রকাশিত হবে স্মরণগ্রন্থ *হানড্রেড ইয়ার্স অব দ্য ডিপার্টমেন্ট অব অ্যাপলায়েড ফিজিক্স*। ব্রিটিশ-ভারতের প্রথম বিশ্ববিদ্যালয়ের প্রযুক্তি বিভাগের ইতিহাস সঙ্কলিত এ বইয়ে, রয়েছে প্রযুক্তিশিক্ষার অতীত থেকে সমকালের নিবিড় বীক্ষণ। কলকাতা বিশ্ববিদ্যালয়ের প্রকাশনায় কুড়িটি মূল্যবান সন্দর্ভ ও প্রাসঙ্গিক তথ্য-সম্বলিত এই গ্রন্থের পরিকল্পনা,

সায়েন্স কলেজে ফলিত পদার্থবিদ্যা বিভাগের শতবর্ষ উদ্‌যাপন

নিজস্ব সংবাদদাতা

শতবর্ষের পথে কলকাতা বিশ্ববিদ্যালয়ের ফলিত পদার্থবিদ্যা বিভাগ। প্রযুক্তি শিক্ষা প্রচলনের অংশ হিসেবে দেশের মধ্যে প্রথম ১৯২৫ সালে রাজাবাজার সায়েন্স কলেজে এই বিভাগ চালু হয়। সেই বিভাগের শতবর্ষ উদ্‌যাপন উপলক্ষে বিভাগ এবং বিভাগের প্রাক্তনী সংসদের যৌথ উদ্যোগে বছরভর বিভিন্ন অনুষ্ঠানের আয়োজন করা হয়েছে। তা শুরু হবে ২৪ জানুয়ারি থেকে।

বর্তমান বিভাগীয় প্রধান কৌশিক দাস শর্মা জানালেন, আশুতোষ মুখোপাধ্যায় বিশ্ববিদ্যালয়ের স্নাতকোত্তর স্তরে এই প্রযুক্তি বিভাগ খুলতে উদ্যোগী হন। কিন্তু ব্রিটিশ ভারতে তৎকালীন সরকারের প্রযুক্তি নিয়ে উচ্চশিক্ষার পঠনপাঠনে উৎসাহ দান ও আর্থিক সাহায্য— কোনওটাই করার ইচ্ছে ছিল না। তবে প্রযুক্তি শিক্ষা যুগের প্রয়োজনেই জরুরি হয়ে পড়েছিল। এই পরিস্থিতিতে আইনজ্ঞ রাসবিহারী ঘোষের মতো কিছু ব্যক্তি এগিয়ে আসেন। রাসবিহারী প্রযুক্তি শিক্ষা ও গবেষণার জন্য ১১ লক্ষ ৪৩ হাজার টাকা দান করেন। বিভাগীয় প্রধান হিসাবে আসেন ফণীন্দ্রনাথ ঘোষ। তিনি ও তাঁর সহকর্মীরা তাঁদের মেধা, চিন্তা ও শ্রম দিয়ে বিভাগটিকে ফলিত বিজ্ঞান ও প্রযুক্তির সেতু হিসাবে তৈরি করেন। কৌশিক বলেন, "শুনতে অবাক লাগলেও সেই সময়ে ফলিত পদার্থবিদ্যা বিষয় হিসাবে পড়ানো হচ্ছে, তা শুধু এই দেশে নয়, পশ্চিমের উন্নত শিক্ষাকেন্দ্রগুলিতেও শোনা যায়নি।"

এইসময় ২০ জানুয়ারি ২০২৪

শতবর্ষে বিভাগ

এই সময়: কলকাতা বিশ্ববিদ্যালয়ে প্রযুক্তি শিক্ষার অংশ হিসেবে ১৯২৫ সালে রাজাবাজার সায়েন্স কলেজে চালু হয় অ্যাপ্লায়েড ফিজিক্স। দেশের মধ্যে প্রথম কোনও বিশ্ববিদ্যালয়ে এই বিভাগ চালু হয়েছিল। তার আসন্ন শতবর্ষ উপলক্ষে আয়োজন করা হয়েছে বছরভর বিভিন্ন অনুষ্ঠানের। ফলিত পদার্থবিদ্যা বিভাগ এবং প্রাক্তনী সংসদের যৌথ উদ্যোগে এই অনুষ্ঠান। বিভাগীয় প্রধান কৌশিক দাস শর্মা জানান, স্যার আশুতোষ কলকাতা বিশ্ববিদ্যালয়ের স্নাতকোত্তর স্তরে এই প্রযুক্তি বিভাগ খোলার উদ্যোগ নেন। বিখ্যাত আইনজ্ঞ স্যার রাসবিহারী ঘোষ ১১ লক্ষ ৪৩ হাজার টাকা দান করেছিলেন। বিভাগীয় প্রধান হিসেবে অধ্যাপক ফণীন্দ্রনাথ ঘোষ দায়িত্ব নেন।

বর্তমান ২০ জানুয়ারি ২০২৪

শতবর্ষের দোরগোড়ায় অ্যাপ্লায়েড ফিজিক্স বিভাগ, অনুষ্ঠান ২৪ জানুয়ারি

নিজস্ব প্রতিনিধি, কলকাতা: ১০০ বছর আগে পাশ্চাত্যের বিশ্ববিদ্যালয়গুলিতেও অ্যাপ্লায়েড ফিজিক্স বা ফলিত পদার্থবিজ্ঞান শাখাটি খুব চেনা ছিল না। সেই ১৯২৫ সালে রাজাবাজার সায়েন্স কলেজে প্রতিষ্ঠিত হয়েছিল বিভাগটি। আইন বিশারদ স্যার রাসবিহারী ঘোষের অর্থানুকূল্যে কলকাতা বিশ্ববিদ্যালয়ে ফলিত পদার্থবিদ্যা এবং ফলিত রসায়নবিদ্যার চর্চা শুরু হয়। তখন বিদ্যুৎ বিপ্লব হচ্ছে বিশ্বে। এদিকে, ব্রিটিশ ভারতের প্রথম বিশ্ববিদ্যালয়ে তা নিয়ে গবেষণার সুযোগ ছিল না। তাই ১১ লক্ষাধিক টাকা অনুদান দিয়ে বিশ্ববিদ্যালয়ে পরিকাঠামো গড়ে তুলতে সাহায্য করেন অধ্যাপক ঘোষ। ২৪ জানুয়ারি শিক্ষক ও প্রাক্তনীদের উদ্যোগে এই বিভাগের শতবর্ষ অনুষ্ঠান শুরু হচ্ছে আলিপুরের ধনধান্যে স্টেডিয়ামে। সারা বছরজুড়েই আয়োজিত হবে বিভিন্ন অনুষ্ঠান। থাকছে টেক-ফেস্ট। শতবর্ষের ইতিহাস দিয়ে একটি স্মরণিকা পুস্তকও প্রকাশ করা হবে।

কলকাতা বিশ্ববিদ্যালয়

আজকাল ২৪ জানুয়ারি ২০২৪

কলকাতা বিশ্ববিদ্যালয়ের ফলিত পদার্থবিদ্যা বিভাগের শতবর্ষ

আজকালের প্রতিবেদন

শতবর্ষে পা রাখতে চলেছে কলকাতা বিশ্ববিদ্যালয়ের ফলিত পদার্থবিদ্যা বিভাগ। তৎকালীন ব্রিটিশ ভারতের প্রথম বিশ্ববিদ্যালয়, কলকাতা বিশ্ববিদ্যালয়ের প্রযুক্তি শাখা শুরুর পর্বে, ১৯২৫ সালে যাত্রা শুরু হয়েছিল এই বিভাগের। বিশ্ববিদ্যালয়ের প্রচলিত বিষয়সমূহের পরিসরের বাইরে গিয়ে ফলিত পদার্থবিদ্যার শিক্ষা ভারতবর্ষে সেই সময় আর কোথাও চালু হয়নি। অবিশ্বাস্য ঠেকলেও, ১৯২৫ সালে পাশ্চাত্যের উন্নত শিক্ষাকেন্দ্রেও বিষয় হিসেবে ফলিত পদার্থবিজ্ঞানের নামটি শোনা যায়নি। সেই বিভাগের শতবর্ষিকীর নানা অনুষ্ঠান আজ, বুধবার ২৪ জানুয়ারি থেকে বিভাগ এবং তার প্রাক্তনী সমিতির যৌথ উদ্যোগে শুরু হচ্ছে। চলবে আগামী একবছর ধরে। এই উপলক্ষে বিশ্ববিদ্যালয়ের পক্ষ থেকে প্রকাশিত হবে প্রযুক্তির স্মৃতি-সত্তা-ভবিষ্যৎ নিয়ে বিপুল আয়তনের শতবর্ষিকী স্মারণিকা— হান্ড্রেড ইয়ার্স অফ দ্য ডিপার্টমেন্ট অফ অ্যাপ্লায়েড ফিজিক্স। আশুতোষ মুখোপাধ্যায় সেই সময় বিশ্ববিদ্যালয়ের স্নাতকোত্তরস্তরে এই বিভাগটি চালু করতে উদ্যোগী হন। রাসবিহারী ঘোষের মতো কিছু ব্যক্তি এগিয়ে আসেন। প্রযুক্তি শিক্ষা ও গবেষণার জন্য তিনি ১১ লক্ষ ৪৩ হাজার টাকা দান করেছিলেন। বিভাগীয় প্রধান হন ফণীন্দ্রনাথ ঘোষ। এই বিভাগের প্রতিষ্ঠাতা তিনিই। বর্তমান বিভাগীয় প্রধান কৌশিক দাশশর্মা জানিয়েছেন, আজ ধনধান্য প্রেক্ষাগৃহে উদ্বোধনী অনুষ্ঠানে থাকবেন শিক্ষা ও প্রযুক্তির সঙ্গে যুক্ত দেশ-বিদেশের বিশিষ্ট বিদ্বজ্জনেরা। বছরব্যাপী চলবে এই মুহূর্তের সবথেকে প্রাসঙ্গিক বিষয়গুলি নিয়ে জাতীয় ও আন্তর্জাতিকস্তরের আলোচনাচক্র, প্রযুক্তি- উৎসব।

Centenary Celebrations

Newspaper Clippings

following inauguration day

আনন্দবাজার ২৫ জানুয়ারি ২০২৪

শতবর্ষ উদ্‌যাপন

কলকাতা বিশ্ববিদ্যালয়ের ফলিত পদার্থবিদ্যা বিভাগের শতবর্ষ উদ্‌যাপনের উদ্বোধনী অনুষ্ঠানে বুধবার দেখা গেল দেশ-বিদেশের বিশিষ্টজনেদের। বিভাগীয় প্রধান কৌশিক দাশশর্মার স্বাগত ভাষণে শুরু হয় অনুষ্ঠান। ধনধান্য প্রেক্ষাগৃহে ওই অনুষ্ঠানে বিশ্ববিদ্যালয়ের অন্তর্বর্তী উপাচার্য শান্তা দত্ত দে-র বক্তৃতায় উঠে আসে, গত ১০০ বছরে স্বদেশ ও বিদেশের প্রযুক্তি-মানচিত্রে এই বিভাগের উজ্জ্বল অবস্থানের কথা। প্রধান অতিথি, ম্যাঞ্চেস্টার বিশ্ববিদ্যালয়ের ইলেকট্রিক্যাল ইঞ্জিনিয়ারিংয়ের অধ্যাপক উচিয়াং ইয়াংয়ের কথায় ছিল এই শহরের প্রতি মুগ্ধতা। সেই সঙ্গে, প্রযুক্তি ও ইঞ্জিনিয়ারিং উদ্ভাবনার ক্ষেত্রে কলকাতা তথা ভারতের বিশেষ অবদানের কথাও। বিশেষ অতিথি ছিলেন ইন্ডিয়ান স্ট্যাটিস্টিক্যাল ইনস্টিটিউটের অধিকর্তা সঙ্ঘমিত্রা বন্দ্যোপাধ্যায়। অন্তর্বর্তী উপাচার্য শতবার্ষিকী স্মরণিকাও প্রকাশ করেন। যাদবপুর বিশ্ববিদ্যালয়ের সহ-উপাচার্য অমিতাভ দত্তের সঞ্চালনায় 'আগামী দিনে প্রযুক্তির সম্ভাব্য যাত্রাপথ' শিরোনামে আলোচনাসভাও ছিল।

এইসময় ২৫ জানুয়ারি ২০২৪

শতবর্ষ ফলিত পদার্থবিদ্যায়

এই সময়: কলকাতা বিশ্ববিদ্যালয়ের অ্যাপ্লায়েড ফিজিক্স বিভাগের যাত্রা শুরু ১৯২৫-এ রাজাবাজার সায়েন্স কলেজে। বিশ্ববিদ্যালয়ের প্রতিষ্ঠা দিবসে, বুধবার 'ধনধান্য' প্রেক্ষাগৃহে দেশ-বিদেশের শিক্ষা জগতের মানুষের উপস্থিতিতে বিভাগের শতবর্ষ উদ্‌যাপন অনুষ্ঠান হলো। ভারপ্রাপ্ত উপাচার্য শান্তা দত্ত গত ১০০ বছরে স্বদেশ ও বিদেশের প্রযুক্তি-মানচিত্রে এই বিভাগের অবস্থানের কথা বলেন। অনুষ্ঠানে বিশেষ অতিথি ছিলেন ইন্ডিয়ান স্ট্যাটিসটিক্যাল ইনস্টিটিউটের অধিকর্তা সঙ্ঘমিত্রা বন্দ্যোপাধ্যায়। প্রধান অতিথি ছিলেন ম্যাঞ্চেস্টার বিশ্ববিদ্যালয়ের ইলেকট্রিক্যাল ইঞ্জিনিয়ারিংয়ের অধ্যাপক উচিয়াং ইয়াং। তিনি প্রযুক্তি ও ইঞ্জিনিয়ারিং উদ্ভাবনার ক্ষেত্রে কলকাতা তথা ভারতের বিশেষ অবদানের উল্লেখ করেন।

বর্তমান ২৫ জানুয়ারি ২০২৪

সাড়ম্বরে পালিত অ্যাপ্লায়েড ফিজিক্স বিভাগের শতবার্ষিকী

নিজস্ব প্রতিনিধি, কলকাতা: প্রতিষ্ঠা দিবসের অনুষ্ঠানে রাজ্যপালের আগমন। আর তা নিয়ে বুধবার উত্তপ্ত হয়ে উঠল কলকাতা বিশ্ববিদ্যালয়ের কলেজ স্ট্রিট ক্যাম্পাস। এদিন অন্তর্বর্তীকালীন উপাচার্য শান্তা দত্তের উদ্যোগে এই অনুষ্ঠানের আয়োজন করা হয়েছিল। সেখানে তোলা হয় বিশ্ববিদ্যালয়ের ফ্ল্যাগ। সবকিছু ঠিকঠাকই চলছিল। তবে রাজ্যপাল ঢুকতেই অন্য চেহারা নেয় ক্যাম্পাস। টিএমসিপি এবং ডিএসও সমর্থক ছাত্রছাত্রীদের দল রাজ্যপালকে কালো পতাকা দেখায়। পুলিস সঙ্গে সঙ্গে পতাকাগুলি সরিয়ে দেয়। তবে রাজ্যপালের গাড়ি বেশ কিছুক্ষণ ঘেরাও করা ছিল। রাজ্যপাল এদিন বাংলাতেই নিজের বক্তব্য রাখেন। বলেন, '১০ কোটি রাজ্যবাসীর জন্য আমি দুর্নীতির বিরুদ্ধে লড়াই চালিয়ে যাব।'

এই বিষয়ে টিএমসিপির বক্তব্য, রাজ্যপালের জন্যই বিশ্ববিদ্যালয়ে স্থায়ী নিয়োগ হচ্ছে না। হতাশ হয়ে পড়ছে কলকাতা বিশ্ববিদ্যালয়। সেই কারণেই তাঁকে কালো পতাকা দেখানোর সিদ্ধান্ত নেওয়া হয়েছিল। ডিএসও এই অভিযোগের সঙ্গে যোগ করে, জাতীয় শিক্ষানীতি বাতিলের দাবিকেও। শিক্ষকরাও রাজ্যপালকে তাঁর দায়িত্বের কথা মনে করিয়ে দেন এদিন। শিক্ষক সমিতি কুটার সাধারণ সম্পাদক সনাতন চট্টোপাধ্যায় বলেন, 'আচার্য আসার ফলে আমরা খুশি। আশা করব, তিনি শিক্ষক নিয়োগ, পদোন্নতি এবং অন্যান্য অ্যাকাডেমিক সমস্যাগুলির সমাধানেও উদ্যোগী হবেন।'

এদিকে এদিন বিশ্ববিদ্যালয়ের ফলিত পদার্থবিদ্যা বা অ্যাপ্লায়েড ফিজিক্স বিভাগের শতবর্ষের সূচনা অনুষ্ঠান ছিল। ধনধান্যে স্টেডিয়ামে এই উপলক্ষ্যে উপস্থিত ছিলেন দেশবিদেশের নামী অধ্যাপকরা। প্রধান অতিথি হিসেবে উপস্থিত ম্যাঞ্চেস্টার বিশ্ববিদ্যালয়ের ইলেকট্রিক্যাল ইঞ্জিনিয়ারিংয়ের অধ্যাপক উকিয়াং ইয়াঙের গলায় ছিল শহর নিয়ে মুগ্ধতা। তিনি বিশ্বের প্রযুক্তি ও ইঞ্জিনিয়ারিং বিভাগের উদ্ভাবনী ক্ষেত্রে কলকাতা তথা ভারতের অবদানের কথা স্বীকার করেন। ইন্ডিয়ান স্ট্যাটিস্টিকাল ইনস্টিটিউটের অধিকর্তা তথা পদ্মশ্রী প্রাপক বিজ্ঞানী সঙ্ঘমিত্রা বন্দ্যোপাধ্যায় বায়ো ইনফরম্যাটিক্স ও মেশিন লার্নিংয়ের আধুনিকতার প্রেক্ষাপটে বিজ্ঞান ও প্রযুক্তির সমন্বয়ের কথা তুলে ধরেন। বুখারেস্ট বিশ্ববিদ্যালয়ের ইলেকট্রিক্যাল ইঞ্জিনিয়ারিংয়ের অধ্যাপিকা মিহেলা আলবু, অসম বিশ্ববিদ্যালয়ের আচার্য তথা প্রাক্তন বায়ুসেনা প্রধান অরূপ রাহা, কোল ইন্ডিয়ার প্রাক্তন চেয়ারম্যান পার্থসারথি ভট্টাচার্য চতুর্থ শিল্পবিপ্লবের প্রেক্ষিতে মানুষের আশা-আশঙ্কার দিকগুলি নিয়ে আলোচনা করেন। এই আলোচনা সভার সঞ্চালক ছিলেন যাদবপুর বিশ্ববিদ্যালয়ের সহ-উপাচার্য অমিতাভ দত্ত। প্রকাশিত হয় বিভাগীয় স্মরণিকা 'হান্ড্রেড ইয়ার্স অব দ্য ডিপার্টমেন্ট অব অ্যাপ্লায়েড ফিজিক্স'।

TOI : 25 Jan 2024

CU's applied physics dept, country's oldest tech edu wing, celebrates 100 yrs

DipawaliMitra@timesgroup.com

Kolkata: The applied physics department of Calcutta University—oldest technology department in the country—kicked off its four-day celebration on Wednesday to mark 100 years of the department's illustrious journey with panel discussion, release of the commemorative volume and a cultural programme at Dhono Dhanya Auditorium.

The department also has year-long plans to celebrate the occasion with tech fest, reaching out to the community, interaction with industry and international conferences. A reunion is also scheduled on Sunday.

The history of the department dates back to 1925 when the two-year master's programme in applied physics was started in the premises of Rajabazar Science College. "It may sound unbelievable but in 1925 the subject name of Applied Physics was unheard of even in the advanced educational centres of the West," said HoD Kaushik Das Sharma, adding that the first batch only had three students.

Sir Asutosh Mookerjee was the man behind the idea of opening the technology department at the postgraduate level as he felt that modern technology education was a need of the time in the country, especially in the dawn of 20th century, when electricity and modern communication technology were on the way to development.

"The famous jurist Sir Rash Behari Ghose donated Rs 11.43 lakh in 1919 for the purpose of technological instruction and research. In 1920, the Senate in its meeting accepted the donation and the then VC Sir NR Sircar and the president of the councils of post-graduate studies in arts and science Sir Asutosh Mookerjee resolved to give shape to the department of applied physics. Professor Phanindra Nath Ghosh became the first head of the department and he along with his colleagues cherished the department as a bridge between science and technology," said Das Sharma.

Ghosh went to Germany and other European countries to get in touch with technological advancement in the western world. After his return, the MSc programme was started in 1925. Some of the notable teachers of the department were Ananta Kumar Sengupta, Purna Chandra Mohanti, Asok Mukhopadhyay, Monaranjan De, Subodh Som, Anish Deb, T K Mitra, among others. On Wednesday, eminent scholars from home and abroad delivered talks. The special guest was Indian Statistical Institute (ISI) director Sanghamitra Bandopadhyay and the chief guest was professor Wuqiang Yang from The University of Manchester, UK. Officiating CU VC Santa Datta attended the programme. A panel discussion on "Future Technology Road Map" was also held with JU pro-VC Amitava Datta as moderator and other speakers included chancellor of Assam University, Silchar Arup Raha, rector Sanghamitra Bandopadhyay, professor Mihaela Albu of Politehnica University of Bucharest, Romania and Partha Sarathi Bhattacharyya, chairman of Less Finance.

ASUTOSH MOOKERJEE, THE MAN BEHIND THE IDEA

- **1925:** 2-year master's course in Applied Physics started at Rajabazar Science College
- **First batch strength:** 3 students
- **1st HoD:** Phanindra Nath Ghosh
- **Notable teachers:** Ananta Kumar Sengupta, Purna Chandra Mohanti, Asok Mukhopadhyay, Monaranjan De, Subodh Som, Anish Deb

A commemorative volume on the department's 100 years journey being released by HoD Kaushik Das Sharma, officiating VC Santa Datta, and registrar Debasis Das

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Reports

Centenary Celebration of the Department of Applied Physics

বছরভ'র অনুষ্ঠানের কিছু প্রতিবেদন

Centenary Celebration of Department of Applied Physics
3rd International Conference

Control, Instrumentation, Energy & Communication (CIEC)

25-27 January 2024
Dhano Dhanyo Auditorium

Report by Professor Rajarshi Gupta &
Professor Kaushik Das Sharma (Faculty Members)

Department of Applied Physics, University of Calcutta organised their flagship event, International Conference on Control, Instrumentation, Energy & Communication (CIEC) during January 25-27, 2024 at Kolkata. The earlier two versions were organized in 2014 and 2016. CIEC24was jointly organized by IEEE Joint CSS-IMS Kolkata Chapter and Department of Applied Physics under the auspices of centenary celebration of the department. Since the first version, CIEC24 has been a premier event in eastern India, and has attracted a wide research community working in the area of electrical and electronic science. The event is organized under the five major tracks, namely:

(a) Control & Automation,
(b) Instrumentation & Measurement,
(c) Power & Energy Systems,
(d) Communication & Networking, and
(e) Computational Intelligence Applications.

This 3-day conference was also supported by a number of professional bodies from Kolkata like IEEE Signal Processing Society, IEEE Industrial Applications Society, IEEE Power & Energy Society, IEEE Circuits & Systems Society, and IETNetwork. Apart from research paper presentations, CIEC24showcased keynote/plenary lectures by leading academicians like Professor Wuqiang Yang, FIEEE, The Manchester University who inaugurated

the conference and presented his Keynote speech on "Electrical capacitance tomography and industrial applications" on 25th January 2024. Professor Mihaela Albu, Politehnica University of Bucharest, Romania, delivered her plenary speech on "Measurements for Emerging Low inertia Power Systems" on 26th January 2024. Professor Boby George, IIT, Chennai, India delivered his plenary speech on "Sensor Interfacing and Latest Trends" on 27th January 2024.

Keynote Lecture : Prof. Wuqiang Yang

Plenary Lecture: Prof. Mihaela Albu

The wide diversity of events under CIEC24 also included five lectures from industry experts on emerging topics like future of Green Energy, new age transportation systems, impact of artificial intelligence on society. Mr. Rabi Chowdhury, Managing Director, CESC Ltd., Mr. Chanchal Chakraborty, Managing Director and CEO of ATM Towers India, Mr. Sekhar Sanyal, Director, ITE India Services Pvt. Ltd., Mr. Ranjan Ghosh, Ex-Executive Director, GAIL India Ltd., Mr. Chiranjib Bhowmik, General Manager, Haldia Energy Limited shared their valuable insight into the current industrial scenario and also discussed on the importance of industry-academia partnership for shaping the future technologies.

Sponsors' Zone

Sponsors' session was represented by eminent PSUs like Indian Oil Corporation, Damodar Valley Corporation. From Corporates, senior executives like Mr. P. S. Choubey, Sales Director, HAIP, Hollysys Automation, Mr. Abhijit Maitra, Armatrics Applications and Dr. Anup Kumar Mandal, Managing Director, Digital Communication & Control India Pvt. Ltdcame

forward. We got presentations on new age engineering products and solutions, and industry sessions from leading experts.

To attract young minds, CIEC24 showcased a poster presentation, named "Innovision 2024", on emerging issues like (a) Smart Health Monitoring Applications; (b) Smart Transportation including e-vehicles; (c) Smart Agriculture; (d) Role of ICT in Rural Education; (e) Security and Surveillance Applications; (f) Energy Saving and Smart Home Applications; (g) Robotics-based Assistive Technologies; and (h) Waste Management and Pollution Control.

Distinguished academicians like, Professor Amitava Chatterjee, Jadavpur University, Professor Rajib Bandyopadhyay, Jadavpur University, Professor Debasis Chatterjee, Jadavpur University, Professor Samarjit Sengupta, University of Calcutta, Professor Madhubanti Maitra, Jadavpur University, Professor Rabindra Nath Bera, Sikkim Manipal University, Professor Sugata Munshi, Jadavpur University, Professor Swapan Kumar Goswami, Jadavpur University, Professor Subir Kumar Sarkar, Jadavpur University, Professor Joyanta Kumar Roy, System Advance Control, Kolkata, Professor Amlan Chakrabarti, AKCSIT, University of Calcutta, Professor Anindita Sengupta, IIEST Shibpur chaired different sessions and honoured us with their presence.

The Session Chair Prof. Joyanta Kr Roy with team of Presenters

CIEC24 received 242 initial submissions, and after a rigorous double blind peer review process, only 75 papers were finally selected for oral presentation over 10 technical sessions. More than 130 reviewers from India and abroad volunteered in the peer review process. The selection of the papers was solely based on quality and relevant to the conference theme. The CD proceedings

was published with ISB N979-8-3503-1369-7, provided by IEEE.The presented paper sare available at IEEEX plore Digital Library with ISBN 979-8-3503-1370-3. There was zero 'No Show' in this conference.

Paper Presentation

The Applied Physics Alumni Association (APAA) extended their hands for successful event planning and smooth execution.

Centenary Celebration of the Department of Applied Physics

Industry Symposium

Emerging Technologies in Instrumentation and Automation

25 February 2024

Dhano Dhanyo Auditorium

[*Report by* Debasish Ghosh (1986), *President-Elect ISA-Kolkata*]

As a part of the Centenary Celebration program of the Department, an Industry Symposium on "Emerging Technologies in Instrumentation & Automation" was jointly organized by the Department of Applied Physics, University of Calcutta, and International Society of Automation (ISA), Kolkata Section in collaboration with Applied Physics Alumni Association, at Dhono Dhanyo Auditorium, on 25th February 2024. Dr Chandrima Roy was the anchor of the event.

Session – I: Inaugural Session

The inauguration was done by Prof. Kaushik Das Sharma, HOD, Applied Physics Department, Mr. Debasis Banerjee, MD, CESC Ltd., Emeritus

Professor Dipak Chandra Patranabis, and Mr. Debabrata Sarkar, President, ISA Kolkata.

Head of the Department of Applied Physics Prof. Kaushik Das Sharma in his welcome address spoke about the background of setting up of the Department under the University of Calcutta, in colonial India in 1925, by the founder Prof. P. N. Ghosh, with the patronage of the then Vice-chancellor Sir Asutosh Mukhopadhyay and eminent lawyer Sir Rashbehary Ghosh. He briefly described the glorious journey of the Applied Physics Department over the last one hundred years, and emphasized on importance of Industry–Institution interactions like this program.

President of ISA Kolkata Section Mr. Debabrata Sarkar in his welcome address, talked about the mission and vision of the International Society of Automation as the global professional body of Instrumentation & Automation engineers. He thanked the honourable delegates from the Industry for joining this program on a Sunday, after a busy week of professional engagement.

Emeritus Professor. Dipak Chandra Patranabis in his inaugural speech shared with the audience his decades of experience, initially as an engineer in Damodar Valley Corporation and Guest Keen Williams, and thereafter as an academician and Department head in Jadavpur University. He called upon the technologists of today to face the challenges of emerging technologies with a holistic view of industrial and social development.

Chief Guest Mr. Debasis Banerjee, MD, Distribution – CESC Ltd. in his keynote address talked about the benefits already obtained by adopting Digital transformation in the industry, and how it has helped restore power supply within a very short time during drastic natural disasters, through remote monitoring and troubleshooting, that enabled experts from a central location to guide maintenance personnel spread over a wide region. He emphasized the significance of Industry-University partnerships in the areas of emerging technologies like Artificial Intelligence and Machine learning.

Tea breaks and Stall visits followed.

Sponsors of the program SIEMENS, EIP, YOKOGAWA, and VTPL put up stalls where the delegates interacted with them regarding their products and services. ISA Kolkata Section also put up a stall demonstrating its functions/ membership benefits etc. Several delegates showed interest and some of them became members on the spot.

Session – II: Technical Session

Prof. Rajarshi Gupta elaborated on the undergraduate and postgraduate

courses as well as research activities conducted in the Department of Applied Physics. He also talked about the present faculty and their professional activities in IEEE, IET, IOP Science, APSIPA, and various events organized by the Department in collaboration with such professional bodies.

Mr. Abhijeet Banerjee, Head - of Business Development, Siemens Ltd. presented various applications and solutions developed by SIEMENS in the field of recent technological advancements, such as Industrial Copilot (AI-based solution for writing Automation code in natural language), Software Controller (where a crash in Windows operating system will not affect the control function), FDE Gateway (Field Data Enablement that provides field data directly to IT level or Cloud, without diversions via OT), Industrial Edge (that centrally manage connected devices and software across machines, lines, and plants), etc.

Dr. Abhishek Goel, Director-EIP Enviro Level Controls presented EIP products, such as ULM 3D-5: 5 beam 3D Radar level transmitter; Nucleonic density and level measurement solutions using Na22 isotopes (that does not require any radiation license); ULFM: open channel Flume flow transmitter, etc.

Mr. Ananda Jana, AVP – Sasken Technologies presented their solutions for the Automotive industry, that cater to Autonomous Vehicle; Vehicle personalization based on AI, Big data and Analytics; In-car Digital assistant; 5G Telematics; and Smart Mobility.

Session – III: Technical Session

Prof. Rajib Bandyopadhyay of Jadavpur University, past President of ISA Kolkata Section, spoke about the History of ISA, founded by Mr. Richard Rimbach in 1945 as "Instrument Society of America" in Pittsburgh, Pennsylvania.

Later it was transformed into "The Instrumentation, Systems and Automation Society", and thereafter grew all over the world as "The International Society of Automation" a global automation community. Prof. Bandyopadhyay elaborated on membership benefits of ISA, such as access to Standards, professional networking, career development opportunities, etc.

Mr. J. Jayshankar of Yokogawa India Limited presented Yokogawa's Cyber security solution – OpreX IT / OT Security Operations Center (SOC), which uses predictive AI and machine learning technology, provides a proactive model, integrating IT and OT security centers for a singular, real-time view, operates as a centralized managed service to monitor and protect the availability and integrity of business-critical systems for a fault-free operation, yet provide proper network segmentation between IT and OT environments.

The live demonstration on behalf of Yokogawa on their laser-based gas analyzer was a special attraction of the event.

Mr. Soham Mitra of VareliTecnacPvt. Ltd. (VTPL) presented VTPL's Digital transformation solutions such as V-Lock: IOT based Vehicle fleet security and logistics optimization, V-Asset: Asset management system with tracking, optimized asset utilization and proactive maintenance, V-Commute: Cloud-based solution to manage workforce attendance, tracking, reimbursement with a customer-centric approach, IIOT solutions: PLC based precision control, remote accessibility, data security, predictive maintenance.

Mr. Somvendra Dubey, Chief Eng. Mgr, Larsen &Toubro Ltd. discussed the latest practices in Engineering & Construction adopted by L&T, using the AVEVA E3D software platform that has facilitated data-centric, multi-discipline 3D engineering.

Valedictory Session

Quiz & Lucky Draw was conducted by Mr. Debasish Ghosh, Technical Director–Dastur, an alumnus of the Applied Physics Department, and Dr Chandrima Roy, anchor of the event.

At the end, Mr. Siddhartha Pal, Secretary of the Applied Physics Alumni Association delivered the Vote of Thanks on behalf of the Department of Applied Physics and ISA-Kolkata Section – quoted more or less in its entirety as follows (in italics):

"I extend a hearty vote of thanks to our chief guest Mr. Debasish Banerjee, MD, CESC who spared time from his busy schedule to grace the occasion. Today we had an opportunity to hear his thoughts and this will surely be going to encourage us in the future.

Respectful pranam to sir -Prof Dipak Chandra Partranabis, an alumnus of Applied Physics, a father-like-figure in the Instrumentation in our country, also honoured as a life member of ISA for his gracious presence on the occasion as a special guest.

Sincere thanks to honourable HOD, Department of Applied Physics Prof. Kaushik Das Sharma, and President of ISA – Kolkata section Mr. Debabrata Sarkar.

I convey my thanks to Dr Rajarshi Gupta, Dept of Applied Physics, CU & Prof. Rajib Bandyopadhyay, JU & ISA for informing us of the activities of the Dept of Applied Physics and ISA Kolkata Section.

Dear speakers, we are so grateful for your time and effort in speaking at our event. Your words were inspiring and your presence was invaluable. Thank you for taking the time to be with us.

I also convey thanks to the Invited speakers Mr. Ananda Jana, AVP, Sasken Technology & Mr. Somvendra Dubey, Chief Eng Mgr, Larsen & Toubro, Symposium Sponsors and their speakers Mr. Abhijit Banerjee from Siemens, Dr Abhishek Goyal

from EIP Enviro Level Controls, Mr. J.Jayshankar from Yokogawa India Ltd and Mr. Soham Mitra from VareliTecnacPvt. Ltd (VTPL).

We are also grateful to Dhono Dhanyo Auditorium authority & staff, Kolkata Police & Kolkata Municipal Corporation, M/S King Decorator & M/S Queen Caterer, Kolkata, Ananda Bazar Patrika & Times of India, Indian Watch Co. our memento supplier, Centenary Gold Sponsor Indian Oil Corp. Ltd., Centenary Silver Sponsors Ramkrishna Forging Pvt Ltd & Institute of Engineering & Technology, Centenary Bronze Sponsor Gas Authority of India Ltd., Centenary Hospitality Sponsor Damodar Vally Corp., Members of ISA Kolkata section, Faculty and Staff Members of the Applied Physics Department, CU, Campus Secretary, Dear Students, Volunteers of CU & JU and Alumni members of Applied Physics, CU, to all the industry professionals for attending the symposium, and our anchor Dr Chandrima Roy for setting and maintaining the right tune of the event."

This report will remain incomplete without special mention of the student volunteers of the Department of Applied Physics & JU who deserve high appreciation for their meticulous and disciplined work in all areas like registration desk, stage & auditorium management, food management, etc. Their effort was flawless. And last, but not least the lunch was delicious with items like Chicken Wanton Soup, Vetki Fish Munia, Kadai Chicken, Hot Gulab Jamun, etc, and of course, the hot Mini Samosa at the end of the Hi-Tea session was too tasty.

Organized by
Department of Applied Physics
&
IEEE Joint CSS-IMS Kolkata Chapter
27 April 2024

Personalized Wearable Robotics:

A Human-Centric Adaptation Framework for Assistance and Rehabilitation

By Samer Mohammed
Professor, University of Paris-Est Creteil, France

[The video recording of the lecture could not be done]

Centenary Celebration of the Department of Applied Physics

A joint effort of the Central Blood Bank and
the Department of Applied Physics

Blood Donation Camp

3 May 2024

Applied Physics Department

[Report by Satyaban Roy (1975)]

Last May 3rd. Outside, it might be forty-three degrees that day. Inside, the temperature in the camp room had to be kept tolerable with the help of an air-conditioner - in the hall on the ground floor. As part of the year-long centenary celebrations of the department, the Central Blood Bank in Maniktala and the Department of Applied Physics jointly organized a blood donation camp from 11 am by the clock. There was also representation from the department's alumni association. People including doctors and technicians of the blood bank had already reached with all the equipment. Director Dr. Soren arrived shortly. In fact, after an address by the HOD towards the formal inauguration of the blood donation camp, the central blood bank director gave the introductory speech. Many things we know and do not know about

blood donation or forget were revealed in his valuable words. On behalf of the Alumni Association, Dr. Anup Mondal gave the necessary message about this arrangement in two or four sentences.

The call for blood donation was limited to the departments within the RashbehariPrangan, including applied physics. There was a total of 31 blood donors. 17 from Applied Physics and 14 from the rest of the departments. Among the blood donors of our department were students, teachers, librarians, non-teaching staff, and others. The number of donors was less than expected due to the sudden announcement of the university's summer vacation and the unbearable heatwave. Director Dr. Soren requested that the camp be held again after the summer vacation of the university. Every season, the supply of blood remains very meager on this hot day. Therefore, the blood donation of these 31 people was also a great achievement for them. The blood donation phase ended at 2:30 pm. All the ancillary activities go very smoothly. There were healthy food packets for blood donors, organizers, guests, and everyone present.

Report of the Physiyantrix '24

Jointly Organized by the Department of Applied Physics &
Applied Physics Alumni Association (APAA)
7 & 8th September 2024

The Department of Applied Physics, University of Calcutta, in collaboration with its alumni, is excited to host the tech fest, Physiyantrix'24, for the first time on September 7th and 8th, 2024, at the Department of Applied Physics. This technological fest is organized as a part of the Centenary Celebration, showcasing cutting-edge technology and brilliant engineering. Events conducted include PES Prodigy, Hack-O-Mania, Shutter Symphony, War of Words, Mind Mantra, Think Tank, Robo Navigation, and Robo Soccer, featuring competitions in gaming, coding, photography, debating, quizzing, entrepreneurship, and robotics. Both UG and PG students are eligible to participate. The total prize money for the winners of the events was INR 1,80,000.

This is the first time that such an event has been organized by the students, faculty, and alumni members. It's a matter of pride and gratitude for everyone who witnessed the event's evolution from a concept to a successful

reality. It was an instance of outstanding teamwork and commitment shown by everyone involved.

Event Details

Robo Soccer: Unleash your inner engineer as robots play soccer, and engage in thrilling battles. Join us for a showcase of robotics excellence.

Robo Navigation: Robots navigate through extremely challenging paths. play soccer, and engage in thrilling battles.

PES Prodigy: Compete in our premier Pro Evolution Soccer mobile gaming event. Showcase your soccer skills and face off against the best.

Hack-O-Mania: Unleash your coding prowess in this electrifying hackathon. Collaborate, innovate, and tackle challenges to create the next big tech breakthrough.

Shutter Symphony: Immerse yourself in photography and exhibit your talent in this captivating competition.

War of Words: Engage in fierce debates and showcase your eloquence in this ultimate clash of perspectives.

Mind Mantra: Test your knowledge in challenging quizzes and demonstrate your engineering expertise in this competition!

Think Tank: Pitch your innovative business ideas and witness creativity collide as aspiring entrepreneurs seek recognition and support.

Report - Hack-O-Mania

"Hack-o-mania", an exhilarating coding event held under the first-ever tech fest "Physiyantrix'24." This dynamic event brought together tech enthusiasts, aspiring developers, and seasoned coders for a day of intense problem-solving and collaborative ingenuity.

Hack-o-mania was not just a coding competition but a celebration of technological prowess and a platform for participants to showcase their skills. As part of Physiyantrix'24, a prominent tech-fest known for its focus on cutting-edge technologies and futuristic solutions, Hack-o-mania aimed to challenge participants with real-world problems, pushing the boundaries of their coding abilities and creative thinking.

Hack-o-mania featured a rigorous and engaging format consisting of three challenging rounds, designed to test the coding skills and problem-solving abilities of the participants. Out of 31 registered participants, 20 attended the event, each bringing their unique expertise and enthusiasm. The competition commenced promptly at 10:45 AM and concluded at 3:45 PM, creating a high-intensity environment where time management and precision were crucial. The event culminated in the recognition of outstanding talent, with one participant emerging as the winner and two others securing runner-up positions. The structured format and competitive spirit of Hack-o-mania not only highlighted individual brilliance but also fostered a collaborative and inspiring atmosphere throughout the Tech Fest.

The winner of the event was Timothy Utsab Bandyopadhyay of the RCC Institute of Information Technology. The first and the second runners-up were Aftab Alam and Anas Nayeem respectively, both belonging to the University of Calcutta.

[Report Prepared by Trisha Chatterjee, M. Tech in Electrical Engineering, Part Time, 5th Sem & Head Coordinator, Physiyantrix'24]

Report - Robo Soccer

The Microprocessor Lab on the 2nd floor of the Department of Applied Physics at the University of Calcutta transformed into a battleground of innovation and technology as "Robo Soccer" made its thrilling debut during the inaugural Physiyantrix'24 tech fest. This highly anticipated event attracted approximately 40 passionate participants from 10 diverse teams, each eager to demonstrate their engineering prowess, creativity, and programming skills in a competitive robotic soccer showdown.

The excitement kicked off on September 7, running from 10:45 AM to 4 PM, and continued the next day from 10:30 AM to 12 PM. Participants received a detailed game schedule a day before the event, ensuring they were well-prepared for the challenges ahead. The schedule was also displayed on a whiteboard at the venue, creating an atmosphere of anticipation as teams strategized for their matches.

"Robo Soccer" featured a meticulously structured format that included two intense knockout rounds, a league round, and a high-stakes final match. Teams were tasked with building and programming their robots to navigate the soccer field, score goals, and outmanoeuvre their opponents—all while

adhering to a set of established rules. The thrill of competition was palpable as teams showcased their robots' capabilities, from speed and agility to precision and strategic manoeuvring.

Participants qualified for the final round based on their performance in the preliminary matches, with the top goal-scoring teams advancing to compete for the championship. The stakes were elevated by enticing cash prizes, with the winning team walking away with 20,000 INR and the runners-up receiving 12,000 INR.

The atmosphere throughout the event was charged with energy, as competitors experienced a mix of nervousness and excitement, eager to showcase their hard work and technical skills. Teams from various regions, including two spirited teams from Odisha, added to the diverse competitive landscape. The event was a nerve-wracking yet exhilarating experience for all involved, filled with memorable moments of teamwork, innovation, and friendly rivalry.

As the final whistle blew, "Robo Soccer" emerged not just as a competition but as a celebration of creativity, engineering talent, and the spirit of collaboration. Participants and spectators alike left with a sense of accomplishment and inspiration, having witnessed a remarkable display of technology and sportsmanship.

The winner was Black Dragon of the Guru Nanak Institute of Technology and the first runners-up was Robozone Orion of the Odisha University of Technological Research.

[Prepared by Saikat Dey, M. Tech in Electrical Engineering, Part Time, 5th Sem, Head Coordinator, Physiyantrix'24]

Report - Report on War of Words

The Department was buzzed with excitement as "War of Words" took center stage at the first-ever Physiyantrix'24 tech-fest. This lively debating event gathered 21 passionate participants across 7 teams, each eager to demonstrate their analytical prowess, persuasive skills, and depth of insight on a diverse range of topics. Held from 10:45 AM to 4 PM, "War of Words" was designed as an open-themed event, creating a space for free-flowing, impactful dialogue on matters that inspired thoughtful debate and reflection.

The event began with the Preliminary Round, where teams selected their topics by toss, adding a unique twist that left participants in suspense until the very last moment. Here, each team had the chance to set the stage with compelling arguments and counterpoints, sparking spirited discussions that showcased their quick thinking and verbal dexterity. The preliminary debates fuelled a high-energy atmosphere, drawing the audience into the unfolding drama of words and ideas.

In the Final Round, topics were assigned by an expert panel of judges, raising the stakes and pushing finalists to their intellectual limits. As the debates continued, participants skilfully navigated their arguments, balancing logic with empathy and challenging each other with thought-provoking questions. Judges meticulously assessed each team's performance, focusing on clarity, coherence, and the ability to defend and counter-arguments under pressure.

"War of Words" concluded with the announcement of two top teams, each recognized for their outstanding performance in both rounds. The winning team proudly took home a cash prize of 10,000 INR, while the runners-up received 6,000 INR, marking their achievements in front of an enthusiastic crowd. More than just a competition, "War of Words" was a celebration of intellectual curiosity, eloquence, and the power of ideas. The event left participants and spectators alike inspired, having witnessed a day filled with passion, thoughtful exchanges, and the spirit of friendly competition that defines Physiyantrix'24.

The winner was the Hebeous Chorus of Jogesh Chandra Chowdhury Law College and the first runners-up was Argumente Avengers of the University of Calcutta.

[Prepared by Saikat Dey, M. Tech in Electrical Engineering, Part Time, 5th Sem, Head Coordinator, Physiyantrix'24]

Report - Robo-Navigation

The event Robo-Navigation wasaimed to showcase the advancements in technology, foster networking opportunities, and inspire collaboration and enthusiasm among participants and budding engineers.

"ROBO-NAVIGATION" – an all-terrain robot race, where teams design and build robots that can navigate challenging and varied terrains. These robots are typically tested against obstacles that simulate real-world environments, such as rocks, hills, and other difficult surfaces.

The All-Terrain Robot Race, Robo-Navigation was an exciting competition that brought together robotics enthusiasts, engineers, and students to showcase their all-terrain robotic creations. The event aimed to promote innovation, teamwork, and practical application of robotics technology. The event was only open to currently enrolled undergraduate/ post-graduate students. The event featured 28 teams from different engineering colleges based in West Bengal and other states of India, each presenting their uniquely designed robots. The challenging course included various obstacles, such as mud pits, rocky terrains, ramps, etc., testing the robots' capabilities in real-world conditions. The event was conducted in 2 rounds – Preliminary and Final. Robots were evaluated based on criteria including speed, agility, and durability. There were concepts of penalty points and bonus points as well to make the competition more interesting and trickier. Teams had to compete in heats, with the fastest and most capable robots advancing to later rounds. The top 10 teams amongst 28, taking minimum time to complete the track were qualified to the final round after the preliminary round.

The winner was the Team Black Dragon. The first and second runners-up were the Team Akasa and Team Jarvis 2.0.

[Report Prepared by Bhaswati Chakraborty, M. Tech in Electrical Engineering, Part Time, 3rd Sem, Head Coordinator, Physiyantrix'24]

Report - PES Prodigy

The "PES," an exciting gaming event that was part of the university's inaugural tech fest, "Physiyantrix'24." This event brought together a diverse mix of tech enthusiasts, budding developers, and experienced coders for a day filled with thrilling competition and teamwork.

Far beyond just a gaming contest, PES served as a showcase of technological skill and creativity, providing participants with a platform to demonstrate their technical knowledge. As a key highlight of Physiyantrix'24, a tech fest known for its emphasis on pioneering technologies and forward-thinking solutions, PES encouraged participants to tackle real-world challenges, pushing them to think innovatively and test the limits of their coding and gaming skills.

The competition featured a demanding, multi-round structure with three rounds designed to rigorously test participants' gaming abilities. Of the 32 registered participants, 28 attended, each bringing a unique blend of skill and enthusiasm. The event began at 10:45 AM and wrapped up at 5:45 PM,

creating a fast-paced atmosphere where both time management and precision were essential.

Ultimately, the event honoured the outstanding achievements of the participants, recognizing one as the winner and another as the runner-up. The competitive spirit and well-structured format of PES highlighted individual talent and fostered a motivating, collaborative atmosphere throughout the tech fest.

The winner was Maharaj Dutta of the North Calcutta Polytechnic and the runner-up was Sanjib Podder of Brainware University.

[Report Prepared by Partha Brata Ghosh, M Tech, Electrical Engineering, 5th Sem, Part-time, Head Coordinator, Physiyantrix '24]

Report - Think Tank

"Think Tank" was an event at Physiyantrix'24, the inaugural tech fest of the Department of Applied Physics, University of Calcutta, held on the 8th of September, 2024. This event focused on fostering entrepreneurial thinking and imparting essential business management insights to aspiring innovators. Participants gained valuable knowledge about the intricacies of running a business from a panel of industry expert judges, Arup Kumar Shome and Mayukh Mitra.

The event spanned two sessions, with the first half conducted in the Meghnad Saha Auditorium from 10:30 to 14:00 hours, followed by the second half in the Model Classroom of the Department of Applied Physics from 14:45 to 17:30 hours. Each session encouraged participants to explore the practical aspects of business operations, including strategy, financial planning, and market impact, providing a real-world perspective on entrepreneurship.

Through interactive sessions and constructive feedback from the judges,

"Think Tank" successfully created an engaging platform where participants could refine their business ideas, understand the core principles of sustainable growth, and develop strategies for brand-building and customer engagement. This event marked an essential learning experience for students, bridging academic concepts with industry expectations and helping them lay the foundation for future entrepreneurial pursuits.

The winner was the Team MediTrack of the Techno Main Salt Lake, Maulana Abul Kalam Azad University of Technology. The first Runners-up was the Team Careify of Netaji Subhash Engineering College, Maulana Abul Kalam Azad University of Technology, and the second runners-up was the Team ASAP of Guru Nanak Institute of Technology, Maulana Abul Kalam Azad University of Technology.

The best Pitch Winner was shared by Team Surabhi of St Thomas College of Engineering and Technology, Maulana Abul Kalam Azad University of Technology, and Team Theodore.

[Report Prepared by Ankit Sarkar, M Tech, Instrumentation Engineering, 5th Sem, Head Coordinator, Physiyantrix '24]

Report - Mind Mantra

The "Mind Mantra" tech quiz event was a highlight of Physiyantrix'24. The event drew tech enthusiasts eager to showcase their knowledge of cutting-edge technology, engineering principles, and advancements in applied physics.

The quiz began with preliminaries from 10:30 to 13:30 hours, where participants tackled a series of challenging questions designed to test their breadth of knowledge and quick thinking. Those who advanced then competed in the finals from 13:45 to 17:30 hours, with rounds that grew progressively more complex, demanding not only a deep understanding of tech but also strong analytical and problem-solving skills. The event was

held in the Meghnad Saha Auditorium at the University's Rashbehari Siksha Prangan campus.

"Mind Mantra" offered a dynamic and engaging experience, inspiring participants to push their intellectual boundaries while fostering a spirit of camaraderie and academic curiosity. It successfully brought together budding tech enthusiasts in an atmosphere that celebrated knowledge, innovation, and the pursuit of excellence in the tech realm.

Team Horsemen of the Jadavpur University was the Winner. The Team Insignia of St Thomas College of Engineering and Technology, Maulana Abul Kalam Azad University of Technology was the first runner-up, and the Team The Riddlers of RCC Institute of Information Technology, Maulana Abul Kalam Azad University of Technology was the second runner-up.

[Report Prepared by Ankit Sarkar, M Tech, Instrumentation Engineering, 5th Sem, Head Coordinator, Physiyantrix '24]

Report - Shutter Symphony

On September 7-8, 2024, the Department of Applied Physics, University of Calcutta, buzzed with innovation and creativity as it hosted the event "Shutter Symphony" an exhibition of photography under the first-ever tech-fest "Physiyantrix'24." This dynamic event brought together the photographers.

The event can be said as, "30 Frames of Life", a captivating photography exhibition showcasing a collection of 30 powerful and evocative images. This event brings together the unique perspectives of talented photographers, each capturing moments that tell stories, evoke emotions, and invite viewers to see the world through fresh eyes. From intimate portraits to sweeping landscapes, the photographs on display cover a diverse range of subjects, styles, and techniques, offering something for every art lover and photography enthusiast.

The exhibition aims to celebrate the art of visual storytelling, where each

frame serves as a window into a different experience, mood, or cultural moment. Whether you are drawn to the beauty of nature, the hustle and bustle of urban life, or abstract and experimental compositions, "Shutter Symphony" promises to engage your senses and inspire new ways of seeing the world around you.

Join us for an unforgettable journey through these carefully curated images, and immerse yourself in the power of photography to connect us, move us, and spark our imagination.

The winner was Dhaval Shah. The first runner-up was Ripunjoy Patra and the second runner-up was Piyasy Sarkar. Prattay Barua received the People's Choice award.

[Report Prepared by Team Shutter Symphony, Physiyantrix'24]

Team Physiyantrix

The judges of different events:
Hack-O-Mania: Mr. Joy Samadder
War of Words: Mr. Shankar Mukhopadhyay and Mr. Debiprasad Sen
Think Tank: Mr. Arup Kumar Shome and Mr. Mayukh Mitra
Shutter Symphony: Mr. Dwaipayan Pal

Faculty Coordinators:
Dr. Amitava Biswas & Dr. Binoy Kumar Karmakar

Head Program Coordinator: Priya Sardar

Head Event Coordinators: Ankit Sarkar, Partha Brata Ghosh, Saikat Dey, Trisha Chatterjee, Ushnik Chakrabarti

Event Coordinators:
Abhisek Chowdhury, Anish Bachhar, Arijit Basak, Avik Singha, Bhaswati

Chakraborty, Rohan Saha, Sayandip Sarkar, Shatabdi Lahiri, Sayantani Biswas, Soumik Banerjee, Tridip Dutta.

Event Volunteers:
Abhijit Roy, Abhishek Banerjee, Abir Paul, Aditi Roy, Anmol Kumar Singh, Akarsh Tripathi, Anmol Nachiketa, Anubhav Bakshi, Arya Manna, Avinash Kumar, Bhaskar Roy Chowdhury, Debjyoti Das, Diptendu Ghosh, Gurudipta Mandal, Haidar Ali, Hariom, Khushi Kumari, Kunal Munda, Kuntal Ghosh, Md Ashanur Mallik, MefuzSk, Moumita Mondal, Nibendu Nandi, Nilesh Patra, Oliva Dutta Banik, Partha Sarathi Maiti, Pradip Karmakar, Prashanta Ghosh, Rahul Shaw, Rajarshi Mondol, Rajibul Islam Gazi, Ranjit Das, Ripunjoy Patra, Sabyasachi Debnath, Riwk Mandal, Sagnik Dey, Samadarshi Phusti, Sanjana Bhattacharjee, Saptarshi Roy, Satanu Singha Roy, Satyaki Dasgupta, Sayan Das, Shadab Arshad, Shankha Shuvra Shome, Soham Bera, Shromana Majumder, Soham Ghosh, Sohini Haldar, Soumi Mukherjee, Soumik Banerjee, Soumya Swar, Srinjan Biswas, Subhadip Bhattacharjee, Subhadip Biswas, Subhankar Chatterjee, Subhradip Ghosh, Subrata Mudi, Suchismita Dutta, Supriya Sarkar, Toukit Jaman, Shubhendu Bikash Banerjee.

Participating Faculty Members: Prof Jitendra Nath Bera, Prof Kaushik Das Sharma, Prof Rajarshi Gupta, Prof Sumana Chaudhuri, Sri Nirmal Murmu, Sri Dipak Kumar Mandal.

Participating Alumni Members: Sudip Saha, Siddhartha Pal, Dr Anup Kumar Mandal, Partha Priya De, Soumitra Ranjan Mitra, Saswati Mukhopadhyay, Biswajit Chakraborty, Sumit Kumar Sinha.

2-Day Symposium

"Renewable Generations and Integration Aspects for Sustainable Energy Mission"

Organized by
Department of Applied Physics, University of Calcutta
In collaboration with the Applied Physics Alumni Association
Venue: Dr. Meghnad Saha Auditorium,
Rajabazar Science College Campus, University of Calcutta
26 & 27 October 2024

This symposium serves as a platform for professionals, researchers, and enthusiasts to explore advancements in renewable energy technologies and their integration into modern power systems. As the world transitions towards cleaner and more sustainable energy solutions, understanding the challenges and opportunities of renewable energy integration becomes crucial.

At the outset the Head of the Department Prof. Kaushik Das Sharma welcome the audience and explain the significance of organizing such a symposium under the auspices of Centenary Celebration of Department of Applied Physics. After that Chief Guest Dr. Santi Pada Gon Chaudhuri, Honorary President, NBRIT Kolkata addressed the audience and elaborated the current scenario of sustainable energy. Our Special Guest Shri Pankaj Kumar, Executive Director, IOCL, India addressed the audience and discussed about the role IOCL in making the nation carbon free. Then Prof. Dipak Chandra Patranobis, President of Centenary Celebration Advisory Committee highlighted the role of the budding engineers and technologist in making the sustainable energy options. Finally, Prof. Rajarshi Gupta gave the vote of thanks to the dignitaries, speakers, audience, sponsors and other vendors and supplies for their relentless support to make the symposium a success.

In the technical sessions during the 2 days symposium, the distinguished speakers across the globe shared their views on this very topic and inspired the audience by their visions. The names and lecture titles of the speakers are as follows:

Prof. Joydeep Mitra, Michigan State University, USA
Title of the lecture: "Increasing Renewable Integration: Challenges and Viable Strategies"

Prof. Zakir Rather, Indian Institute of Technology Bombay, India
Title of the lecture: "Challenges of Large-Scale Renewable Energy Integration-Global and Indian Power System Perspective"

Prof. Prabir Barooah, Indian Institute of Technology, Guwahati, India
Title of the lecture: "Renewable integration without batteries"

Mr. Alok Singh, IOCL, India with a Contemporary title on Green Energy Resources

Prof. A. Vadivel Murugan, Pondicherry University, India
Title of the lecture: "Recent Research Trend and Perspectives of Sustainable Energy Storage Battery for Renewable Energy Generation and Integration in India"

Mr. Probir Kumar Bhattacharyya, Ernst & Young India
Title of the lecture: "Net Zero: Steel Production and the Indian Context"
There were 180 participants on the first day and 150 on the second day of this symposium. A large number of students from Applied Physics and other institutes were present in the audience and had extensive interactions with the eminent speakers.

Photo Gallery

Symposium Welcome address by Prof (Dr) Kaushik Das Sharma,
HOD, Applied Physics

Address of Chief Guest "Solar Man" Dr. Sakti Pada Gan Chaudhuri, a veteran in the field of Renewable Energy

Speaker – Prof. Joydeep Mitra of Michigan University delivering his lecture as captured

Lunch-Break

3

Audit Report

Centenary Celebration of the Department of Applied Physics

পরীক্ষিত হিসাবপত্র

1925 - 2024
Applied Physics
100 Glorious Years of Journey

MITRA DEBMALLIK & CO.
Chartered Accountants
S. Mitra M. Com., F.C.A.
M. Debmallick, B. Sc., F.C.A.

Date 27/06/2024

AUDITORS' REPORT

We have audited the annexed accounts of APPLIED PHYSICS CENTENARY CELEBRATION C.U. for the year 2023-24 with the books of account, vouchers, Bank statement and other records as maintained by the organizers and produced before us and report that :-

a) **The Balance Sheet as at 31st March 2024 represents a true and fair view of the assets and liabilities of the conference as on that date, and**

b) **The Income & Expenditure Account and Receipts & Payments Account represents a true and correct figure of the Income earned and expenditure incurred for the conference during the year 2023-24**

For MITRA DEBMALLIK & CO.
Chartered Accountants
(S. MITRA)
Partner
M. NO. 010653
FRN 324924E

9, KIRAN SANKAR ROY ROAD, KOLKATA - 700 001
Mob. : 90510 52011, E-mail : camitraca@gmail.com

MITRA DEBMALLIK & Co.
Chartered Accountants

APPLIED PHYSICS CENTENARY CELEBRATION C.U.
Dept. of Applied Physics, Calcutta University
92, A.P.C. Road, Kolkata - 700009

RECEIPTS & PAYMENTS ACCOUNT For the year ended 31st March 2024

RECEIPTS	AMOUNT	AMOUNT	PAYMENTS	AMOUNT	AMOUNT
To Alumni Donation		5,098,058.86	By Meeting Expenses		30,656.00
			By Conveyance & Hotel Bill		135,418.00
To Sponsorship :			By Food & Catering		1,124,836.00
from ISA Symposium	580,000.00		By Decoration		457,910.00
Ramkrishna Forging Ltd.	450,000.00	1,030,000.00	By Mementos		595,147.00
			By Venue Preparation		199,142.00
To Souvenir Advertisement		991,824.72	By Cultural Expenses		161,360.00
			By Printing & Photography		240,521.00
To Suspense		58,035.00	By Bag Purchased		117,700.00
			By Security Deposit		75,000.00
To Refund of Security Deposit		75,000.00	By Misc. Expenses		84,237.82
			By Suspense		68,120.00
To Interest from Bank		77,458.00	By Closing Balances :		
			Cash at Bank	4,031,575.58	
			Cash in hand	8,753.18	4,040,328.76
		7,330,376.58		-	7,330,376.58

Signed in terms of our separate Report of even date

9, Kiran Sankar Roy Road
Kolkata - 700 001.

Dated : 27/06/2024

For MITRA DEBMALLIK & CO.
Chartered Accountants

(S. MITRA)
Partner

MITRA DEBMALLIK & Co.
Chartered Accountants

APPLIED PHYSICS CENTENARY CELEBRATION C.U.
Dept. of Applied Physics, Calcutta University
92, A.P.C. Road, Kolkata - 700009

BALANCE SHEET As at 31st March 2024

LIABILITIES	AMOUNT	AMOUNT	ASSETS	AMOUNT	AMOUNT
CAPITAL FUND			**CASH IN HAND**		8,753.18
Excess of Income over Expenditure		5,465,413.76			
			CASH AT BANK		
SUSPENSE			Bank of Baroda		4,031,575.58
Suman	5,000.00				
CIEC24	25,000.00		**SUSPENSE**		
Institute of Engineers	28,035.00	58,035.00	Refund due to wrong entry	28,120.00	
			CIEC24	40,000.00	68,120.00
OUTSTANDING LIABILITIES					
Audit Fees		5,000.00	**RECEIVABLE**		
			Sponsorship	1400000.00	
			Souvenir Advertisement	20000.00	1,420,000.00
		5,528,448.76		-	5,528,448.76

Signed in terms of our separate Report of even date

9, Kiran Sankar Roy Road
Kolkata - 700 001.

Dated : 27/06/2024

For MITRA DEBMALLIK & CO.
Chartered Accountants

(S. MITRA)
Partner

4

Alumni Activities and Proposals

Centenary Celebration of the Department of Applied Physics

প্রাক্তনী সংঘের সক্রিয়তা ও প্রস্তাবনা

Activities of the Applied Physics Alumni Association (APAA)

Since the 63rd Reunion held on 28th January 2024

1. APAA had their first executive committee meeting on 16th February 2024 where it was decided that physical meetings will be held on 3rd Friday of every month at 6PM in APAA room at the department and virtual meetings will be held on 1st Monday of every month at 8.30PM (IST) over goggle meet. This is being meticulously continued till date with hardly any exception. So far 17 such meetings were conducted.
2. Organized Industry Symposium in collaboration with International Society of Automation on 25th February 2024 at Dhano Dhanya Auditorium.
3. Consent was sought from the honourable Vice Chancellor of University of Calcutta for using the department's address for APAA and the consent has been received.
4. As decided in EC meeting, the initial expenses incurred by APAA will be met from centenary fund till APAA open their bank account. It is also decided that Presently APAA will function without registration. Registration of APAA will be initiated after completion of Centenary Celebration in January 2025.
5. Memorandum of Article (MOA) of APAA for registration has been finalized.
6. The grandson of Prof. P.N.Ghosh has donated the inaugural presidential address of Indian Science Congress held on 1942 and some old memories of Prof.P.N.Ghosh. This will be properly preserved in the department.
7. The renovation plan of APAA room was submitted to university.
8. All outstanding dues are collected. All vendor payments are made. Souvenir books are sent to all advertisers.
9. Internal audit was conducted by Abhijit Nandi (1986) on 2nd April 2024 and external audit was conducted by university approved auditor on 19th April 2024. Treasurer Prof J. N. Bera (1990) was the auditee. Both the

audit findings are satisfactory. External audit report was received on 2nd July 2024 and will be published during next year reunion. Present cash in hand as on 30th June 2024 is Rs. 45.97L.

10. Since 63rd reunion 65 gift packs were distributed to various alumni who donated but could not attend the reunion. Gift packs were delivered to very senior alumni at their houses.
11. Published 5th and 6th Newsletters.
12. Mr. Sameer Mohamad from University of Paris delivered a lecture on 'Robotics' on 27th April 2024. The event was organized jointly with IEEE Joint CSS-IMS Kolkata Chapter.
13. Organized blood donation camp on 3rd May 2024.
14. On students' development front, following activities have been carried out
    a) Training on 'Group Discussion' by Amalendu Kumar (1973) on 14th March 2024.
    b) Training on 'Communication Skill' by Amalendu Kumar (1973) on 14th March 2024.
    c) Training on 'Interview Preparation' by Sharmila Banerjee (1987) on 15th March 2024.
    d) Training on 'Resume Preparation' by Goutam Basak (1979) on 15th March 2024.
    e) Conducted survey among alumni fraternity on various Workshop Modules for the students but the number of responses is not encouraging.
    f) IT workshop by Siddhartha Pal (1985) and Nirmal Murmu (Faculty) on 20th April 2024.
    g) Registering the name of final semester students of both B.Tech and M.Tech in alumni database.
    h) Visit of 30 students to Kolaghat Thermal Power Station on 3rd July 2024 along with Partha Priya Dey (1977), Sumit Sinha (1985) and Siddhartha Pal (1985).
    i) PLC System Workshop by Siddhartha Pal (1985), Arijit Sarkar (1992) in association with Mitsubishi and one industry professional of Woods PLC on 28th Setember'24.
15. Conducted Tech Fest on 7th and 8th Semester'24 where students from many engineering colleges participated.

16. Conducted Two Days Symposium on 'Renewable Generation and Integration Aspects of Sustainable Energy Mission' on 26th and 27th October'24.
17. APAA room was fully renovated with AC installed in November'24.
18. Website www.cuappa.com was updated in regular interval. YouTube Channel contents enriched with videos of all lectures/events of Centenary Celebration and 63rd Reunion.
19. Future plans and activities of APAA:
    a) Society registration of APAA and opening bank account.
    b) Arranging various workshops and training classes for the students.
    c) Arranging industry visits for the students.
    d) Arranging internship/vocational training supports to the students.
    e) Providing financial/material support to needy and meritorious students.
    f) Making PLC training centre.
    g) Making good research laboratory.
    h) Install VC facility in APAA room.

The above report is compiled on 24th December 2024.

ROOM FOR THE ALUMNI ASSOCIATION

A room has been allotted to the Alumni Association within the Department. The room is now ready to use with all virtual communication facilities. This opens up the opportunity for regular meetings of the members. Alumni members are welcome to visit the room.

[APAA Activity Report compiled by Siddharth Pal (1985) and remains in the process of updating]

Proposal - 1

Centenary Benevolent Fund (CBP)

Rabindranath Chakraborty of the 1965 batch proposed to create a benevolent fund to help a few poor students of the department each year. This may be in the form of monetary help or providing useful gadgets. There may be provision of occasional help to needy alumni as well.

It was proposed that the money required for the program is to be raised from the alumni members. The yearly help may be given from the interest of the accumulated fund. Some funds may also be obtained from the Centenary Celebration account.

The proposal was circulated among the alumni members and a few responses from the alumni were received. The following are commitments:

Mrinal Saha (1968) - Rs. 1.25 lakh

Tapan Dasgupta (1984) - Rs. 1 lakh

Anindya Chakraborty (1994) – Rs. 1 lakh

Asok Punjabi (1979) – Rs. 2000 per month for 2 years (till the interest on the corpus is adequate to cover the required sum).

There was a proposal from Parthasarathi Bhattacharyya of 1970 batch like:

- The various items can be thrown open for sponsorship by Alumni through a cafeteria approach indicating a price tag for each unit.

- The donor should have the option of a regular annual donation (more affordable) or a one-time capital grant with the choice left to the donor for select items from the cafeteria for application of the donated amount. Allowing the Executive Council to decide the item(s) based on felt needs could also be offered as an option.

- A proper format will have to be developed for this purpose to be filled in by interested Alumni Members.

The proposal for the Student Benevolent Fund was approved and decided that it may be made operational as soon as a bank account in the name of APAA can be created after completion of the registration process.

A guideline for disbursement of funds among the students has also been prepared by Prof Samarjit Sengupta.

Proposal - 2

Innovation & Consultancy Services Program

We discussed several times a proposal of Rabindranath Chakraborty of the 1965 batch about the possibility of undertaking a program of "Innovation & Consultancy Services" that may make the centenary celebration event a permanent memory for all of us and the coming generation.

It was aimed at, in the first place, providing students with some hands-on experience in product development and secondly, extending consultancy services to small and medium-scale industries to augment their productivity through the improvement of production processes and optimizing energy use.

We could not go ahead with the program because of a lack of a sufficient number of interested persons from the alumni to undertake such responsibility. Besides, the space for such a project was not available within the department at the present moment.

Proposal - 3

Developing a Laboratory Facility for the Department

"Technology Development Center" & "PLC Training Center"

Achintya Mukhopadhyay of the 1971 batch proposed a "Technology Development Center" at the department to make the Centenary Celebration memorable.

The proposal was discussed at the EC meetings. However, we could not go ahead due to the non-availability of space for such a development center within the premises of the department and also due to the lack of enthusiastic persons to carry out the program.

During the discussion of this proposal, given the constraints, an alternative proposal of setting up a PLC Training center on a smaller scale was evolved. The proposal came from Siddhartha Pal of the 1965 batch.

It was envisaged that a PLC training facility if developed may be made available for the training students of the department and also to the students of other institutes and the willing industry people. A scheme for such a

laboratory was worked out and the idea of expenditure was obtained from a reputed company.

Before going further, the proposal was sent to the HOD for the consideration of the department. The department replied that it has a PLC laboratory for its students. They would rather prefer to have a laboratory on some advanced futuristic subject. We wanted to know from the department if they have any idea of such areas. We are waiting for a response from the department.

5

Alumni Activities for Students

Centenary Celebration of the Department of Applied Physics

ছাত্র-সহায়তায় প্রাক্তনী সংঘের সক্রিয়তা

1925 - 2024
Applied Physics
100 Glorious Years of Journey

A brief account of activities on Students' affair

Saswati Mukhopadhyay (1977)

During the Centenary Celebration program of the Applied Physics Department, where alumni gathered to commemorate the occasion, a significant decision was made to share the wealth of knowledge and experience accumulated by the esteemed alumni during their professional journeys with the current students. The primary objective was to equip students with insights and skills that would aid them in their future careers.

Past activities

In line with this vision, several programs were organized collaboratively by the Alumni-Student Liaison (ASL) group and the current faculty/research scholars of the department. These initiatives included soft skill development programs, workshops on IT modules on 20.04.2024, workshop on PLC on 28.09.2024and an industry visit for 30 students to the Kolaghat Thermal Power Station in 30.07.2024. The last 3 activities on workshop and industry tour are reported in fairly detail concerned alumni or students in the pages to follow within this section as a matter of record and future guidance.

Outcome of the Workshops

This initiative proved to be a fruitful collaboration between the alumni and the department, fostering a culture of knowledge sharing and professional development that will undoubtedly benefit the students in their career paths.

Our mission

The alumni who conducted the Workshop were greatly appreciated for their active participation, framing of the program and carrying it out meticulously.

Their efforts highlighted the invaluable role they play in bridging the gap between academic learning and real-world applications. In light of the success of such events, we encourage the alumni community to come forward in large numbers for their engagement in such workshops and support.

By maintaining regular interaction with the students, alumni can help ensure a consistent platform for skill enhancement and professional guidance for students across both the Electrical and Instrumentation streams. This collaborative effort can serve as a cornerstone for preparing students to excel in their respective fields, fostering a tradition of mentorship and mutual growth within the department.

Workshop on IT Tools For the Students

Department of Applied Physics

20 April 2024

As part of the Students' Development Program, the Applied Physics Alumni Association organized a Workshop on IT Tools at the Applied Physics Department's seminar hall on 20th April 2024.

Workshop Objectives:

To provide exposure to some frequently used IT tools with the content as:

a) Introduction of AI through ChatGPT.

b) Generation of Google form and QR code.

c) Set MCQ paper through ChatGPT and automatic score sheet generation.

Workshop Planning:

A notice was circulated in the students' WhatsApp group announcing the details of the workshop and inviting the students to participate in the workshop by registering through Google form. The registration form was circulated on 31st March 2024 and 27 students from both B. Tech and M. Tech courses registered for the workshop. The students volunteered to take charge

of various activities like group coordination, food management, infrastructure management, etc. The students were asked to bring their laptops to have some hands-on experience and submit online assignments during the workshops.

Details of the Workshop:

Siddhartha Pal, an alumnus of the 1985 batch, and Nirmal Murmu, a faculty of the department were the instructors of the workshops. Partha Priya Dey, alumni of the 1977 batch and department's faculty Prof. Jitendranath Bera were present during the workshop to encourage the participants.

27 participants were divided into nine groups having three members in each group. Members of the group were selected by lottery. There were two sessions. ChatGPT was discussed in the pre-lunch session and the Google Form generation was discussed during the post-lunch session. There were online assignments both on ChatGPT and Google Forms in each of the sessions.

Students were encouraged to ask questions and to participate wholeheartedly to make the workshop interactive. Spot token gifts were distributed to the good responders, this made the workshop interesting and joyful. Homework was given after the workshop.

Infrastructure and Lunch:

Infrastructure like WiFi connection, projector facilities, lunch, etc were well organized by the students.

Incentive:

There was an announcement of a prize for every member of the best performing group. The evaluation was based on the score of all 27 participants from all the tasks like responses during the workshop, online assignments, homework, etc.

The Winner:

Group 5 was declared as the winner of the workshop on 30th April 2024 and the members of this group were –

- *Ariyan Islam – B. Tech, IE, 6th Semester*
- *Moumita Mondal – B. Tech, IE, 4th Semester*
- *Sohom Mondal – B. Tech, IE, 4th Semester*

Cost of the workshop:

The program cost was Rs. 4500/- against a sanctioned budget of Rs. 5000/- fully funded by APAA.

Feedback: *Follows*

Training Feedback Form - IT Tools

Workshop on Programmable Logic Controller (PLC)

Department of Applied Physics
28 September 2024

Authored by: Rahul Shaw (5th Semester, IE, B. Tech)
Edited by: Partha Brata Ghosh (5th semester, EE-PT, M. Tech)

Introduction

PLCs are crucial components in modern industries, enabling efficient, reliable, and flexible automation. Their importance will continue to grow as industries adopt emerging technologies like IIoT, AI, and edge computing.

PLC knowledge is highly sought after in industries like manufacturing, oil and gas, and automation. It offers improved job prospects, career advancement, and a competitive edge.

Keeping these points in mind, a 5-hour-long PLC workshop on the 28th of September, 2024 was organized in the Department of Applied Physics by the joint efforts of the Faculty of the Department and the Applied Physics Alumni Association.

Objectives of the workshop

1. Exposure to PLC logic and SCADA program development.
2. Fundamental concept & engineering aspects of a PLC.
3. Online class assignments.
4. Mock Interview.

Speakers and Trainers

1. Siddhartha Pal - Head Projects, Vareli Tecnac Pvt Ltd, (AP Alumni 1985).
2. Arijit Sarkar - Chief Engineer, M. N. Dastur & Co. Pvt. Ltd., (AP Alumni 1992).
3. Jit Sarkar - Senior Instrumentation & Control Engineer, Woods Group.
4. Tuhin Chowdhury - Trainer, IITCA (Mitsubishi).

The Workshop

The workshop started at 11 am with Siddhartha Pal sir welcoming all the students and instructors. He then delivered a presentation that covered several aspects of PLC such as the History and Evolution of PLC, Architecture of PLC, and Various Components of PLC.

He also introduced us to the fundamentals of PLC programming Languages which was further explained by Mr. Tuhin Chowdhury. A working PLC was brought for the purpose of practical demonstration of the Structure, Working, and Programming of a PLC.

During the presentation itself, a Q&A session was taken by Siddhartha Pal sir, the objective of which was to enhance of sense of Inclusivity among the students and also prepare them for interviews.

After the 3-hour long presentation by the two instructors, a tiffin break was provided. A delicious meal was arranged for all the students as well as the instructors. Desserts and water bottles were also made available which added an extra flavour to the workshop. The expense of the meal was borne by the Applied Physics Alumni Association. The participants were also instructed to pay a small amount of only Rs 100 per head for the arrangement of the PLC itself.

After the meal a practical session on the programming of PLC was taken by Mr. Tuhin. It was then followed by an online assessment of the overall knowledge of PLC. The winners of the test - Trisha Chatterjee, and Partha Brata Ghosh were also given very lucrative prizes.

The interview was conducted with Mr. Jit Sarkar as the candidate and Siddhartha Pal sir and Arjit Sarkar sir as interviewers. The nearly perfect demonstration of an interview session was something we must appreciate all three of them, for. Mr. Jit Sarkar very carefully demonstrated the handling of tough questions and maintained the stability of mind for a fresh candidate. Arijit Sarkar sir was quite impressive in his way of being an interviewer. He, as well as Siddhartha Pal sir, conveyed the idea of what an interviewer genuinely expects from a fresher, which will again remind the students of the objective of the questions of the interviewer in a real interview, which will hold them back from being frustrated and pessimist in a tough situation.

All of this ended with a brief motion of thanks to all the instructors present who tried their best to make the workshop successful and worthy of interest.

Feedback And Criticism

After the workshop an online feedback form was provided to the student

to express their views and opinions and to express their criticism in order to have a scope of improvement. The blind feedback submission ensured a correct and unbiased evaluation of the overall experience of the participants.

The key points noted in the feedback were –

1. Demand for a more detailed instruction on PLC programming techniques.
2. Demand for learning of at least one Programming Language, preferably ladder logic, in the session.
3. Hands on experience.

Conclusion

It may be concluded that the workshop was quite successful in achieving its desired objectives and the imperfections will certainly be compensated for in the times to come.

Photo Gallery

A Day Out For Visiting An Industry Kolaghat Thermal Power Station

30 July 2024

Rahul Shaw
Instrumentation Engineering, 5th Semester

Part-I

Introduction

An industrial visit to the Kolaghat Thermal Power Station was organized for the students of the Department of Applied Physics, University of Calcutta on July 3rd, 2024. The visit aimed to provide the students with practical insights into the workings of a thermal power plant and to complement their theoretical knowledge with real-world applications.

Objectives

The main objectives of the visit were:

1. To understand the functioning and operations of a thermal power plant.
2. To learn about the different components and machinery used in power generation.
3. To observe safety protocols and environmental measures in place at the plant.
4. To gain knowledge about the energy production process from coal.

Organizers

The industrial visit to Kolaghat Thermal Power Station was organised by the Applied Physics Alumni Association of the University of Calcutta.

The following alumni stepped forward to arrange and organize the visit:

- Ms. Saswati Mukhopadhyay (1977) – Facilitator.
- Mr. Partha Priya Dey (1977) – Tour companion.
- Mr. Siddhartha Pal (1985) – Tour companion.
- Mr. Sumit Kumar Sinha (1985) – Tour companion.
- Mr. Joydeb Bhattacharya (1985) – Co-ordinator, PDCL
- Ms. Arundhati Banerjee (1986) – Instructor, PDCL
- Mr. Umesh Parida (1989) – Instructor, PDCL

Not to forget, the role played by the faculties Prof Kaushik Das Sharma, HOD and Prof. Jitendra Nath Bera for making the excursion happen.

The responsibility was shared among the students for coordinating the bus & its passengers, arrangement of breakfast, ensuring gifts for the alumni who were currently working at Kolaghat Thermal Power Station, managing the funds etc. The students fulfilled their responsibilities well, the management of everything was absolutely perfect. It was indeed a great project management learning for the students.

The Group

The excursion group consists of 3 alumni, 30 students (both B.Tech and M.Tech), and one research scholar. So, the total head count was 34.

The Journey

Our journey to Kolaghat Thermal Power Station began early in the morning, with students gathering at the University Campus at 7:00 AM. It was raining,

yet all the thirty students who had registered for the visit arrived almost on time. All the arrangements were checked once again. The bus coordinator took attendance. The excitement and anticipation were palpable as everyone boarded the bus, ready for an enriching experience.

By 7:30 AM, all students and alumni members were seated, and the bus departed from the campus after having a group photo, just to capture the moment. The journey started with a brief orientation from Siddhartha sir, who outlined the day's schedule and emphasized the importance of safety, discipline, and punctuality throughout the visit.

The journey finally started!!

Food packets and water bottles were distributed among all. Biting the hot kochuri, kasha alum dam, and boiled egg.....just awesome, and then followed by hit Bollywood songs made the day for us. At around 8:30 AM, the bus made a brief stop at Ankurkathi to pick up two students from there. As the bus made its way out of the city, the scenery changed from urban landscapes to more rural and scenic views. The lush green fields and small villages provided a refreshing contrast to the usual city environment.

During the journey, Siddhartha sir and Sumit sir took the opportunity to brief the students about Kolaghat Thermal Power Station. They explained the basics of thermal power generation and what to expect during the visit. It was extremely helpful as it created a sense of awareness about the power plant, serving the purpose of our visit. Students were also encouraged to ask questions.

At approximately 10:30 AM, the bus arrived at the Kolaghat Thermal Power Station. The imposing structure of the plant, with its tall chimneys and expansive layout, immediately caught everyone's attention. The group disembarked, eager to begin the plant visit. We were provided safety helmets at the entrance.

Overview of Kolaghat Thermal Power Station

Kolaghat Thermal Power Station is one of the largest thermal power plants in West Bengal, India. It is located at Mecheda, approx. 55 km from Kolkata in the Purba Medinipur district. The plant under the West Bengal Power Development Corporation Limited (WBPDCL), has a total installed capacity of 1260 MW, comprising six units of 210 MW each. The units were commissioned in two stages from 1984 to 1995. Units 1 and 2 reportedly retired by March 2022. The power station primarily uses coal (Bituminus) as its fuel source procured from various coal mines in India.

Visit Highlights

Introduction Session

The visit began with an introductory session by the plant's engineers, who provided an overview of the power station, its history, and its significance in the region's power supply. They explained the basic principles of thermal power generation and the plant's operational workflow. Meanwhile, snack packets were provided by PDCL to all of us.

Control Room

The next stop was the control room, the nerve center of the power station. Here, students observed how operators monitor and control the various processes involved in power generation. The engineers explained the importance of maintaining optimal conditions and how data is continuously analyzed to ensure efficient operation.

Boiler and Turbine Section

Students were then taken to the boiler and turbine section. The boiler, where coal combustion occurs, converts water into steam. This high-pressure steam drives the turbines, which in turn generate electricity. The engineers provided a brief explanation of each component's role, emphasizing the significance of maintaining proper temperature and pressure levels.

Switchyard

Students were also taken to the switchyard which consists of several facilities

outside a power plant that directs electricity onto the transmission lines. The switchyard comprises transformers plus a series of large switches, breakers, and other protective devices that can usually be manually or remotely opened and controlled to energize or de-energize specific transmission circuits leaving the plant.

Environmental Measures

Environmental sustainability is a critical aspect of modern power generation. The PDCL officers also briefed the students on the measures taken to minimize emissions and waste. They discussed the implementation of electrostatic precipitators, flue gas desulfurization units, and other technologies to reduce air pollution.

It is worth mentioning that when one sees the ash pond of Kolaghat Thermal Power Station, the question of environmental safety arises in one's mind about the impacts of the ashes on the nearby land and water bodies as well as on the living beings including humans. But it turned out that the ash pond was no problem at all, as it has a high demand in the cement industry. Ramco Cements Ltd. uses the fly ash of Kolaghat Thermal Power Station and the water of the Rupnarayan river for its cement production.

The Guest House and Refreshment

The lunch was arranged at the Guest House of the Kolaghat Thermal Power Station. After the power plant visit was over at around 1:30 PM, the bus took us to the Guest House where we had our meals in the refreshment hall. Some of us took rest for a while, while others visited the beautiful place covered with trees and flowers everywhere. Finally, we took a group photo and then we departed from there and the return journey began.

The Return Journey

We started our return journey at around 4:00 PM. The view from the window was captivating, with lush green fields, quaint villages, and occasional glimpses of water bodies reflecting the late afternoon sunlight. The view of Rupnarayan river was amazing. The bus reached our campus around 6:30 PM. Students disembarked, tired but enriched with knowledge and a sense of accomplishment.

Learning Outcomes

The visit to Kolaghat Thermal Power Station provided students with several key takeaways:

Practical Understanding: Students gained a hands-on understanding of how a thermal power plant operates, complementing their theoretical studies.

Technological Insights: Exposure to advanced machinery and control systems used in power generation.

Safety and Environment: Awareness of the safety protocols and environmental measures essential in industrial operations.

Teamwork and Communication: The importance of teamwork and effective communication in managing complex industrial processes.

Discussion and Feedback: Alumni members encouraged students to share their observations and insights from the visit. The students shared their feedback online.

Conclusion

The bus journey to and from Kolaghat Thermal Power Station was an integral part of the overall experience. It provided not only transportation but also an opportunity for bonding, learning, and reflection. The well-planned schedule ensured that students remained engaged and energized throughout the day, making the visit both educational and enjoyable.

The visit was well-organized and informative, leaving students with a deeper appreciation of the complexities involved in power.

6

‘Tech Talk’

an Alumni Association initiative

Centenary Celebration of the Department of Applied Physics

প্রযুক্তিভাষ্য

1925 - 2024
Applied Physics
100 Glorious Years of Journey

'Tech Talk'

An Initiative of Applied Physics Alumni Association

Tech Talk Report

When the planning and preparation of the Centenary Celebration had gathered momentum during the 1st quarter of 2023, the idea of arranging a periodical talk online on a very relevant as well as contemporary technical topic was mooted by some of the alumni perhaps in a meeting of the concerned committee. Subsequently, it emerged that the speaker for each talk would be an alumnus of the Applied Physics Department who is involved with the subject as part of his profession at home or abroad. The periodicity of the talk was not decisive but might be quarterly. And it took the minimum time to contact the speaker and the topic – Publication Group.

Dibyendu Datta, an alumnus of the 1989 batch, was thus the maiden speaker for the Tech Talk programme initiated by the Alumni Association on May 27, 2023. He is now with Mahindra Tech as Head of Automotive & Discrete Manufacturing for Germany & Austria.This session aimed to provide an overview of the concept of "Software Defined Vehicle" (SDV) and the kind of conceptual changes the Automotive industry isgoing through to adapt to current customer demands based on technologicaladvances. A lucid technical and techno-commercial narrative followed on SDVs that uses software to control and customize its functions, rather than relying on a mechanical framework. SDVs are a key part of the automotive industry's shift towards smarter, more efficient, and safer vehicles. The online Q&A session was interesting too. We are thus given the perception that transformation to SDV will be an inexorable trend driving the development of the automotive industry over the next 5-10 years.

"Software Defined Vehicle" – By Dibyendu Datta

https://www.youtube.com/watch?v = RpoVjQjzYQE

Susanta Saha, an alumnus (1987) and presently in the position of General Manager at Indian Oil Corporation was chosen next to deliver a talk on "Hazards & Safety Consideration in Hydrocarbon Processing Units" on July 29, 2023. This is a very challenging job to provide the safety of a chemical plant dealing with inflammable chemicals both within and outside the area of the plant. This is done through the installation of numerous sensors, instruments & control mechanisms. Sri Saha, an acclaimed expert in this field, gave an overview of the entire process starting with the nature of danger associated with the functioning of the plant and the nature of safety measures taken to save the life of the men at work and also the plant. The students of instrumentation & control will be highly benefited from this lecture.

"Safety issues in a Chemical Plant" - By Susanta Saha

https://www.youtube.com/watch?v = 0JXJpyM2bH8

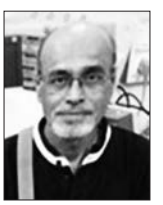
Mriganka Basak, of the 1974 alumni batch who had worked in different industries in various capacities and finally retired as General Manager, Engineering Services from Piramal Glass Ltd at Gujarat, volunteered for the next Tech Talk assignment- Role of Instrumentation & Control in Glassware Manufacturing Processon November 30,2023. We know glass is a wonder material and is being used by people for thousands of years. In fact, Glass-making dates back to at least 6000 years, long before humans had discovered how to smelt iron. Archaeological evidence suggests that the first true synthetic glass was made in Lebanon and the coastal north Syria, Mesopotamia or ancient Egypt. Early glass was rarely transparent and often contained impurities and imperfections. However, red-orange glass beads excavated from the Indus Valley Civilization dated before 1700 BC (possibly as early as 1900 BC) predate sustained glass production, which appeared around 1600 BC in Mesopotamia and 1500 BC in Egypt. Since then, the properties of the glass have improved with time and its use has also been extended from simple glass vessels to structural materials. So, the manufacturing of such glasses today is a highly sophisticated process needing various control mechanisms in every stage of its production.

"Role of Instrumentation & Control in Glassware Manufacture Process" – By Mriganka Basak

https://www.youtube.com/watch?v = SIm7ikiDnXI

Swarup Talukdar, alumnus (1977) of this department, offered the saga of a person of middle class background who materialized his dream of building a manufacturing company in our fourth Tech Talk programme on November 25, 2023. He dreamt of becoming an entrepreneur while studying B Sc with Physics honours. After doing his B Tech in 1980 from the Department of Applied Physics he started his career as an Engineer in a CPSU company. Although he knew that he could rise up to higher ranks in the company very soon, he didn't give up on his dream of building something of his own. At some point in time, he decided to give up his lucrative job to join a small electrical manufacturing company to gain first-hand knowledge of designing electrical equipment and nitty-gritty knowledge of doing business. After a short stint of serving as a consultant design engineer, he started his own company. Thus, Century Transformers Pvt Ltd was established with the aim of manufacturing special types of transformers. At present this company is well established in making customized transformers and gained a reputation in this field not only within the country but also outside in European, African & Middle Eastern countries.

"Story of the journey from a CPSU Engineer to a Builder of an Engineering Industry" – By Swarup Talukder



https://www.youtube.com/watch?v = hPxsBHUUEhA

Tapan Dasgupta (1984) turns out to be another entrepreneur after serving anElectricity Generation Company for nineteen years after graduation and

the 5th Tech Talk dated December 16,2023,is all about his own build-up. He established an electrical project engineering company named "Powertronix Engineering Pvt Ltd", in short PEPL. From a humble beginning, it has culminated in a well-established company for planning and execution of various projects of newly built power plants throughout India and Bangladesh with a workforce of about two thousand. This is an eye-opener for those who doubt the capability of the Sons of Bengal to develop and run a business. In this talk he preferred not to talk much about his own company, rather he spent much of his time elaborating more about both opportunities and hurdles in doing business in a huge country like India where diversity is a rule rather than an exception. Being a large country it is a great advantage to do business seamlessly in any corner of the country. Again, because of the existence of a good number of states each having their unique rules and cultural milieu, one has to struggle hard to meet the local laws and regulations too. This talk will help to a large extent to get a preliminary idea about Do's and Don'ts for any budding entrepreneur. His candid confession is that knowing the basic rules of company and tax laws etc. is a must for all beginners of his or her own business. Too much dependence on external help incurs trouble quite often ashe explained with the help of his own experiences. He mentioned the joy of handling projects of his own and also mentioned about his satisfaction in providing employment to young men, i.e., providing means of subsistence to a large number of families.

"Sharing of Hands-On Experience of Doing Business by an Entrepreneur"

– By Tapan Dasgupta

https://www.youtube.com/watch?v = bQUv8kUuvkg

Dr. Siddhartha Bhattacharyya, an alumnus of the 1998 batch, offered the 6th Tech Talk titled Quantum Computing: A Gentle Introduction on September 28, 2024, so far the latest in the row of the Talk programme till the materials of souvenir are given to print. Siddhartha is currently serving as a Senior Researcher in the faculty of Electrical Engineering and Computer Science at VSB Technical University of Ostrava, Czech Republic. He is also serving as the Scientific Advisor of Algebra University College, Zagreb, Croatia. He is a co-author of 6 books

and the co-editor of 106 books and has more than 400 research publications in international journals and conference proceedings to his credit. He has two PCTs to his credit. He has been a member of the organizing and technical program committees of several national and international conferences.

Abstract: Quantum computing is a relatively new computing paradigm inspired by the principles of quantum physics and its features of wave function, superposition, entanglement, coherence, and measurement to name a few. This talk aims to introduce the fundamentals of this computing paradigm to the audience concerning the basic elements in qubits, their properties, and quantum gates. An insight into the IBM Qiskit platform will also be provided at the end of the talk.

"Quantum Computing: A Gentle Introduction"
– By Dr Siddhartha Bhattacharyya

https://www.youtube.com/watch?v = aC9qouxuBhg

In lieu of summing-up:

It is highly interesting to see that the Tech Talk programmes arrayed over a span of sixteen months – six in number so far from May 2023 to September 2024 – manifest the topics in great diversity in the wide arena of advancing engineering and technology. While two of these are focussed on intricacies of instrumentation and control in chemical and glass industries from the viewpoints of two serving engineers, two illuminate the less ventured trajectories of entrepreneurship in the field of power equipment manufacture keeping behind the safe and secure past as employees. The other two, although deeply touching the enigma of software, are far apart from their respective orientation – QC and SDV; better to expand: Quantum Computing and Software-driven vehicle. The alumni years of the speakers incidentally cover the rest of the last century since the mid-seventies. For the space constraint, the complete text of the talks cannot be given in print, but YouTube links are attached for ready reference. We are hopeful to have continuation of Tech Talk programme in coming days with defining topics from our galaxy of alumni.

[Report prepared by Satyaban Roy]

7

63rd Reunion

Centenary Celebration of the Department of Applied Physics

৬৩-তম পুনর্মিলন

1925 - 2024
Applied Physics
100 Glorious Years of Journey

Secretary's Report: 63rd Reunion held on January 28, 2024

We celebrated 63rd Reunion on 28th January 2024. It was held just after the four-day-long Centenary Celebration of the Department of Applied Physics. The 63rd Reunion could be made so colourful due to your overwhelming support and gracious presence. Particular mention is to be made of the support of our Networking Group of the Alumni Association which made it possible to connect thousands of Alumni around the world. We could make it a Grand event with the financial support of the Centenary Committee.

This time we invited the spouses of our Alumni which made the event more colourful. You will be pleased to know that the total headcount on that day, including Alumni, their Spouse, Faculty, Staff, and Students of the department, was 700. We distributed a gift pack to all alumni and students on Reunion Day which contained two publications, namely, the Centenary Volume and the Souvenir. Besides, there were other gift items too. You are the best judge to assess the success of the 63rd Reunion. It could be held with the active support of the Alumni Association and the faculty, staff, and students of the department.

Your presence makes our Applied Physics community vibrant and impactful. Let us come together to honour our past, celebrate our present, and embrace the opportunities ahead.

I am thankful to all Faculty members and, the Alumni Association for their untiring support, and congratulations to all Students for their efforts to make the Reunion a SUCCESS.

Warm regards,
Secretary,
Applied Physics Students' Reunion

General Body Meeting

63rd Reunion of the Department of Applied Physics
28 January 2024
Meghnad Saha Auditorium

Members present: 173

The meeting started at 10:30 am with Dr. Anup Mandal, the President of the Reunion Committee in the Chair. Sri Nirmal Murmu, Professor Rajarshi Gupta, and Professor Samarjit Sengupta also took the stage. Discussions started agenda-wise.

Item No. 1: Welcomeaddress byHOD

At the outset, Professor Kaushik Das Sharma, the Head of the Department welcomed all members present in the Hall. He deliberated on different activities of the centenary celebration of the department and also the year-long unstinted efforts and support by the alumni, teachers, staff and students of the department. He requested everybody to enjoy this gala-day full of events and memories.

Item No. 2: Speech by the President of the Reunion Committee

Dr. Anup Mandal, the President of the Reunion Committee welcomed the alumni members and all other members for their support and participation in the 63rd reunion and the centenary celebration of the department.

Item No. 3: Presentation of Secretary Report and Income Expenditure Statement

(a) In the absence of Professor Sumana Choudhuri, the President invited Sri Nirmal Murmu to present the Secretary's report. The report was read out by Sri Nirmal Murmu. After discussion, it was adopted.

Resolution: It is resolved that the Secretary's report be adopted unanimously.

Proposed by: Amitava Biswas (Faculty)

Seconded by: Dipak Mandal (Faculty)

(b) Professor Rajarshi Gupta, as treasurer was invited to present the last year's income and expenditure statement along with the budget for the next reunion to be held in January 2025. He read out the written statement of accounts and the budget proposal. During the discussion, Professor Asit Kumar Dutta (1965) opined that the statement of accounts should be circulated before the meeting. Prof. Gupta accepted and assured me that follow the same in the future.

Resolution: It is resolved that the Income–Expenditure Statement of the 62nd Reunion and the budget for the 64th reunion to be held in January 2025 be adopted.

Income–Expenditure Statement of the 62nd Reunion be accepted:

Proposed by: Jyotirmoy Guha (1980), Seconded by: Debasish Ghosh (1986)

The budget for the 64th reunion is accepted:

Proposed by: Uday Banerjee (1982), Seconded by: Soumendra Gupta (1985)

Item No. 4: Formation of Applied Physics Alumni Association (APAA)

The next part of the session was devoted to presenting the draft guideline for the formation and running of the Alumni Association. Prof. Samarjit Sengupta, the ad-hoc president of APAA, gave a brief introduction about the background of the draft preparation through discussions among alumni members. The draft was circulated in advance among the alumni through emails. (RNC's addition). Then, he invited Prof. Kaushik Das Sharma to briefly describe the salient features of the guideline for the proposed alumni association.

Prof. Das Sharma presented the salient features of the interim guideline with the help of a PowerPoint presentation. He explained that this guideline is to initiate the functioning of the association and this may again be amended at the time of formal registration under the Society Registration Act. In the end, he moved a resolution for ratification of the draft. The resolution reads as:

"This meeting dated 28th January 2024 of the General Body of the Applied Physics Alumni approves the proposal of formation of the Applied Physics Alumni Association (APAA) and the guidelines set for it".

At this point, Prof. Asit Kumar Datta pointed out that the guideline should have a 'Mission and Vision'. In the circulated guideline it has been mentioned as 'Aims and Objectives'.

Afterward, as per the guidelines of the association, the names of a few alumni were suggested as office bearers and executive members. Before suggesting the names, the basis for the selection of names was explained. It was said that the names were chosen based on involvement during the course of preparation of the centenary celebration. The declared names were as follows:

Resolution: It is resolved that

(a) "This meeting dated 28th January 2024 of the General Body of the Applied Physics Alumni approves the proposal of formation of the Applied Physics Alumni Association (APAA) and the guidelines set for it".

(b) The members of the Executive Committee for the 1st term are as follows:

1. Kaushik Das Sharma (HOD), 1998 -PATRON (Ex-Officio), 2. Probir Kumar Bhattacharya, 1970 CO-PATRON, 3. Achintya Mukhopadhyay (OS)*, 1971 CO-PATRON, 4. Rabindranath Chakraborty, 1965 – President, 5. Anup Kumar Mandal, 1972 – Vice President, 6. Samarjit Sengupta, 1973 – Vice President, 7. Ranjan Ghosh (OS), 1970 – Vice President, 8. Siddhartha Pal, 1985 – Secretary, 9. Satyaban Roy, 1975 – Joint Secretary, 10. Rajarshi Gupta (Faculty), 1995– Joint Secretary, 11. Jitendra Nath Bera (Faculty), 1990 – Treasurer, 12. Sumana Chowdhury (Faculty), 13. Nirmal Murmu (Faculty), 14. Binay Karmakar (Faculty), 15. Sudip Saha, 1971, 16. Siddhartha Sen Majumder, 1976, 17. Parthapriya De, 1977, 18. Saswati Mukhopadhyay, 1977, 19. Debabrata Sarkar, (OS),1981, 20. Subrata Paul, 1982, 21. Asish Mandal (OS), 1985, 22. Parthapratim Bhaskar (OS), 1985, 23. Debasis Ghosh, 1986, 24. Prabhakar Pal (OS), 1988, 25. Dibyendu Datta (OS), 1989, 26. Debi Prasad Sen, 1990, 27. Dwaipayan Bhattacharya, 1998, 28. Saswata Banerjee, 2001, 29. Tushar Datta (OS), 2001, 30. Sumi Pal, 2001, 31. Neha Duary, 2006, 32. Srimanti Roychoudhury (OS), 2008, 33. Sumangal Bhaumik, 2015, 34. Amitava Biswas (Faculty), 35. Dipak Mandal (Faculty)

*[**OS** stands for Out Station]

Proposed by: Sudip Saha (1971)

Seconded by: Siddhartha Sen Majumder (1976)

Item No. 5: Formation of Executive Committee for 64th Applied Physics Reunion

As requested by President Dr. Mandal, the House proposed a few names of the office bearers for the 64th reunion committee. The names and designations were as follows:

REUNION COMMITTEE

Resolution: The executive committee for the 64th Applied Physics Reunion is formed as follows:

President: Anup Kumar Mandal (1972)

Vice President:
1. Samarjit Sengupta (From Alumni) (1973)
2. The second name to be chosen from the Faculty members

Joint Secretaries:
1. Sudip Kumar Saha (From Alumni) (1971)
2. Parthapriya De (From Alumni) (1977)
3. One from the faculty members
4. Two from Research Scholar / Student

Treasurer: To be chosen from the faculty members.

The full body of the reunion committee be formed after discussion with the faculty members and the students.

Proposed by: Samarjit Sengupta (1973)

Seconded by: Srimanti Roychoudhury (2008)

Item No. 6: Alumni Interaction (In a separate document)

Item No. 7: Any other point with the permission of the President

Nil

Participation count on the 63rd Reunion day was as follows:

1. Alumni + Faculty Members = 357
2. Students = 137

Total = 494

There being no other points, the meeting ended with a vote of thanks to the President.

A brief account of the Alumni Views at the Interaction Session

Interaction Session at the 63rd Reunion 2024 held on 28 Jan 2024

Saumendra Gupta of the 1985 batch initiated the discussion by suggesting that the classes conducted by the alumni for soft skill generation of the students of different batches should be properly documented. These lectures may be compiled and published at some interval of say 5 years. This lecture series may be useful material for the students to prepare for job interviews in the future.

Biswanath Ghosh of the 1982 batch lamented that for some time NTPC has stopped recruiting the students of our department. Earlier they used to recruit our students regularly. But practice has been discontinued, maybe, due to some miscommunication. They may not be aware of the nature of the course curriculum of our department. He suggested that the Department should make an effort to get in touch with the NTPC authority and make them aware of the course curriculum of our department. He specially requested our HOD to take this initiative.

Pathik Nayek of the 1989 batch said that he was delighted to see the assembly of so many 'dada-didi-bhai-bon' of the department. He was feeling very happy to see them all together. He thanked the organisers for their efforts to make it happen. He suggested that the alumni association may take some initiative to develop some laboratory facilities for the department on the occasion of the centenary celebration. By doing so the association may prove its worth.

Dibyendu Nath of the 1986 batch has suggested that our alumni association may help the department in various ways. It may help in getting industrial collaborative programs. It may help in finding companies who may come for campus interviews. It may also help the students gain hands-on experience through short-term industrial training after completion of B Tech or M Tech courses. It may also arrange for industrial tours for the students.

Probir Bhattacharyya of the 1971 batch recalled the lecture of Prof Wuqiang Yang who talked about the capacitive sensors as used in roboticdesigns. He drew attention to the applicability of such capacitive sensors for security devices suitable for airports. He suggested that our department may undertake some research projects in this area.

Rabindranath Chakraborty of 1965 reminded everybody that ours being a centenary old institute with a large number of alumni members holding responsible positions in a wide range of industries scattered throughout the country and abroad has all the potential to become a vibrant organisation with the active participation of its members. The large talent pool of the alumni members taken together can generate many useful activities for the department. Our alumni members are the brand ambassadors of our department. The presence of our alumni members in large numbers would assure the current students about the brand of our department.

The alumni association can help the current students in several ways. They may help them gain the experience of industry ambiance by providing short-term training facilities at their companies. The members may share their technical experience through lectures and videos posted on the YouTube channel of the Alumni Association. Nowadays, a YouTube channel may be the better means of branding the department by enriching its content with a variety of technical topics.

The alumni association can extend financial and/or material help to the students. In this connection, he recalled the assurance he received from Sri Mrinal Kanti Saha of the 1968 batch and Sri Tapan Dasgupta of the 1984 batch who committed to donate Rupees one lakh each if any such fund is created. He appreciated the proposal of some of the alumni members to create a

Centenary Laboratory or some collaborative activities with the industries. But it needs money of the order of several crores. This can very well be achieved if the alumni members take the initiative to bring in CSR funds from the industries based on well-formulated projects. If seriously tried, money of the order of 5 to 10 crores may easily be fetched from the CSR fund of the industry houses for academic purposes like this.

Balendranath Lahiri of the 1968 batch made a brief comment. It appears that in the initial part of his comment, he appreciated the opinion expressed by the earlier speaker. However, the remaining part of his comment could not be deciphered due to the defective audio quality of the video recording and the surrounding noise. (Apology for the inconvenience.)

Samarjit Sengupta of the 1973 batch reminded us about how the department came to the university's service. In 2000 the university requested our department to study the existing electrical power distribution system of the College Street, Rajabazar and Ballygunge Science College Campus. The system in use was very old. So, a total overhaul of it became necessary. It was a very complex problem. It needs proper evaluation of existing conditions to make any future plans. The department successfully assessed the system and submitted a report. Based on that report, the electrical distribution system was overhauled in 2005 at a cost of Rs.35 crores. The department played a vital role in monitoring the work during the execution of the project and also the work was executed by an ex-applied entrepreneur. The electrical network of the Salt Lake campus was also executed under the guidance of the department.

[This is not a verbatim reproduction of the speeches. Every word of the speech could not be deciphered due to the poor quality of the video. Compiled by Rabindranath Chakraborty.]

Members present in AGM dt 28.01.24

1	Ranjan Ghosh-1970	32	Ashok Punjabi-1979
2	Rabindranath Chakraborty-1965	33	Asim Kumar De-1978
3	Sushanta Saha-1987	34	Mriganka Basak-1974
4	Ratna Bandyopadhyaya-1968	35	Biswajit Mitra-1977
5	Probir Kumar Bhattacharyya-1970	36	Swarup Talukdar-1977
6	Anu Bhattacharya-1970	37	Pranab Kanti Datta Majumder-1974
7	Kanti Bhushan Datta-1960	38	Gour Kishore Biswas-1974
8	Kaushik Das Sharma-1998	39	Pramatesh Das-1965
9	Uday Banerjee-1982	40	Chandan Kumar Bandyopadhyay-1965
10	Dipank Chandra Patranabis-1958	41	Pranab Kumar Chattopadhyay-1965
11	Debasish Ghosh-1986	42	Sananda Pal-2010
12	Saumendra Gupta-1985	43	Joydip Sarkar-1981
13	Abani Bhusan Bera-1985	44	Somnath Thakur-1981
14	Anupendra Narayan Bhattacharya-1966	45	Prabir Kumar Datta-1981
15	Swapan Kumar Roy-1966	46	Soumitra Basu-1981
16	Sumit Kumar Sanyal-1970	47	Sujoy Kumar Banerjee-1981
17	Manojit Kumar Basak -1974	48	Atanu Bag-1985
18	Baijnath Prasad-1974	49	Balendra Nath Lahiri-1967
19	Partha Pratim Bhaskar-1985	50	Subrata Pal-1982
20	Bimal Kumar Santra-1974	51	Ajey Kumar Rout-1975
21	Asit Kumar Datta-1963	52	Pranab Kumar Kar-1973
22	Srimanti Roy Chowdhury-2008	53	Krishna Kamal Mallik-1974
23	Rajprasanta Chakraborty-1994	54	Ram Prasad Hajra-1974
24	Sudip Kumar Saha-1968	55	Jayanta Kumar Roy-2000
25	Brajendra Kumar Santra-1967	56	Satyaban Roy-1975
26	Amal Chandra Debnath-1967	57	Ratan Mukhopadhyaya-1975
27	Siddhartha Pal-1985	58	Sampa Saha (Nayek)-1989
28	Jyotirmay Guha-1980	59	Pathik Kumar Nayek-1989
29	Gautam Banerjee-1970	60	Susanta Bhattacharya-1989
30	Gautam Basak -1979	61	Prabhakar Pal-1988
31	Soumitra Ranjan Mitra-1979	62	Souvik Pal-2019

63	Rajat Kumar Ghosh-2003	99	Narayan De-1993
64	Tapas Kumar Kundu-1979	100	Sanjay Guha-1998
65	Debi Prasad Bhowmik-1967	101	Subhankar Chatterjee-2008
66	Asok Kumar Roy-1967	102	Sudip Talukder-2007
67	Samir Kumar Sarkar-1967	103	Sanghamitra Banerjee-2019
68	Dipendu Kumar De-1967	104	Jayanta Majee-2007
69	Dilip Kumar Das-1967	105	Achintya Mahata-2010
70	Syama Prasad Bajpayee-1971	106	Sayana Majumdar-2017
71	Colonel Balaram Mandal (R)-1971	107	Arka Bhattacharya-2017
72	Krishna Prasad Datta-1971	108	Swapnil Bardhan-2017
73	Chandan Kumar Datta-1971	109	Abhijit Nandi-1986
74	Sudip Saha-1971	110	Dibyendu Nath-1986
75	Jayita Datta-1985	111	Nitai Kumar Barat-1972
76	Jayanta Kumar Mukhopadhyay-1973	112	Ranjit Das-1972
77	Suman Kalyan Malaker-2001	113	Someswar Gupta-1972
78	Sumi Pal-2001	114	Asish Saha-1987
79	Anindya Pal-2001	115	Anup Das-1992
80	Ananta Sinha Ray-1981	116	Subhadip Sarkar-1992
81	Chiraranjan Saha-1981	117	Arijit Sarkar-1992
82	Uttam Kumar Bhaumik-1981	118	Arnab Halder-1992
83	Kamal Kumar Datta-1981	119	Anupam Saha-1992
84	Anil Kumar Bag-1999	120	Susmita Das-2008
85	Supriyo Sarkar-1998	121	Khusi Kumari-2023
86	Jayanta Kumar Chandra-1998	122	Anmol Nachiketa-2023
87	Surajit Roy-2000	123	Anmol Singh-2023
88	Saumyendranath Ghosh-1985	124	Anand Raj-2023
89	Subhankar Basak-2011	125	Debasis Guha-1992
90	Swagata Kundu-2012	126	Apurba Kumar Basu-1980
91	Achintya Kumar Mukhopadhyay-1971	127	Soma Dey-1986
92	BikramadityaSasmal-1980	128	Sampa Ray-1986
93	P. G. Shaw-1980	129	Bibekananda Chakraborty-1958
94	Chiranjib Bhowmik-1991	130	Aparna Saha-1986
95	Arundhati Bandyopadhyay-1986	131	Arabinda Das-1986
96	Debasis Sen-1980	132	Kamal Kumar Das-1986
97	Dipak Ghosh-1982	133	Akshay Kumar Bid-1986
98	Tridib Halder-1998	134	Tapas Sarkar-1977

135	Abhijit Mandal-1994	155	Kshitish Ray Chaudhuri-1973
136	Biswanath Ghosh-1982	156	Rupendra Nath Majumdar-1973
137	Asim Kumar Ghosh-1977	157	Susanta Chakraborty-1980
138	Premananda Manna-2014	158	Swapan Roy Chowdhuri-1973
139	Ujjal Sur-2014	159	Gopa Dey (Ganguly)-1973
140	Shubhrajyoti Mitra-2018	160	Kalpesh Maiti-1977
141	Shantanu Singha Roy-2021	161	Barnali Chatterjee-2013
142	Arijit Basak-2020	162	Amit Khan-2013
143	Abhishek Majumder-2015	163	Dipon Das-2015
144	Rajarshi Gupta-1995	164	Abhishek Das-2013
145	Samarjit Sengupta-1973	165	Soumen Chakraborty-2011
146	Satyabrata Gupta-1965	166	Bivash mandal-2010
147	Arun Kumar Majumdar-1965	167	Partha Pratim Roy-1980
148	Saswati Mukhopadhyay-1977	168	Shila Ghosh (Chandra)-1984
149	Krishna Das-1977	169	Towsif Ahmed-2015
150	Debiprasad Deb-1965	170	Souvik Roy-2015
151	Nirmalya Majumdar-1965	171	Suranjan Das-2015
152	Anupam Kumar Das-2002	172	Nirmal Murmu-Faculty
153	Sanjoy Dutta-2002	173	Anup Kumar Mandal-1972
154	Subhasish Sengupta-1974		

CULTURAL EVENTS

Cultural Program: Events & Timings			
Sl. No.	Name and Description	Time (Mins)	Timings/PM
1	Inauguration of the Cultural Program with Chanting of Vedic Mantra by Dr Binoy Kumar Karmakar	3	02:27-02:30
2	Bishwajit Chakraborty (1978): On Setar/ Raag Tori/Raag Yamuna	15	02:30-02:45
3	Mr. Sudip Saha (1968): Recitation of self-composed poem & Rabindra Sangeet	9	02:49-03:01
4	Sumit Sinha (1985): OnViolin-Akash Bhora Surjo Tara…	10	03:05-03:15
5 6	Ranit Ghosh (2014): Harmonica Presentation-Part:1 Ratna Bandyopadhyay (1968): Recitation-Jhultey – Jhultey…	5 5	03:18-03:23 03:26-03:31
7	Sumi Pal (2001): Solo Dance-Bharatnatyam / Toriyam	4	03:34-03:38
8	Prabhakar Paul (1988): Rabindra Sangit-Onek Kotha Bolechilem.	4	03:42-03:46
9	Dance: Duet by Trisha Chatterjee MT EE4 and Shatabdi Lahiri MT EE 4on Marathi Song	4	03:49-03:53
10	Dance: Solo by Bhaswati Chakraborti MT EE2 on Madhura Dhwani…	4	03:55-03:59
11	University Song: Written and composed by Swapan Kumar Jana	5	04:01-04:06
12	Song:Purano Sei Diner Kotha with Bondhu Tomar Pother Sathi by Faculty, Staff, New & Past Students	8	04:09-04:17
13	Subrata Pal (1982): SongDekhechiRupsagore, Bhenge Mor Ghorer Chabi, Oi Ujjolo Din…	8	04:20-04:28
14	Ranjan Ghosh (1970): Solo Acting – AthoGonopoti Kotha	3	04:31-04:34
15	Saumendra Gupta (1985): Bengali & EnglishRecitation	5	04:36-04:41
16	Ranit Ghosh (2014): Harmonica Presentation-Part: 2	5	04:44-04:49
17	Brati Ranjan Das (1972): Song-MucheyJaowa Din Guli…	4	04:52-04:56
18	Duet Song: by Swapan Kr. Jana and Banachhaya Jana-Amar BhitoroBahirey	4	05:04-05:08

19	Group Song: Dr Binoy Kumar Karmakar, Swapan Kumar Jana, Satabdi Lahiri, Trisha Chatterjee, Partha Brata Ghosh, Sayantani Biswas, Rwik Mondal, Joyita Chowdhury, Octopad: Anuvab Bakshi, Keyboard: Soumik Banerjee	11	05:10-05:19
20	Folk Song: Sayandeep Das MT EE1-Tomay Hrid Majharey Rakhbo…, Chere diley sonar gour… Keyboard: Soumik Banerjee MT EE1	4	05:21-05:25
21	Department Theme Song Witten and Composed by Swapan Kumar Jana: Performed by Dr Binoy Kumar Karmakar, Swapan Kumar Jana, Satabdi Lahiri, Trisha Chatterjee, Partha Brata Ghosh, Sayantani Biswas, Rik Mondal, Joyita Chowdhury; Octopad: Anuvab Bakshi, Keyboard: Soumik Banerjee	3	05:27-05:30
22	Group Dance: By Sohini Haldar, Suchismita Dutta, Soumi Mukherjee, Oliva Dutta Banik, Moumita Mondal	5	05:34-05:39
23	Solo Dance: By Sayantani Biswas on ProthomoAditomo…	4	05:42-05:46
24	Solo Dance: By Sohini Das on TomakeBhalobese…	3	05:49-05:52
25	Solo Dance: By Joyita Chowdhury on Coldplay	5	05:55-06:00
26	Drama: Mahabrikkho		
	Drama Prep time	15	06:02-06:16
	MahabrikkhoWritten by Ushnik Chakrabarti, Jointly Directed by Bedprakash Das and Ushnik Chakrabarti Announcement after the Drama by Bedprakash Das Cast: Bhaswati Chakraborty, Ushnik Chakraborty, Manjusha Roy, Partha Brata Ghosh, Shatabdi Lahiri, Saikat Dey, Trisha Chatterjee, Trdip Dutta, Partha Sarathi Maity	30	06:16-06:46

[Cultural Event Report compiled by Dr. Benoy Kr Karmakar]

8

Feature Articles

Centenary Celebration of the Department of Applied Physics

প্রবন্ধ-নিবন্ধ

Impact of Generative AI for Engineering Education

Tultul Chakraborty (Majumder)

Generative Artificial Intelligence (AI) is a cool, growing field that uses machine learning to whip up content based on patterns from existing data—whether that's text, images, or even whole simulations. It lets us create fresh, valuable content without needing to code everything from scratch. In the realm of engineering education, generative AI can really shake things up by changing how we craft, update, and share educational materials with students. It's a game changer, tackling the usual headache of generating and delivering content. Traditionally, whipping up relevant, up-to-date material in engineering has been super time-consuming for educators. But generative AI steps in as a smart solution, automating content creation. This means educators can give students dynamic, tailored learning experiences that stay current with the latest in their fields. That said, we've also got to be careful about the downsides of AI, like misinformation and biases, and the potential for academic misconduct from both students and educators.

A. Advantages of Generative AI in Content Generation

1) Enhanced Currency and Relevance

One big plus of generative AI in engineering education is how it can churn out relevant and up-to-date content. By tapping into machine learning algorithms grounded in Natural Language Processing, tools like ChatGPT, Bard, Midjourney, and Perplexity can sift through loads of data from all sorts of sources—think research papers, industry reports, and real-world case studies. This means we get educational materials that reflect the latest happenings in the field, with all the newest theories, technologies, and best practices included.

2) Adaptive and Personalized Learning

Generative AI can also make learning way more personal and adaptable for students. By looking at individual learning styles and patterns, these algorithms can create customized educational content tailored to each student's unique needs and preferences. This not only boosts student engagement but also helps in achieving better learning outcomes. For instance, generative AI could adjust the difficulty of problem sets or suggest extra resources based on how a student is doing.

3) Smart Curriculum Updates

Keeping the curriculum fresh is a real challenge for educators, especially in fast-paced engineering fields. Generative AI makes this a whole lot easier by automating how new content is generated and integrated. When new research or tech advancements come about, these algorithms can quickly analyze the info and update the curriculum accordingly. This way, students get the most recent and accurate knowledge, setting them up for success in the industry.

4) Virtual and Simulated Experimentation

Generative AI can whip up realistic simulations and virtual experiments, giving students some great hands-on learning experiences. For example, in electrical engineering, these algorithms can create virtual circuit simulations where students can design and test electrical circuits in a safe and interactive setting. In mechanical engineering, generative AI can craft virtual simulations of complex machines, systems, or manufacturing processes, letting students dive into the details and really get a grasp on how everything works.

Overall, generative AI is super promising and has the potential to change the game in engineering education. From generating content and providing personalized learning experiences to helping with quick curriculum updates, generative AI boosts the relevance, currency, and engagement of educational materials. It empowers educators to offer dynamic and up-to-date content to students, prepping them for the constantly changing demands of the engineering industry. Incorporating generative AI into engineering education could totally revolutionize how students learn and give them the knowledge and skills they need for success in their careers.

B. Generative AI in Electrical Engineering Education

I. Current Issues & Challenges

Electrical engineering (EE) education has its share of hurdles, especially

in keeping pace with the fast-moving field. One major challenge is getting timely development and delivery of course materials that reflect the latest advancements in electrical engineering. Traditional methods of content generation often fall behind, leaving students with outdated resources. Plus, hands-on learning experiences—like simulations and practical applications—can be tough to come by due to limited resources and the complexity of electrical systems. But generative AI is stepping up with some promising solutions to tackle these issues.

II. Applications of Generative AI in Electrical Engineering Domain

1) Modern and Up-to-date Course Materials on Energy Systems

Generative AI can play a big role in creating and updating course materials focused on renewable energy systems. As renewable energy tech continues to grow rapidly, it's crucial for electrical engineering students to stay on top of the latest developments. The challenge of integrating renewable sources (which can be affected by weather) to meet specific power needs with limited storage will likely stick around for a while. Generative AI algorithms can dig through tons of data from research papers, industry reports, and renewable energy databases to whip up current course materials. This way, students get exposed to the freshest theories, technologies, and best practices in renewable energy systems.

2) Advanced Smart Grids: Tutorials and Simulations

Generative AI can make a big difference in creating tutorials and simulations for understanding smart grids. Smart grids use advanced communication and info tech to optimize how electrical power is generated, distributed, and used. Crafting comprehensive tutorials and simulations for smart grids can be pretty tricky due to their complexity. But with generative AI, we can whip up interactive tutorials and realistic simulations that let students dive into and analyze how smart grid systems work. This really boosts their grasp of this cutting-edge tech.

3) IoT Applications in Power Systems: Hands-on Learning Method

The Internet of Things (IoT) has changed the game in various industries, including power systems. Generative AI can play a key role in creating hands-on learning experiences that allow students to explore IoT applications in power systems. By using generative AI algorithms, educators can design virtual environments where students can create, simulate, and analyze

IoT-enabled power systems. This hands-on approach gives them practical experience in integrating IoT tech into power systems, sharpening their skills in this exciting area.

4) Sensors and Data Mesh

Combining data from a bunch of sensors to drive a specific application can be a bit of a puzzle. Generative AI allows us to smartly and selectively fuse data from a smaller number of sensors, tackling multiple applications at once. This leads to compact, efficient, smart, and cost-effective systems. Students get the chance to learn and design practical, complex systems for real-world applications, making the curriculum feel a lot less abstract.

III. Accrued Benefits and Implications

Bringing generative AI into EE education packs plenty of benefits. First off, it keeps course materials fresh and relevant, showcasing the latest advancements in the field. This enhances education quality and equips students with the knowledge and skills they need to tackle real-world challenges. Secondly, generative AI makes it possible to create interactive and immersive learning experiences—think simulations and hands-on applications—that boost student engagement and understanding. Lastly, these AI tools can lighten the load for faculty by automating content generation, giving educators more time for student mentorship and personalized support.

That said, we also have to be mindful of the implications of rolling out generative AI in engineering education. Faculty and educators need to make sure that the content produced is accurate, reliable, and aligns with the learning goals. Keeping a close eye on and validating the material is crucial to maintain the integrity of the education provided. Plus, there might be a need for faculty training and upskilling to effectively use generative AI tools in their teaching methods.

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***Tultul Chakraborty (Majumder)**, an Applied Physics alumnus of the 1985 batch, has 20+ years of diverse experience in Silicon Valley. She completed her Masters in Computer Science from the University of Nebraska and did a series of condensed courses from the University of California, Berkeley, and Galvanize Bootcamp School specializing in data science and machine learning. Tultul specializes in data integration and data analysis driving digital capabilities to make the enterprise Customer-Led, Insights-Driven, Fast, And Connected. She worked in Oracle HQ in their famed ERP Application development for 10 years, building their Government and Education product before moving to consulting roles for the past 12 years. She has an avid interest in music, foreign language, and literary and social works. She is a resident of the San Francisco Bay Area for 25+ years with her husband Sudip and daughter Sharanya.*

DER Integration into Grid – An Overview

Bhaskar Bhattacharya

Over the past three decades, the electric utility industry has undergone a significant transformation to diversify and distribute resources. This shift has led to environmentally friendly resources, improved grid utilization, and more efficient electricity use by customers. However, this progress has introduced complexity and stress to the grid due to the variability of intermittent wind and solar photovoltaic (solar PV) resources, along with the anticipated integration of millions of distributed energy resources (DER).

Large scale penetration of DERs has brought in several challenges to the Electricity Industry and new challenges are emerging as the world marches toward a sustainable future goal. The impacts are varied and widespread across the value chain. Some of those are mentioned below:

1. Impacts on Grid Operation

a. **Reduced System Inertia:** The transition to renewable energy sources, such as wind and solar, which typically lack the inertia provided by conventional power plants, reduces overall system inertia. This makes the grid more susceptible to fluctuations and disturbances.

b. **Reduced Visibility:** The increase in distributed energy resources (DERs) can reduce grid operators' visibility into real-time grid conditions, complicating efforts to manage and predict grid performance.

c. **Increase in Hidden Load:** "Hidden load" refers to the electricity demand that isn't readily visible to grid operators, such as behind-the-meter resources. This can increase as more distributed energy resources are deployed, making it harder to accurately forecast and manage demand.

d. **Increase in Back feed:** Distributed generation, like rooftop solar panels, can lead to back feed, where excess power is sent back into the grid. This can cause voltage and stability issues if not properly managed.

The combined effect of the above results in:

- Increased chance of grid instability

- Heightened crew safety issues
- Increased level of complication related to service restoration after fault
- Higher complexity regarding fault protection scheme
- Potential of reduced asset life
- Potential impact on power quality (especially voltage profile)

2. Impacts on Business Operation

a. **Changing Rate Case Model:** With the integration of DER, utilities might need to shift from traditional Net-Asset-Valuation to models such as Performance-Based Regulation (PBR) or Revenue Decoupling. These models can better align utility incentives with customer benefits and grid modernization, encouraging investments in efficiency, reliability, and renewable integration rather than just capital expenditures.

b. **Changing Planning and Investment Priorities:** The influx of DER requires utilities to rethink their planning and investment strategies. Priorities might shift towards upgrading grid infrastructure to handle bi-directional energy flows, investing in energy storage systems, and enhancing cybersecurity measures to protect increasingly digital and decentralized networks. Additionally, more focus might be placed on demand response programs and smart grid technologies to optimize the use and distribution of energy.

c. **Emerging Prosumer Economic – Feed-in Tariffs:** As prosumers (consumers who also produce energy) become more prevalent, utilities must adapt to new economic models such as dynamic feed-in tariffs. These tariffs can provide incentives for prosumers to generate and feed electricity back into the grid at times when it is most needed, thus helping to balance supply and demand. This economic shift empowers consumers while requiring utilities to develop new strategies for integrating and compensating distributed generation.

d. **Additional Areas of Work – Registration, Coordination with Aggregation Agencies:** The rise of DER adds complexity to utility operations, necessitating new areas of work such as the registration of DER assets, and coordination with aggregation agencies that manage multiple distributed resources. This coordination ensures that DER can be effectively aggregated and dispatched, providing grid services such as frequency regulation and voltage support.

e. **Need for Reimagining Customer Relationship:** With the increasing role

of DER, utilities need to transform their customer relationships from a transactional to a more engagement-focused model. This involves educating customers about their energy use, offering personalized energy solutions, and engaging in proactive communication. By leveraging digital platforms and data analytics, utilities can provide customers with real-time insights, personalized energy management tools, and better customer service experiences.

3. **Impacts on IT Design and Operation**

   a. **Need of Multiparty Integration:** As DERs become more prevalent, utilities must integrate systems and data from multiple parties, including independent power producers, aggregators, and customers. This requires robust IT infrastructure to facilitate seamless communication, data sharing, and coordination across different stakeholders. Solutions like interoperable platforms and standardized protocols are essential to manage these integrations efficiently.

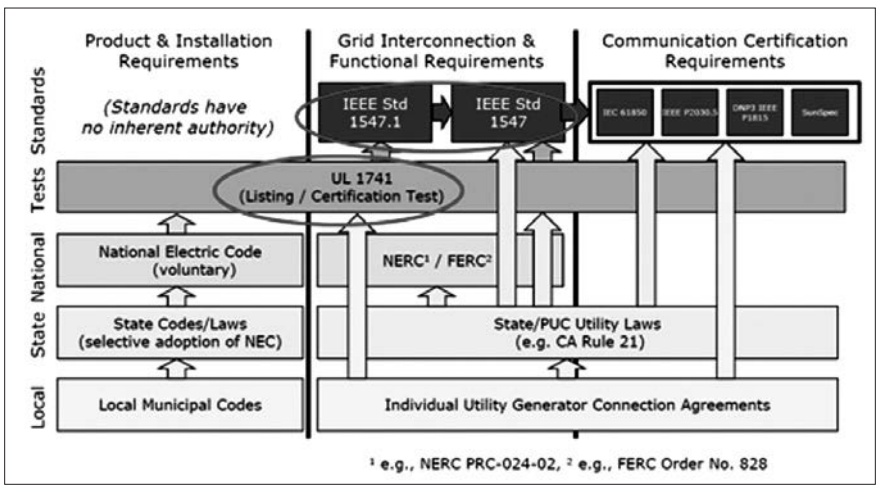
   b. **Data Volume Explosion with Accompanying Data Management Complexities:** The rise of DER results in an exponential increase in data generated from various sources such as smart meters, sensors, and distributed energy devices. This data deluge brings complexities in data management, requiring advanced data storage, processing, and analytics capabilities. Utilities must adopt big data technologies, real-time analytics, and scalable cloud solutions to handle this influx effectively.

   c. **Increasing Expectation of Situational Awareness in Internal Stakeholders:** With the integration of DER, there is a heightened expectation for real-time situational awareness among internal stakeholders. Utilities need to implement advanced monitoring and visualization tools to provide up-to-the-minute insights into grid performance, DER output, and potential issues. This enhanced awareness enables quicker decision-making and more effective grid management.

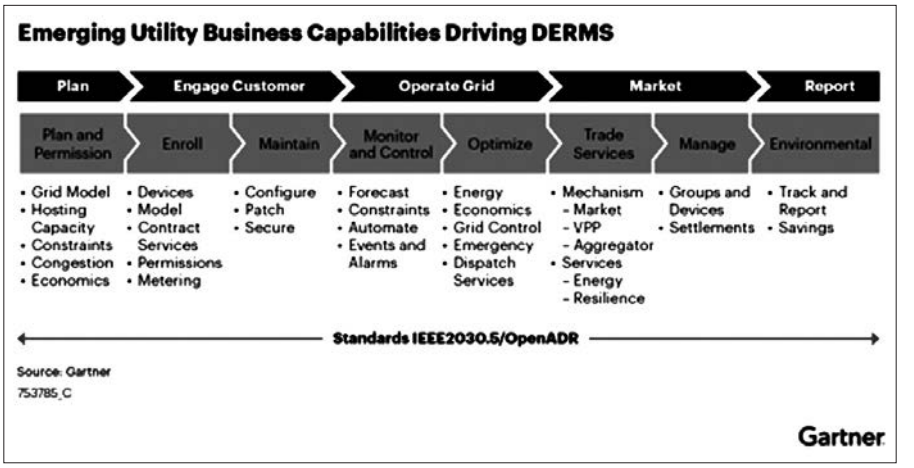
   d. **Need of Refactoring Existing Applications with Minimal Impact on BAU (Business-As-Usual):** The integration of DERs necessitates the refactoring of existing IT applications to accommodate new functionalities and interoperability requirements. This must be done with minimal disruption to day-to-day operations. Adopting microservices architecture and using agile development methodologies can help utilities update and integrate applications smoothly while maintaining business continuity.

e. **Heightened Security Concerns Due to Increasing Ingress Points:** The proliferation of DER devices increases the number of ingress points into the utility's network, thereby raising cybersecurity risks. Utilities must enhance their security posture by implementing robust cybersecurity measures such as multi-layered security frameworks, continuous monitoring, threat detection systems, and strict access controls to protect the grid from potential cyber threats.

Interoperability and standardization in communications have become essential for the sustainability and controllability of the modern grid. Various markets and standardization bodies have addressed these needs by developing multiple standards, some of which have gained significant popularity. Notable examples include IEEE 1547, UL 1741, IEEE 2030, and IEC 61850. The interconnectedness and relationships between these standards are illustrated in the figure below (for USA markets).



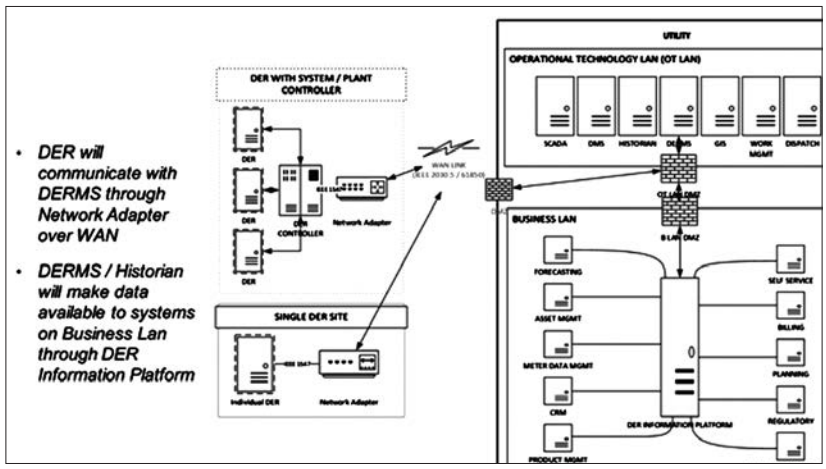
Most automation vendors have enhanced their offerings in Advanced Distribution Management Systems (ADMS) by incorporating Distributed Energy Resource Management Systems (DERMS). However, widespread DERMS implementation has not yet gained significant traction. This delay is not due to a lack of demand but rather due to several factors: the necessity to upgrade existing ADMS or implement new ADMS, ongoing debates around which communication protocols should be adopted, and the absence of Common Information Model (CIM) models for the networks. As per Gartner, the DERMS uptake will be due to the new or enhanced functionalities emerging in the Utility Industry:



As mentioned earlier, a large part of success would be centred around the abilities to:

1. predict the DER generation
2. control the DERs
3. integrate DER data into Operational Technology (OT) and Information Technology (IT) stacks
4. removing barriers to the introduction of DERs
5. allowing DERs to participate in Market mechanisms
6. implementing appropriate security and privacy measures

All of the above would need the interoperability and integration of the DERs into the OT and IT stacks of the Utility directly or through aggregation agency:



As shown in the diagram above, IEEE 1547 will enable standardised communication between the the DERs and the DER Controllers and IEEE 2030.5 would enable the capability of the DER Controllers to seamlessly communicate with the OT stack of the Utility.
DER Information Platform (DIP) will act as the source of truth for DER related information in Business Lan and will enable the capabilities:

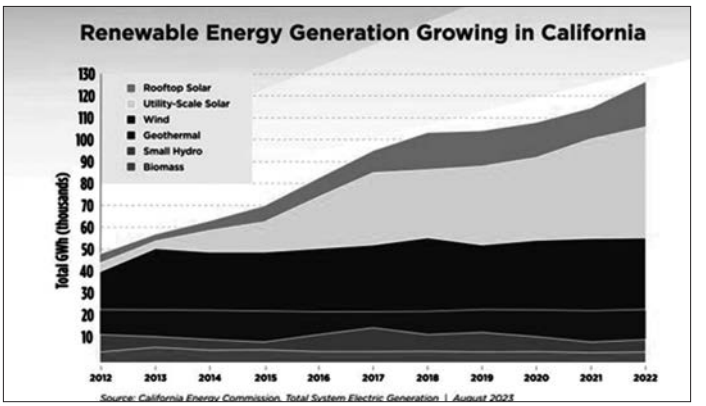
- Collect
  - Collect data from various sources pertaining to DER like
    - DERMS/Historian/DER Registration Platform/MDMS/Billing
- Provide
  - Provide automated interfaces with the upstream and downstream systems which will support
    - Periodic transfer based on business events
    - One time transfer
    - Non periodic transfers based on business events/user intervention
- Persist
  - Persist data in suitable storages – choice of type of storage being based on data type/data volume/access frequency/volume being accessed/aging/etc
- Allow
  - Allow computational load/analytical load to be developed and executed on the data to augment/enhance capabilities of the existing applications
- Create
  - Complete process audits of upstream, downstream and computational activities

Please find below a short summary of DER implementation in the California market. California has made significant progress in recent years to develop a solution that addresses the challenges posed by the growing adoption of rooftop solar. This effort led to the California Public Utilities Commission's (CPUC) June 2016 Rule 21 decision, which mandates that smart inverters be managed by utilities or DER operators/aggregators to ensure grid reliability.

Analysis of California's Total System Electric Generation report shows how its power mix has changed over the last decade. Since 2012[1]:

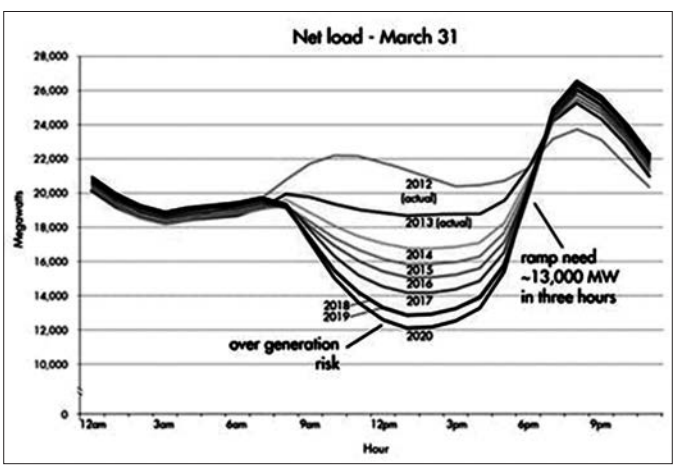
- Solar generation increased nearly twentyfold from 2,609 gigawatt-hours (GWh) to 48,950 GWh.

- Wind generation grew by 63 percent.
- Natural gas generation decreased 20 percent.
- Coal has been nearly phased-out of the power mix.

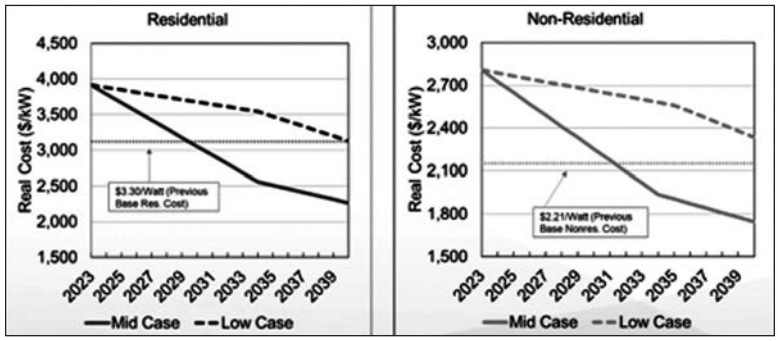


California Duck Curve – A Cautionary Tell on Solar Integration

One already-visible impact of the transition is the California Independent System Operator's ubiquitous "duck curve". The addition of a large amount of solar is forecasted to depress daytime generation net load from 9 a.m. to 5 p.m., which results in a steeper and more rapid ramp-up between the hours of 5 and 8 p.m., as solar generation drops off. Additional solar installations in subsequent years will exacerbate the magnitude of the ramp. The duck curve is often held up as a cautionary image for other states of what they can expect as the penetration of solar and other variable resources rises in their regions[2].



California Energy Commission predicts that with a higher uptake of Solar, the cost of generation per kilowatt will reduce substantially



California has adopted IEEE 1547 – 2018[3]. Over several years, California has developed requirements for the regulation functions as well as communications and control. Much of this effort was conducted by the Smart Inverter Working Group (SIWG), a joint effort led by the California Public Utilities Commission and the California Energy Commission, with involvement from numerous stakeholders, including utilities, manufacturers, developers, non-profits and other organizations. The SIWG's effort also informed development of the IEEE 1547 standard. SWIG's consensus recommendations for updating California's interconnection tariff (Rule 21) were developed in three phases, with adopted changes incorporated into the utilities' Advice Letters in the Rule 21 proceeding. Most recently, the utilities submitted revised Advice Letters to incorporate the phase 3 functions, which include the regulation functions, which as mentioned above, have the potential to reduce energy production of DER projects under certain situations. While somewhat contentious, these updates will require the default activation of the frequency-watt and volt-watt functions.

CA Rule 21 has selected the IEEE 2030.5 standard (also known as Smart Energy Profile 2.0) as the default communications protocol as it satisfies all the listed selection criteria. IEEE 2030.5 is a secure, scalable, and consumer-friendly application-layer protocol built upon standard Internet protocols. The standard contains DER object models based on IEC 61850, direct controls, autonomous curves, and status and metrology information. These features ensure the utility has the tools necessary to maintain grid stability and reliability .

In conclusion, integration of DER into the grid is a non-trivial challenge involving Operation, Business and IT changes. Different markets have responded

differently to the challenge; however, interoperability and integration have been central themes. Indian Market is expected to embrace renewable energy in major ways in days to come and it is also expected that DERs will get integrated into the Grid and will start playing a pivotal role in providing capacity and sustainability.

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2. https://sepapower.org/knowledge/california-a-case-study-on-ders-capability-to-replace-peaker-plants-for-grid-support/
3. https://irecusa.org/ieee-1547-2018-adoption-tracker-california/

***Bhaskar Bhattacharya**, an alumnus (1990) of the Applied Physics Department (CU) is a veteran in the Electricity Industry with over 30 years of global experience spanning different parts of the value chain. Bhaskar's expertise includes Solution Architecture, Program Management, Business Process Analysis and Reengineering in diverse fields such as Billing, Customer Care, Pricing, Forecasting, Network Analysis, CIM, Renewable Integration etc.*

State-of-the-Art Laboratories of the Department of Applied Physics

(Since 2005)

Report prepared by Prof Samarjit Sengupta with the help of the faculty members of the department

Following are a few significant Laboratory facilities along with other common ones available to our department. As the subject report is highly important for all concerned – students and alumni – it is felt for inclusion within the chapter of Articles – Publication Group

1.1 Real-Time Digital Simulator (from RTDS Technologies Inc., Canada)

Single Rack Real Time Digital Simulator including

(a) 1 Giga Processor Card (GPC), 4 Triple Processor Cards (3PC), 1 Workstation InterFace (WIF) Card per rack, and other accessories.

(b) High Precision DDAC analogue output (a total of 12 channel, optically isolated 16-bit D/A converters) rail mount unit.

(c) High Precision OADC analogue input (total of 6 channel, optically isolated 16–bit A/D converters) rail mount unit.

(d) RTDS Simulator Software including RSCAD Graphical User Interface Software, RTDS Compiler, and other accessories.

High Precision OADC analogue input (six numbers) rail mounted unit, RSCAD Graphical User Interface, RTDS pre-processing compiler, and Power and Control System Component Models library. It has the facility of Control System Testing and Protective Relay Testing. This system is provided with an operator station and an instructor station.

(e) Two nos. 2500W 4-Quadrant Linear Power Amplifier with 4000W matching resistive load for providing Power Hardware in the Loop (PHIL) simulation facility.

(f) Besides, the other simulation software is also equipped with this laboratory for various studies of modern power systems. These are

(i) ETAP

(ii) PSS-E

(iii) PSCAD

(iv) High voltage (up to 100 KV) partial discharge (PD) facility

1.2 Smart Grid Test Bed Laboratory

This newly developed Smart Grid Test Bed (SGTB) laboratory is capable of providingahands-on insight into the evolving trends of conventional power grids to SMART grids. All the required technologies, like (i) information and communication technologies; (ii) Sensing, measurement, control, and automation technologies; (iii) Power electronics and storage technologies, for successful implementation of smart grid are adopted in this laboratory testbed prototype. The schematic diagram of its functional blocks is shown in Figure 1. It is so designed that the system can be reconfigured as per the need of the testing of the newly developed product for the upgradation of the smart grid. The primary features of this SGTB are as follows:

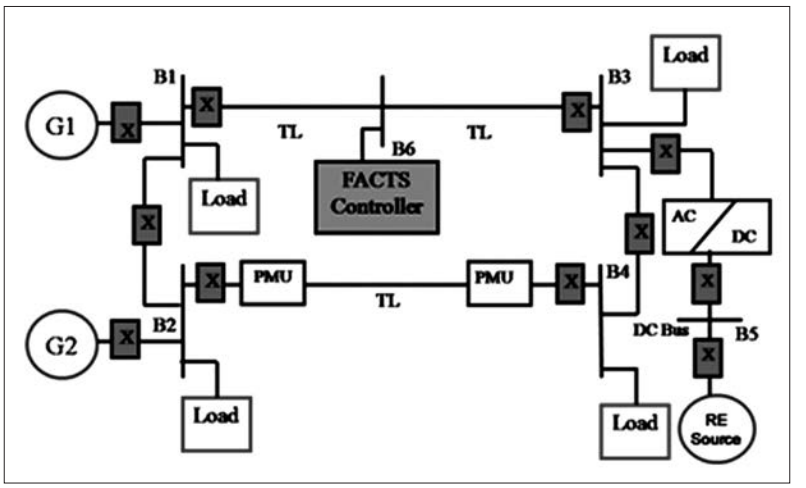


Fig.1: Schematic diagram of SGTB System

A) Smart HMI-based substation with power system control and monitoring panel

The objective is to develop a substation using a power system control and monitoring panel with its design, engineering, fabrication/manufacturing

along with all associated equipment including interconnection to the power supply system in a fully integrated manner. The basic scope of work includes the following:

(i) Incoming supply from grid and synchronous generator; (ii) Interfacing of 3rd supply source through Tie Line; (iii) Transmission Line and (iv) Integration of Renewable energy sources and so on.

B) Remote Smart Controller panel

Smart controller and communication panel for remote monitoring and control of hybrid generation, transmission, and distribution substations of power system towards smart grid test bed development.

C) Synchronous generator prime mover control panel with digital communication

A synchronous generator drive control panel with a digital communication facility along with all associated equipment in a fully integrated manner is incorporated.

D) Simulator module of 400 kV Transmission line of 1500 KM length with digital communication facility

The simulation panel is to work at 415V, 50 Hz supply to simulate a 400 kV Transmission line of 250 KM length with a digital communication facility. The length of the transmission line can be varied in multiple of 250 KM length by cascading such modules up to six (6) in numbers.

E) Load modules with a digital communication facility

The load modules will be comprised of: Individual R type with 5 kW capacity with remote or local selector switch, individual L type with 5 kW capacity with remote or local selector switch, and individual C type with 5 kW capacity with remote or local selector switch, or in combination of RL or RC or RLC with total capacity up to 5 kW with remote or local selector switch. The remote control will be done by a compatible digital communication system.

F) Drive panels for Wind Generator using PMSG and/or DFIG

Doubly Fed Induction Generator and/or Permanent Magnet Synchronous Generator (DFIG and/or PMSG) Control panel with digital communication for customized remote monitoring and control along with installation and commissioning services for the entire system.

G) Remote HMI control panel for Wind Generator

PLC Controller panel for Power system along with installation and commissioning services for the total system.

H) HMI control panel for other Renewable Energy

Module for Hybrid Renewable Energy penetrated AC and DC Bus Control panel with digital communication for customized remote monitoring and control along with installation and commissioning services for the entire system.

I) Development of Server and Multi-Client based Remote Monitoring System

Remote Client and Server-based smart grid test bed monitoring and storage system.

J) Power Electronics based grid-tied converter stacks

Module for3-phase Inverter Stack for a customized power converter to be integrated with solar or grid system. This Particular module can be used to make a hybrid DC microgrid with various kinds of resources and hybrid energy system as well. The hybrid AC microgrid can also be built with both grid-tied and standalone modes of operation.

The entire development of SGTB is funded bythe prestigious UGC SAP DRS-II project. This second phase i.e. DRS-II project (2015-2020) is awarded to our Department after the successful completion of its first phase (DRS-I) (2009-2014).

The developed laboratory is aimed to support laboratory work for two B.Tech and three M.Techpapers as per the current curriculum. So far, the system has beenutilized by 4 M.Tech. students for their end-semester projects. Three scholars are working on this line.

1.3 Real and Virtual Power and Process Laboratory

(a) This laboratory consists of a Distributed Control System (DCS), Yokogawa CS-3000, associated with Field Bus and HART Field Bus Instruments for connecting to DCS, Operator Station, and Instructor Station. This DCS has DCS MMI workstations and a DCS Input (32-DI) / Output (32-DO) simulation console. It is Foundation Field (FF) bus H1 and HART communication ready System.

(b) Software-based Process simulation package for different plant simulation

provided with Uninterruptible Power Supply unit and Multimedia Projector System. The plants are (i) a Hydro-Cracker unit model of a typical Industrial Hydrocracker plant, (ii) a power plant of power generation capacity 210 MW along with a superheated steam generator having boiler section, furnace section, electrical section, feedwater section, and switchyard, (iii) 20 MW gas turbine and power generation unit.

(i) Hydrocracker simulator unit has the following sections e.g. Feed Section, Reactor effluent cooling section, Heater section, Reactor section, Hot and cold separator section, Makeup gas compressor section, and Main Fractionator Section. This helps in understanding the Hydro Cracking Process dynamics, Start-up and Shutdown, Emergency Handling, Process Interlocks, and Logics, Recognize and Respond to Upsets, Process Instrumentation, and Process Electrical Layout.

    Each dynamic simulator has the following two major components e.g. instructor station and operator station. The Instructor Station enables the Instructor to navigate the program through the simulation model. The Operator Station has an emulated DCS (Yokogawa CS-3000) through which the students undertake the training program.

    The simulator Model Development Environment has four major components e.g. Instructor Station Configuration, Operator Station Configuration, Graphics Development Tool, and Simulation Model Development Tool. Instructor station assists in Model Selection, Startup Mode, Speed, BackTrack, Snapshot, Failure, Disturbances, Instrument Fault, Field Devices - Block Valves, Field Devices - Globe Valves, Process Condition Summary and Summary Report. Besides these, there are facilities for PV Logging, Alarm Logging, Event Logging, and Event Message. Similarly, the Operator station has the following simulated windows for the emulated DCS e.g. Overview Window, Control Group Window, Tuning Window, Graphic Window, Trend Window, and Process Alarm Summary Window.

(ii) 210 MW Power plant along with superheated steam generator having Boiler Section, Furnace Section, Electrical Section, Feedwater Section, and Switchyard.

(iii) 20 MW Gas Turbine and Power Generation unit.

1.4 BIOPAC Laboratory

It is equipped with the following facilities:

1. Ethernet ready 16 channel data acquisition and analysis system for Biopac MP150 module.
2. Non-invasive Blood Pressure System with NIBP 100D module.
3. Multi-lead ECG withElectrocardiogram amplifier (Three) ECG 100C and Multi-lead ECG cable (TDS155C).
4. Heal/Toe Strike and blood pressure with a High-level transducer module (HLT 100C).
5. Pulse Plethysmography (PPG100C).
6. Heart Sound System (TSD108).
7. Wireless telemetry system.
8. Lead adapter and shield lead.

1.5 Biomedical signal processing laboratory

(A) Facilities:

1. 2-channel portable Biomedical data acquisition module from Biopac Systems USA (MP45).
2. 4-channel portable Biomedical data acquisition module from Biopac Systems USA (MP36).
3. 16-channel Biomedical data acquisition system from Biopac Systems USA (MP160).
4. Non-invasive blood pressure and haemodynamics measurement module (CNAP) from Biopac Systems USA (NIBP-100HD) with standard accessories.
5. Smart Electrocardiogram and Photoplethysmogram sensors compatible with Biopac MP-160 module.
6. 3-lead ECG, 12-lead ECG, Pulse, Respiration, blood pressure, cardiac output sensors compatible with Biopac MP-36 and MP-45 system.

(B) Projects which are supported by this facility:

1. UGC Special Assistance Programme (SAP) Departmental Research Support (DRS) Phase II: Sanction No. F. 530/15/DRS-II/2015(SAP-I) dated August 18, 2015. Theme: Remote Healthcare.
2. DST WB project on “Development of short-range health monitoring system using ZigBee based wireless communication”, Sanction No. 851(Sanc.)/ ST/P S&T/6G-2/2013 dated: 11/01/2016.

3. DST WB project on Development of cardiovascular signal simulator for training of medical professionals", Sanction No. 20(Sanc.)/ST/P/S&T/6G-12/2017 DTD:12/06/2018.(Outside CU)
4. DST WB project on "Development of Low-cost Point-of-care Technology for Early Screening of Chronic Obstructive Pulmonary Disease (COPD) for Remote Population of West Bengal", Sanction No. – 15(sanc)/ST/P/S&T/6G-6/2018 DTD: 29/01/2019. (Outside CU)
5. Sensor and System Development Group; University Potential for Excellence (UPE) phase -II under UGC, Area of work: Cardiovascular health assessment device development.
6. DST Women Scientist Project titled: "Self-enabled monitoring of hypertension towards low-cost digital healthcare" File No: SR/WOS-A/ET-67/2018.
7. Regional Geriatric Centre, Medical College Kolkata, "Affordable, wearable cardiac monitor for early detection, monitoring and prevention of cardiac arrhythmia for elderly citizens". MC/4982/09/2022 dated: 13/09/2022 (Outside CU)
8. DST WB project on "Self-operated cardiac monitor for early detection of Electrocardiogram rhythm disorder", Sanction No. - 2052(Sanc)/SBST-11012(16)/5/2023-STSEC DTD: 31/01/2024.(Outside department)

(C) Number of M.Tech. projects catered: 19 (from 2014)

(D) Number of PhDs (awarded) supported: 6

(E) Number of current PhD students using this lab: 6 (including outside CU: 02).

(F) Publications using the infrastructure of this lab (journal only):
Total: 27 (IEEE transactions/ journals 14, Elsevier: 4, Others: 9)

(G) Outside institutes/faculty utilizing the facility of this lab:

Within CU: Institute of Radio Physics and Electronics
Outside CU: Purulia Govt. Engg. College, WB, GLA University, UP, Techno India Main, Salt Lake, Jadavpur University, Kolkata.

(H) Number of Internships offered using this lab facility (outside CU): 7

1.6 Control and Robotics Laboratory

The Systems and Control Laboratory was founded by Prof. Kaushik Das Sharma in the Department of Applied Physics, University of Calcutta to serve as a dedicated space for cutting-edge research and innovation. Its primary

focus is on the fields of control systems, robotics, and biomedical signal processing, integrating theoretical concepts with practical applications. The lab is designed to foster interdisciplinary research, offering state-of-the-art facilities and equipment that enable students and researchers to work on advanced projects. Supported by strong institutional backing, the lab provides a robust platform for academic learning, experimental studies, and collaborative research, contributing significantly to advancements in engineering and technology.

Number of Courses Catered

The lab supports several courses in control systems, robotics, signal processing, AI and machine learning, and Bioinformatics contributing to the academic curriculum for undergraduate and postgraduate students.

Facilities

The lab is equipped with the following tools and hardware to facilitate advanced research:

Robotics Platforms: Four-wheeled and three-wheeled robots, small-scale manipulators (two-link), and tiny and large quadcopters.

Computing Systems: High-Performance Computing (HPC) machine, Jetson Nano, Raspberry Pi, Arduino, and ESP32.

Control Systems: DC motor control systems and air heater setups.

Fabrication Tools: 3D printer for rapid prototyping and hardware development.

Several M. Tech. Projects Catered

The lab has facilitated more than 10 MTech research projects, allowing students to explore practical and innovative solutions.

Ph.D. Support

The lab has supported over 16 Ph.D. researchers, with 3 current PhD students actively utilizing the facilities for their work.

Publications

Research from the lab has resulted in numerous journal publications, including contributions to IEEE and Springer journals, reflecting the lab's impact on the academic community.

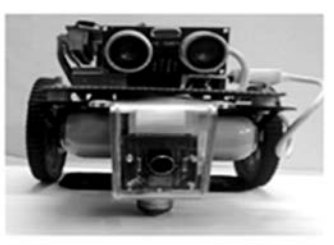
Internships Offered

The lab offers internships primarily to undergraduate students from the department and other institutions. Over the last 5 years, it has hosted more than 10 interns, providing them with hands-on experience in cutting-edge technologies.

External Collaborations

The lab's facilities are utilized by faculty and researchers from renowned institutions such as Jadavpur University, University of Paris, and University of Southampton, fostering collaboration and interdisciplinary innovation.

The Systems and Control Laboratory is a vital part of the department, providing students and researchers with the tools and environment needed to excel in control systems, robotics, and biomedical engineering.

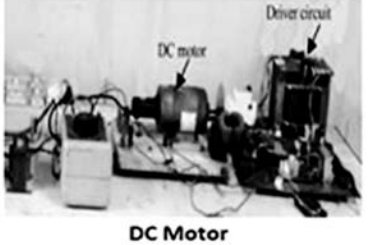


Wheeled Robot

Pluto (Tiny Quadcopter

Unmanned Areal Vehicle

Air Heater

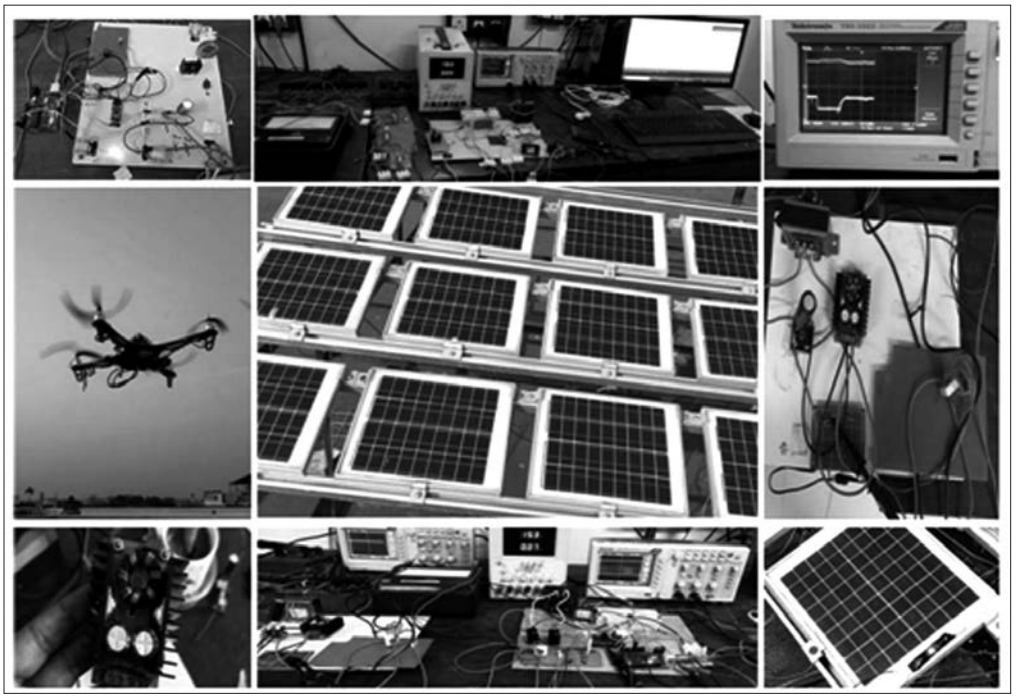


DC Motor

Two Link Robot Manipulator

1.7 Renewable Energy Laboratory

A. Solar Photo Voltaic Laboratory



Lab briefs:

The Renewable Energy Laboratory is dedicated to the development, optimization, and deployment of cutting-edge solar energy technologies. Its mission is to advance the science and engineering of photovoltaic (PV) systems, facilitating a global transition towards a sustainable, carbon-free energy future. The lab's primary focus is on harnessing solar power—one of the most abundant, clean, and sustainable energy resources available—to address the growing demand for renewable energy solutions.

Facilities:

- Solar PV System Setup: Three Solar PV setups with a total installed capacity of 560 W serve as a platform for real-world testing and analysis of solar photovoltaic systems.

- Monitoring and Diagnostics: Equipped with three 2-channel and one 4-channel Digital Storage Oscilloscopes (DSOs) for precise monitoring of electrical signals and diagnosing system performance.
- Energy Storage: Includes two 24V batteries designed for energy storage and management experiments.
- Power Conversion: A high-efficiency 1000 W inverter is used to support AC loads efficiently.
- Computing Resources: Two advanced computing systems dedicated to simulation, data analysis, and modeling of Solar PV systems for enhanced research and learning.
- One 10kW solar power plant with grid-tied and storage facility along with a Departmental office, corridor, and classroom lighting, and fan are treated as local load.

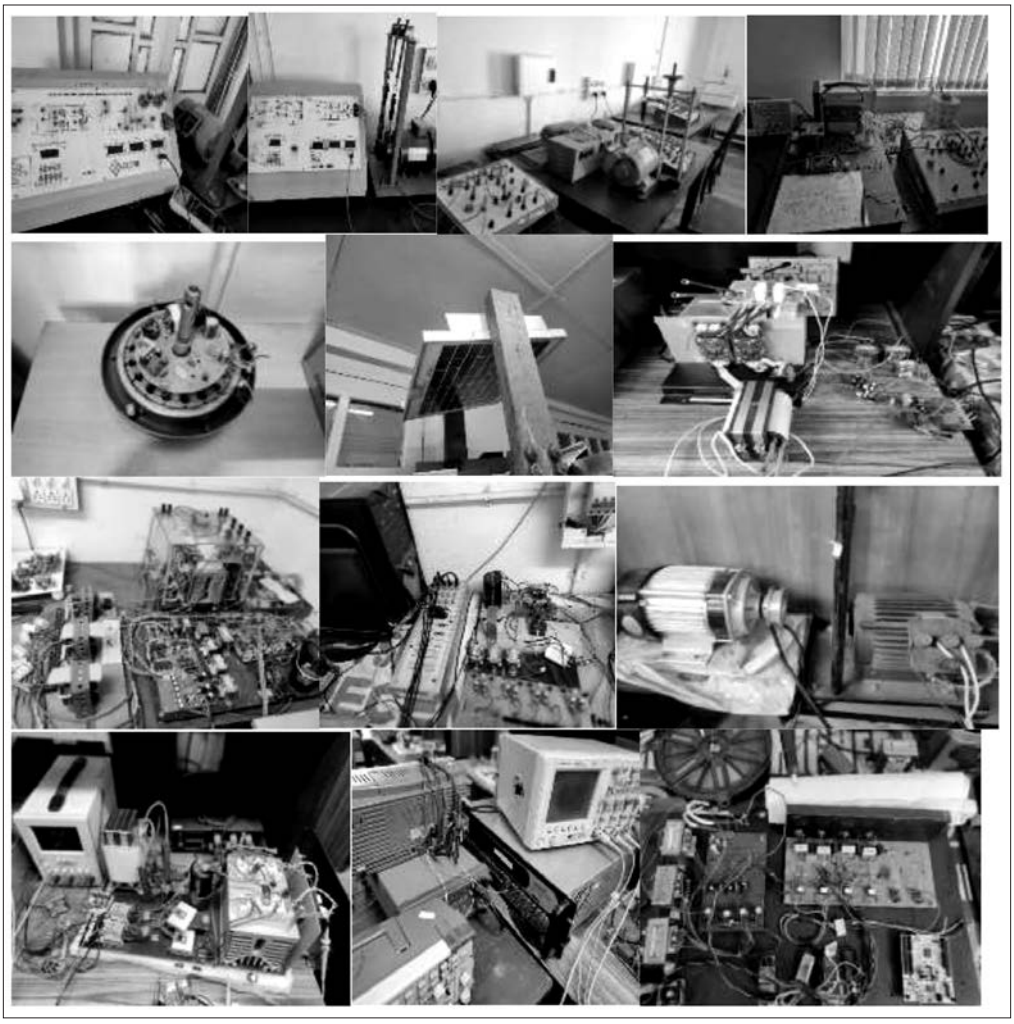
The lab is poised to expand its research capabilities with the establishment of a Smart Remote Solar PV Laboratory. This facility will enable researchers and students to conduct experiments and access real-time data remotely. The remote lab will facilitate collaborative research, enhance educational outreach, and accelerate the development of next-generation solar PV technologies.

B. Power Electronics and Renewable Energy Conversion Laboratory (PEARE LAB)

Area of research: Design and development of Power Electronics Converter for Renewable Energy sources and Electric Vehicles (EV).

The purpose of the Lab is to foster an understanding of how power electronics drive the transition to sustainable energy and transportation systems. We provide practical exposure to the design, implementation, and testing of power electronic circuits and converters (AC-DC, DC-DC, DC-AC, AC-AC) used in renewable energy and electric vehicle applications.

Glimpse of available facilities:



Total No of PhD Research Scholars at present: 10

1.8 Power System Laboratory

400kV 3-phase 50Hz 800km 3Bus High Voltage AC Transmission line Simulator having Resistance, Inductance, Capacitance, and Combined load, measurement facility of voltage, current, power (active, reactive, apparent), power factor, and network reconfiguration facility.

Two terminal High Voltage DC Transmission lines.

Relays: conventional, static, and numerical relays and their testing facilities using secondary injection test sets.

1.9 Embedded System Lab

Having programming facilities of Microcontrollers (MCS-51 family, PIC 16F, PIC 18F, DSPIC30/33 Family of Microcontroller, Arduino (AVR) based control system, ESP32 based Control System, IoT Enabled Control System with Database access facilities. Raspberry-based Python programming for real-time and complex system development.

ফলিত পদার্থবিজ্ঞান বিভাগীয় গ্রন্থাগারের গৌরবময় স্মৃতি ও ধারাবাহিকতা

ডঃ স্বরূপ কুমার রাজ

ভূমিকা : কলিকাতা বিশ্ববিদ্যালয় আনুষ্ঠানিকভাবে ১৮৫৭ সালে চালু হলেও প্রাথমিক বছরগুলিতে বিশ্ববিদ্যালয়ের গ্রন্থাগারের নিজস্ব কোনো স্থায়ী ভবন ছিল না। ১৮৭২ সালে নিজস্ব একটি স্থায়ী ভবন পাওয়ার পরে বিশ্ববিদ্যালয়ের লাইব্রেরি স্থাপনের প্রচেষ্টা শুরু হয়। ১৮৮৬ সালে গ্রন্থাগারের জন্য একজন নতুন সহকারী নিযুক্ত করে তাঁকে সহকারী গ্রন্থাগারিকের উপাধি দেওয়া হয়। কিন্তু গ্রন্থাগার প্রশাসনের ভারপ্রাপ্ত ছিলেন রেজিস্টার। ১৯১২ সালে ভারত সরকার গ্রন্থাগারের পুস্তক-ভান্ডার তৈরি করার জন্য এক লক্ষ টাকা আর্থিক সহায়তা দেন। সমস্ত সরকারি প্রকাশনা এই বিশ্ববিদ্যালয়-গ্রন্থাগারকে বিনামূল্যে সরবরাহের জন্য সিদ্ধান্ত হয়। ১৯১৩ সালে কলিকাতা বিশ্ববিদ্যালয়ের তৎকালীন উপাচার্য স্যার আশুতোষ মুখোপাধ্যায় ভারত সরকারের সহায়তায় স্বীকৃতি দিয়ে মন্তব্য করেছিলেন, "গ্রন্থাগারের উন্নয়নকে বিশ্ববিদ্যালয়ের সম্পত্তির তহবিলের মাধ্যমে বাস্তবায়িত হয়েছে।" কলিকাতা বিশ্ববিদ্যালয়ের গ্রন্থাগারের গঠন পর্যায়ক্রমে পরিবর্তিত হয়েছে।

পটভূমি : স্যার তারকনাথ পালিত মহাশয়ের ১৫ লক্ষ টাকা সম্পত্তি দানের ফলস্বরূপ স্যার আশুতোষ মুখোপাধ্যায় ১৯১৪ সালে ২৭শে মার্চ রাজাবাজার বিজ্ঞান কলেজ স্থাপন করেন। ১৯১৬ সালে প্রাথমিকভাবে পদার্থবিজ্ঞান, রসায়ন ও গণিত স্নাতকোত্তর বিভাগগুলি শুরু হয়। অন্যদিকে স্যার তারকনাথ পালিত মহাশয়ের বসতবাড়ি বালিগঞ্জে জীববিদ্যা বিভাগ শুরু হয়। ১৯১৩ সালে রাসবিহারী ঘোষ মহাশয়ের ১০ লক্ষ টাকা দানের মাধ্যমে ৪ (চার) টি বিষয়ের বিশেষ শিক্ষক পদ গঠন করা হয়।

ফলিত পদার্থবিজ্ঞান বিভাগ প্রতিষ্ঠা ও বিভাগীয় গ্রন্থাগার: পরবর্তীকালে ১৯২৫ সালে ফলিত পদার্থবিজ্ঞান বিভাগ অধ্যাপক ফণীন্দ্রনাথ ঘোষ মহাশয়ের হাতেই প্রতিষ্ঠিত হয়। একটি শিক্ষা প্রতিষ্ঠানের গ্রন্থাগার ও পরীক্ষাগার দুটি অবিচ্ছিন্ন অঙ্গ। অধ্যাপক ঘোষ ১৯২০ সালে বিশ্ববিদ্যালয়ে যোগদান করে গ্রন্থাগারের জন্য গ্রন্থ সংগ্রহের প্রচেষ্টা শুরু করেন। তিনি সিন্ডিকেটের সম্মতি নিয়ে গ্রন্থ ক্রয়ের সূচনা করেন। সেকালে বিশ্ববিদ্যালয়ে বিভাগীয় গ্রন্থাগারের নির্দিষ্ট কোনো কক্ষ ছিল

কিনা জানা যায় না। তবে পুরাতন রেকর্ড অনুযায়ী প্রথম বিভাগীয় গ্রন্থাগারের বই অর্ডার দেওয়া হয়েছিল ২৮ জুলাই ১৯৩৯ তারিখে। ওইসময় গ্রন্থাগারের দায়িত্বে ছিলেন শ্রী নিতাইচন্দ্র নাগ মহাশয়। পরে ১৯৫২ সালে শ্রী প্রবীরচন্দ্র চৌধুরী গ্রন্থাগার সহায়ক হিসেবে যোগদান করেন। আরও পরে পূর্ণাঙ্গ গ্রন্থাগার কক্ষ পাওয়ার পর ক্রমে তিনজন কর্মী শান্তিরঞ্জন দাস, প্রবীরকুমার দাসগুপ্ত ও হরিপদ নায়ক গ্রন্থাগার পরিষেবার জন্য নিযুক্ত ছিলেন। ১৯৮৪ সালে শ্রী প্রবীরচন্দ্র চৌধুরী মহাশয়ের অবসর গ্রহণের পর শ্রী গোপাল চৌধুরী আসেন বিভাগীয় গ্রন্থাগারিক হিসেবে। খুবই অল্প সময়কাল তিনি এই বিভাগে কাজ করেছেন (১৯৮৪-১৯৮৬)। এরপর আসেন শ্রীমতী তপতী রক্ষিত (১৯৮৬- ১৯৯৮)। তারপর শ্রী বিশ্বনাথ ঘোষ (১৯৯৮-২০০৩) এই বিভাগে পরিষেবা দেন। ২০০৩ সালে শ্রী প্রেমাংশু বশিষ্ঠ এই বিভাগের গ্রন্থাগারে আসেন ও ২০০৪ সালে অন্য বিভাগে স্থানান্তরিত হন। ২০০৪ সালের ডিসেম্বরে বিভাগীয় গ্রন্থাগারিক হিসাবে কেন্দ্রীয় গ্রন্থাগার থেকে যোগদান করেন শ্রী স্বরূপ কুমার রাজ। এই সময় গ্রন্থাগারে তিনজন কর্মী সহায়ক যথাক্রমে শ্রী প্রবীর কুমার দাসগুপ্ত, শ্রী নিরঞ্জন ঘোষ ও হরিপদ নায়ক পরিষেবা দিতেন। পরবর্তীতে কয়েকজন স্থানান্তরিত হওয়ায় শ্রী তড়িৎ কুমার বন্দোপাধ্যায়, শ্রী সুশান্ত মান্না ও ফরিদ আলি এই বিভাগের গ্রন্থাগারে যোগদান করেন। বর্তমানে গ্রন্থাগারকর্মী শ্রী অরিন্দম দাস মহাপাত্র ও শ্রী প্রদীপ মণ্ডল এই বিভাগের গ্রন্থাগারে কর্মরত আছেন। এছাড়াও ২০০৭-১২ সালে আংশিক সময়ের জন্য কেন্দ্রীয় গ্রন্থাগার থেকে গ্রন্থাগার বিজ্ঞানের ছাত্রছাত্রীদের পাঠানো হতো। তাঁদের মধ্যে শ্রী অর্ণব সাহা কুণ্ডু ও শ্রীমতী পায়েল বিশ্বাস উল্লেখযোগ্য।

গ্রন্থাগারের ক্রমবর্ধমান বিকাশ: বিভাগীয় গ্রন্থাগারে মূল্যবান নথি হলো Accession Register বা প্রবেশ নিবন্ধন, প্রথম পুরাতন নিবন্ধনে উল্লেখ আছে যে ১৯৩৯ সাল থেকে ৩১.৫.১৯৬০ পর্যন্ত বইয়ের সংখ্যা ৩৫৩০ ছিল। তারপর প্রথাভিত্তিক Accession Register-এ বইয়ের রেকর্ড লেখা শুরু হয় ৩৫৩১ সংখ্যা থেকে। বর্তমানে বইয়ের সংখ্যা ২৪৬১৪।

দীর্ঘ ৮০ বছর পর ২০০৫ সালে ফলিত পদার্থবিজ্ঞান বিভাগ দ্বিখণ্ডিত হয় পূর্বতন ফলিত পদার্থবিজ্ঞান বিভাগ (Electrical Engineering এবং Instrumentation Engineering) এবং ফলিত আলোক ও আলোক-কণা বিভাগ (Applied Optics and Photonics)। বিভাগীয় গ্রন্থাগারটি অবিভক্ত থাকে। দুটি বিভাগের একটি গ্রন্থাগার থাকলেও বাজেট (Budget Head) ভিন্ন ছিল। পরে ২০১৪ সালে সল্টলেকে টেকনোলজি ক্যাম্পাস চালু হলে Applied Optics and Photonics বিভাগ সেখানে স্থানান্তরিত হয়। এই স্থানান্তরের জন্য ওই বিভাগের বইগুলি আলাদা করে নিয়ে টেকনোলজি ক্যাম্পাসের গ্রন্থাগারে নিয়ে আসা হয়।

২০০৫ সালে প্রযুক্তি বিভাগগুলির জন্য একটি TEQIP (Technical Education Quality Improvement Program) গ্রান্ট আসে। এইখাতে বিভাগীয় গ্রন্থাগারের ২১৮৮টি বই ও দুটি আধুনিক কম্পিউটার পাওয়া যায়। ২০০৬-০৭ সালে বিশ্ববিদ্যালয় কেন্দ্রীয় গ্রন্থাগার থেকে SOUL (software for university libraries)-এর সাহায্যে বইয়ের ডেটাবেস তৈরি করা সম্ভব হয়। ফলে

OPAC (Online public access catalogue) এর মাধ্যমে পরিষেবা দেওয়া শুরুর ফলস্বরূপ গ্রন্থাগার কর্মী ও ব্যবহারকারীরা খুবই উপকৃত হচ্ছেন।

গ্রন্থাগারের একটি প্রধান সমস্যা হলো স্থানাভাব এবং পাঠ্যবই, পত্রপত্রিকা রাখার সঠিক প্রয়োজনীয় আলমারি। এই কারণে ১৯৮৬ সালে এই গ্রন্থাগারে একটি মেজেনাইন ফ্লোর তৈরি করা হয়, যার প্রধান ভূমিকায় ছিলেন ড: অনীশ দেব। ড: দেব এই গ্রন্থাগারকে খুবই ভালোবাসতেন ও সঠিক ভাবে ব্যবহার করতেন। তাছাড়াও ছাত্রছাত্রীদের গ্রন্থাগারমুখী করতে উৎসাহিত করতেন।

২০০৭ সালে পুরাতন দেশি ও বিদেশি পত্রপত্রিকাগুলি রাজাবাজার কেন্দ্রীয় গ্রন্থাগারে স্থানান্তরিত করার ফলে এই বিভাগীয় গ্রন্থাগারের স্থানাভাব সাময়িকভাবে দূর হয়। ফলে বিভাগের অনেক অমূল্য পুরাতন ও দুস্প্রাপ্য বইগুলি সঠিক ভাবে সাজিয়ে রাখা সম্ভব হয়। এছাড়াও এই বিভাগের প্রতিষ্ঠাতা-অধ্যাপক ফনীন্দ্রনাথ ঘোষ মহাশয় তাঁর ব্যক্তিগত প্রায় ২৫০০ বই এই গ্রন্থাগারে দান করেছিলেন। তিনি তাঁর অধ্যাপনার প্রথম দিকে জার্মানিতে কিছুকাল ছিলেন, এবং জার্মান ভাষা চর্চা করেছিলেন। তাই তাঁর সংগ্রহের জার্মান ভাষায় কিছু গণিত ও পদার্থবিজ্ঞানের বই এই গ্রন্থাগারে সংগৃহীত আছে। এছাড়াও রয়েছে অধ্যাপক চন্দ্রশেখর ঘোষ সংগ্রহ। এখানে তড়িত প্রযুক্তির বিভিন্ন বিষয়ের মূল্যবান প্রায় ২০০০ বই আছে যা এখনও অনেক পাঠকের কাছেই অজানা। চন্দ্রশেখর-বাবু অধিকাংশ সময় বিদেশে অধ্যাপনা করেছেন এবং পরবর্তীকালে তিনি আমাদের এই বিভাগে আসেন। তাঁর দুষ্প্রাপ্য সংগ্রহ এই গ্রন্থাগারে একটি অনবদ্য সংযোজন।

২০১০ সালে গ্রন্থাগারের একটি আমূল সংস্কার করা হয়, যার স্বরূপ আমরা বর্তমান গ্রন্থাগারটিকে দেখতে পাই। এই বাহ্যিক রূপের মূল স্থপতি ছিলেন অধ্যাপক অনীশ দেব, অধ্যাপক সমরজিৎ সেনগুপ্ত ও অধ্যাপক জিতেন্দ্রনাথ বেরা। এছাড়াও প্রত্যেক শিক্ষক- শিক্ষিকা, তৎকালীন বিভাগীয় প্রধান ও সান্ধ্যকালীন এম.টেক বিভাগের কোর্স-কোঅর্ডিনেটর শিক্ষক-শিক্ষিকাগন প্রভূত সাহায্য করেছেন। সকলের ঐকান্তিক শুভ উদ্যোগ ও সদিচ্ছার ফল স্বরূপ বর্তমানে একটি মডেল লাইব্রেরি হিসেবে বিভাগীয় গ্রন্থাগার আত্মপ্রকাশ করেছে। এছাড়াও সদ্য-পূর্বতন বিভাগীয় প্রধান অধ্যাপক কৌশিক দাশশর্মা গ্রন্থাগারে শীততাপ নিয়ন্ত্রণের মেশিনগুলি রক্ষণাবেক্ষণের যথেষ্ট ব্যবস্থা গ্রহণ করেছেন।

পুরাতন এবং মূল্যবান দুষ্প্রাপ্য পুস্তক সমূহ: এই গ্রন্থাগারে P.N. Ghosh collection ও C.S. Ghosh collection এই দুটি বিশেষ সংগ্রহ ছাড়াও বিভিন্ন সময়ে এই বিভাগের প্রথিতযশা শিক্ষকশিক্ষিকা, গবেষক ও ছাত্রছাত্রীরা তাঁদের ব্যক্তিগত সংগ্রহের বই এখানে দান করে গ্রন্থাগারকে সমৃদ্ধ করেছেন। তার মধ্যে বিশেষ উল্লেখযোগ্য ব্যক্তিবর্গ হলেন অধ্যাপক পি.সি মহান্তি, অধ্যাপক অনন্ত কুমার সেনগুপ্ত, অধ্যাপক শ্রীকৃষ্ণ প্রসাদ ভট্টাচার্য, অধ্যপক মনোরঞ্জন দে, অধ্যাপক কে সর্বাধিকারী, অধ্যাপক দেবব্রত বসু, অধ্যাপক অশোক কুমার মুখোপাধ্যায়, অধ্যাপক অনীশ দেব, শ্রীমতী কেকা বসু, শ্রী আশিস কুমার বিশ্বাস ও আরও অনেকে।

শতবর্ষে বিভাগীয় গ্রন্থাগারের কার্যাবলী ও আধুনিক পরিষেবা সমূহ: পি এন ঘোষ সংগ্রহ ও সি এস ঘোষ সংগ্রহ-এর অনেক

মূল্যবান ও দুষ্প্রাপ্য বইয়ের সম্ভার এবং অতীত ও বর্তমান শিক্ষকশিক্ষিকাদের ঐকান্তিক প্রচেষ্টা ও সদিচ্ছার ফলে অনেক মূল্যবান দেশি ও বিদেশি বই সংগ্রহ করা সম্ভব হয়েছে। এই গ্রন্থাগারে ১৮৯৬, ১৮৯৭ ও ১৯০০ সালের অনেক বই আছে, যার ব্যবহারিক মুল্য এখনও বর্তমান। উল্লেখযোগ্য কিছু বই হলো–

1. The Science absolute of space/ John Bolyai; translated from the Latin by George Bruce Halsted.- Texas: The Neomon, 1896
2. An Elementary treatise on geometrical optics / R.S. Health. - 2nd ed.- Cambridge: The University Press, 1897
3. Traite De radioactivite / Madame P. Curie. Paris: Gauthier-Villars, Imprimeur-Libraire, 1910
4. Opticks or A Treatise of the reflections, refractions, inflections & colours of light/ Isaac Newton.- USA: Dover Publications, 1952 (Based on the 4th ed. London, 1730)
5. Electricity and matter / J. J. Thomson. London: Archibald Constable, 1908
6. Relations from Radioactive substances /Ernest Rutherford, James Chadwick and C.D. Ellis. Cambridge: The University Press, 1930
7. Physics and philosophy/ Wener Heisenberg. London: George Allen & Unwin, 1958
8. The Theory of Spectra and atomic constitution/Niels Bohr. Cambridge: The University Press, 1924
9. The Meaning of relativity / Albert Einstein. London: Methuen, 1956
10. Elements of electrical design / Alfred Still New york: McGraw-Hill, 1924

বিশ্ববিখ্যাত বিজ্ঞানী কিংবা নোবেল পুরষ্কার-প্রাপক যথা স্যার আইজ্যাক নিউটন, আলবার্ট আইনস্টাইন, জেজে থমসন, মাদাম কুরি, ভার্নার হাইজেনবার্গ, নীলস বোর, আর্নেস্ট রাদারফোর্ড প্রমুখ লেখকের বই এই বিভাগীয় গ্রন্থাগারটিকে আরও সমৃদ্ধ করেছে। কিন্তু এই গ্রন্থগুলির শারীরিক অবস্থা খুব একটা ভালো নয়। নিকট ভবিষ্যতে এই গ্রন্থগুলির ডিজিটাইজেশনের কাজ শুরু হবে। বিশ্ববিদ্যালয়ের কেন্দ্রীয় গ্রন্থাগার এই কাজে সাহায্যের আশ্বাস দিয়েছেন। যুগান্তকারী প্রযুক্তিগত পরিবর্তন হবার ফলে গ্রন্থের ডিজিটাল রূপান্তর এখন সম্ভব হয়েছে। বর্তমান প্রগতিশীল যুগে সময় একটি মস্ত বড় বিষয়। এর পাশাপাশি অর্থনৈতিক দিক থেকে লাইব্রেরি কনসর্টিয়াম তৈরি করে একাধিক গ্রন্থাগার বিভিন্ন গবেষণামূলক পত্রপত্রিকা সংগ্রহ করে থাকে। গ্রন্থ ও পত্রপত্রিকাগুলি

ডিজিটাইজড হবার ফলে কম খরচে অতি দ্রুত বিভিন্ন গ্রন্থাগার নিজেদের মধ্যে তথ্য আদান-প্রদান করতে পারে। বিভিন্ন বিদেশি প্রকাশনার গ্রন্থ ও পত্রপত্রিকা ডিজিটাইজড প্রক্রিয়াকরণের ফলে অতি অল্প পরিসরে তিন লক্ষ ই-বুক (বৈদ্যুতিন গ্রন্থ) এবং ১৪০০০ ই-জার্নাল (বৈদ্যুতিন পত্র পত্রিকা) অনেক সংখ্যক ব্যবহারকারীর কাছে অতি দ্রুত পৌঁছে দেওয়া সম্ভব হয়েছে। এছাড়া বিশ্ববিদ্যালয়ের কেন্দ্রীয় গ্রন্থাগার পুরাতন নথিগুলিকে ডিজিটাইজড করে সংরক্ষণের ব্যবস্থা করেছে, যা প্রত্যেক ব্যবহারকারীর কাছেই উপলব্ধ। ডিজিটাইজড নথির তালিকাটি হল নিম্নরূপ:-

- বার্ষিক প্রতিবেদন (১৯৫১-২০০৫)
- বাংলা পত্রিকা সমূহ
- সমাবর্তনের দীক্ষান্ত ভাষণ
- কলিকাতা বিশ্ববিদ্যালয়ের কমিশন রিপোর্ট (১৯১৭-১৯১৯)
- গবেষণা পত্র
- আর্থিক প্রতিবেদন (১৯২৫-২০০৬)
- শতবর্ষের কলিকাতা বিশ্ববিদ্যালয় (১৮৫৭-১৯৫৭)
- এশিয়াটিক সোসাইটি অফ বেঙ্গল জার্নাল (১৮৩৫-১৯৩৪)
- বক্তৃতা সংরক্ষণাগার (১৮১৫-২০০৩)
- ডাক্তারি গবেষণা মূলক প্রবন্ধ
- সেনেট সিন্ডিকেট ও পরিষদের সভার কার্যবিবরণী (১৮৫৭-২০১৪)
- সিন্ডিকেট মিনিটস (১৯২০-১৯৪৩)
- বিবিধ প্রতিবেদন (১৯১৮-২০০১)
- পুরনো ও বিরল বই (১৫৬১-১৮৭০)
- পুরাতন পাঠক্রম (১৯৫৫-১৯৭৭)
- বিরল ও বিখ্যাত চিত্র (১৭৯৫-১৯২১)
- টেগোর আইন বক্তৃতা (১৮৭০-১৯৮৬)
- দ্য ক্যালকাটা রিভিউ (১৮৪৫-২০০৭)
- আধুনিক পর্যালোচনা (১৯০৭-১৯৮৭)
- বিশ্ববিদ্যালয় প্রকাশনা (১৯০৭-২০০৮)
- বিশ্ববিদ্যালয় আইন (১৯৪২-১৯৭৯)
- বিশ্ববিদ্যালয়ের ক্যালেন্ডার (১৮৫৮-১৯৬৫)
- বিশ্ববিদ্যালয়ের প্রশ্নপত্র (১৮৯১-১৯৮০)
- বিশ্ববিদ্যালয়ের বিধিসমূহ (১৯১২-১৯৬৬)

বিভাগীয় গ্রন্থাগারে একটি 'New Arrival' শাখায় একটি আলমারিতে সাম্প্রতিক গ্রন্থগুলিকে সাজানো হয় যাতে ব্যবহারকারীরা জানতে ও দেখতে পান প্রতিবছর কতো নতুন ধরণের গ্রন্থ গ্রন্থাগারে এসেছে। বিভাগীয় গ্রন্থাগারের আরও একটি শাখা হল বিভাগীয় শিক্ষক-শিক্ষিকা ও গবেষকদের লেখা গ্রন্থ। বেশ অনেকগুলি গ্রন্থ বিশেষত বিদেশি প্রকাশনা থেকে প্রকাশিত যা বিভাগীয় গ্রন্থাগারকে আরও সমৃদ্ধ করেছে।

ডিজিটাল লাইব্রেরি ও বিভাগীয় গ্রন্থাগার: ২০০২ সালে Inflibnet থেকে SOUL নিয়ে কেন্দ্রীয় গ্রন্থাগার প্রাথমিক ভাবে ডেটাবেস তৈরি কাজ শুরু করে। পরে বিভাগীয় গ্রন্থাগার গুলিতে SOUL-এর মাধ্যমে ডেটাবেস তৈরি করা হয়। ফলে OPAC থেকে প্রত্যেক ক্যাম্পাস এবং বিভাগীয় গ্রন্থাগারগুলি নিজেদের গ্রন্থতালিকা ব্যবহারকারীদের কাছে সহজলভ্য হয়েছে। পরবর্তীকালে WEB-OPAC-এর মাধ্যমে সব ক্যাম্পাসগুলির তথ্য বিভাগীয় গ্রন্থাগার থেকে জানা সম্ভব হয়েছে। এছাড়াও বিভাগীয় গ্রন্থাগার বা ক্যাম্পাস গ্রন্থাগার থেকে ব্যবহারকারীরা বৈদ্যুতিন গ্রন্থ ও পত্রপত্রিকা সহজেই ডাউনলোড করতে পারেন।

শতবর্ষ উদযাপনের প্রারম্ভে ২০২৪ সালের জানুয়ারি মাসে বিভাগীয় গ্রন্থাগারকে একটু সুসজ্জিত করা হয়েছিল। বর্তমানে প্রযুক্তিগত উন্নতির ফলে গ্রন্থাগারের ব্যবহার ক্রমশ কমে আসছে। ছাত্রছাত্রীদের গ্রন্থাগারমুখী হওয়ার প্রবণতা কোভিড অতিমারী- র পরে প্রায় হারিয়ে গেছে বলা যায়। শতবর্ষের প্রারম্ভে এই গ্রন্থাগারের বিশেষ সংগ্রহগুলি, পুরাতন নথি, মূল্যবান গ্রন্থ, পত্রপত্রিকা ও গবেষণা পত্রগুলিকে সুসজ্জিত করা হয়। এই পুরাতন, দুষ্প্রাপ্য ও মূল্যবান গ্রন্থগুলিকে ১০০ বছরের বেশি, ১০০ বছর ও ১০০ বছরের কম- এই তিনটি শ্রেণীভুক্ত করে সকলের কাছে প্রদর্শন করা হয় যা অনেকেই তাঁদের ছাত্রাবস্থায় দেখেননি বা পড়া সম্ভব হয়নি বলে মন্তব্য করেছেন। পুরাতন নথিগুলির মধ্যে বিশেষ উল্লেখযোগ্য কয়েকটি হল:

- Report of Applied Physics Students' Re-union 1941-47
- ১৯৪১ সালে বেনারসে আয়োজিত ২৮তম ভারতীয় বিজ্ঞান কংগ্রেসের সভাপতি অধ্যাপক পি এন ঘোষের অভিভাষণ: The Role of Applied Physics in Industry
- ১৯৫৯ সালে কলকাতায় এম এস থ্যাকার কর্তৃক অধ্যাপক পি এন ঘোষ স্মারক বক্তৃতা: দ্য ইন্ডিয়ান ফিজিক্যাল সোসাইটি-র ডিসেম্বর ৭, ১৯৫৯ সংখ্যায় মুদ্রিত।

অনেক প্রাক্তন শিক্ষক শিক্ষিকা ও ছাত্রছাত্রীরা বিভাগীয় গ্রন্থাগারে এসে পুরনো অনেক স্মৃতি ফিরে পেয়েছেন ও খুবই আনন্দিত হয়েছেন।

শতবর্ষ উদযাপনের শেষ পর্বে এসে বিভাগীয় গ্রন্থাগার অনেক পুরাতন নথি ও বার্তার সংরক্ষক হিসেবে কাজ করে চলেছে এই বিশ্বাস নিয়ে যে এর ফল আগামী প্রজন্মকে ভাবতে শেখাবে। বিভিন্ন পুরাতন গ্রন্থ বা তাদের ব্যাখ্যা ও বিভিন্ন গবেষণাপত্র ভবিষ্যৎ প্রজন্মকে সঠিক দিশায় চালিত করবে। বিভাগীয় গ্রন্থাগারের এই মহা মূল্যবান সংগ্রহ একদিনে গড়ে ওঠেনি। পি এন

ঘোষ সংগ্রহ-এর অনেক গ্রন্থই ১৯২৫ সালের পূর্বে প্রকাশিত। সেই সংগ্রহে তাঁর নাম ও ঠিকানা লেখা একটি Book Register-ও আছে। তার প্রত্যেকটি বইয়ে তারিখসহ ব্যাক্তিগত স্বাক্ষরিত।

বিভাগীয় গ্রন্থাগার সমৃদ্ধ হওয়ার প্রধান কারণ বহু পণ্ডিত গবেষক এইবিভাগে অধ্যয়ন ও শিক্ষকতা করেছেন। তাঁদের প্রিয় বিষয়ের গ্রন্থগুলি এই বিভাগীয় গ্রন্থাগারে সংগ্রহ করার চেষ্টা করেছেন। মূল্যবান গ্রন্থ সংগ্রহের ক্ষেত্রে সাম্প্রতিক শিক্ষকদের মধ্যে অধ্যাপক অনীশ দেব, অধ্যাপক লক্ষ্মীনারায়ন হাজরা, অধ্যাপক সমরজিৎ সেনগুপ্ত প্রমুখের অবদান উল্লেখযোগ্য। গ্রন্থাগারকে ঠিকমতো সাজানো ও পরিষ্কার রাখা আরেকটি প্রধান দিক। এইক্ষেত্রে গ্রন্থাগার কর্মীরা ও বিশেষ ক'রে সামিম মণ্ডলের অবদান অনস্বীকার্য। সর্বোপরি ছাত্রছাত্রী, শিক্ষক-শিক্ষিকা ও গ্রন্থাগার কর্মীদের সকলের ঐকান্তিক প্রচেষ্টায় বিভাগীয় গ্রন্থাগার সজীব ও সচল হয়ে থাকবে আশা রাখি।

পরিশেষে উল্লেখ করি ২০০০ সালের আগে মূল্যবান গ্রন্থ ও মুদ্রিত গ্রন্থ, পত্রপত্রিকা নির্ভর ছিল উচ্চতর শিক্ষা ও গবেষণা। সেই সময়ে ছাত্রছাত্রী, শিক্ষক-শিক্ষিকা ও গবেষকদের কাছে বিভাগীয় গ্রন্থাগার প্রধান ভূমিকা পালন করতো। সেই সঙ্গে গ্রন্থাগারকর্মীদের ব্যবহার ও দক্ষতা গ্রন্থগারের প্রয়োজনীয়তাকে সকলের কাছে আকর্ষণীয় করে তোলে। বর্তমানে প্রযুক্তিবিদ্যার অভাবনীয় উন্নতির ফলে ইন্টারনেট নির্ভর হয়েছে সকলে। গ্রন্থাগারও পিছিয়ে নেই। গ্রন্থাগারও বৈদ্যুতিন গ্রন্থ ও বৈদ্যুতিন পত্রপত্রিকা সরবরাহ করে পাঠক-পাঠিকাদের, গবেষকদের জন্য উপযুক্ত পরিবেশ সৃষ্টি করতে সক্ষম হয়েছে। অদূর ভবিষ্যতে বিভাগীয় গ্রন্থাগারের কার্যাবলী ও পরিষেবসমূহ বৈদ্যুতিন পদ্ধতিতে দেওয়া সম্ভব হবে আশা রাখি।

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আমার চোখে ফলিত পদার্থবিজ্ঞান বিভাগীয় গ্রন্থাগার

হরিপদ নায়ক

১৯৭৫ সালে ১১ এপ্রিল সোমবার আমি ফলিত পদার্থবিজ্ঞান বিভাগে একজন নিয়মিত কর্মচারী হিসেবে যোগদান করি এবং Instrument and measurement Laboratory তে আমার কর্মজীবন শুরু হয়। তখন বিভাগীয় প্রধান ছিলেন অধ্যাপক মনোরঞ্জন দে। তখন অবিভক্ত ডিপার্টমেন্ট। তাই অবিভক্ত গ্রন্থাগার Applied Physics Library; সেইসময় গ্রন্থাগারিক ছিলেন প্রবীরবাবু (শ্রী প্রবীর চৌধুরী)। ১৯৭৬ সালে আমি গ্রন্থাগারে স্থানান্তরিত হই এবং ২০১৯ সাল পর্যন্ত দীর্ঘ ৪৪ বছর সক্রিয়ভাবে এখানে কাজ করার সুযোগ পাই। ২০১৭ সালে আমি অবসর গ্রহণের পরেও ২ বছরের বেশি সময় আংশিক সময়ের কর্মচারি হিসেবে এখানেই যুক্ত ছিলাম। এখনও যাতায়াত ও যোগাযোগ রেখে চলেছি।

প্রবীরবাবুর আগে লাইব্রেরির দায়িত্বে ছিলেন নিতাইবাবু (শ্রী নিতাইচন্দ্র নাগ)। তখন লাইব্রেরি পরিষেবায় এখনকার মতো লাইব্রেরি সায়েন্সের Dewey classification system অনুসরণ করা হত না। বই-এর সংখ্যা ছিল শতকের ঘরে। বর্তমানে বই-এর সংখ্যা প্রায় ২৫০০০, ২০১৯ সাল পর্যন্ত আমার দেখা প্রায় ২৪০০০ বই ছিল। বইগুলো সাজানো থাকত কিছু কাঁচ বসানো কাঠের আলমারিতে এবং স্টিল আলমারিতে। বইগুলো এখনকার মতো গ্রন্থাগার বিজ্ঞানের Dewey system-এর subject code অনুযায়ী বই-এর শ্রেণিবিভাগ করা হতো না। একটা নম্বর ব্যবহার করা হতো ডিপার্টমেন্টের নামে AP. প্রত্যেক বই-এর একটা কোড নম্বর, যেমন- 100, এবং সাবজেক্ট-এর নম্বর 1 থেকে শুরু। যতগুলো বিষয় ততগুলো নম্বর, যেমন 1-42, কারণ তখন পর্যন্ত ৪২ টা বিষয় ছিল, উদাহরণ স্বরূপ Electrical, Instrumentation এবং Optics এগুলি মূলকাণ্ড, এদের সম্মিলিত শাখা ৪২ টি যেমন, Instrument, Measurement, Meter, Motor, Machine, Transformer, Optics, Laser, Photography, Mathematics, Electronics, Drawing ইত্যাদি। পরবর্তীকালে এর অনেক শাখাপ্রশাখা বেড়ে যাওয়ায় তখন গ্রন্থাগারে Dewey Classification system em অপরিহার্য হয়ে ওঠে।

যে কথা বলছিলাম ১৯৭৫ সালের আগে এইভাবে কোন একটা সাবজেক্টকে ধরে নম্বর হতো AP:100.001, AP:100.002 ইত্যাদি। মোট ৪২ টা সাবজেক্ট অতএব AP:100 থেকে AP:142. এবার যেক্ষেত্রে বইয়ের সংখ্যা এবং বইয়ের কপির সংখ্যা ১, ৫, ৭, ১০ বা তারও বেশি কপি আছে তার উদাহরণ দিই। ধরা যাক গণিত বিষয়ে কোনো একজন লেখকের পাঁচ কপি বই আছে, সেখানে কোড এইরকম করা হয়েছিল AP:107.015(A), AP:107.015(B), AP:107.015(C), AP:107.015(D),

AP:107.015(E). যেখানে 107 হচ্ছে subject code, 015 হচ্ছে author code, আর A, B, C... এগুলো কপি।

এই লাইব্রেরিতে Dewey Classification system চালু হয় প্রবীরবাবু অবসর গ্রহণের পর। প্রবীরবাবুর পর গ্রন্থাগারিক হয়ে আসেন গোপালবাবু (শ্রী গোপাল চৌধুরী)। তিনি এসে Dewey system চালু করেন। এখানে উল্লেখ করি গোপালবাবু আসা পর্যন্ত AP বইয়ের প্রায় ১০০০০-এর বেশি। গোপালবাবু খুবই সক্রিয়তার সঙ্গে পুরনো বইয়ের কাজে হাত দেন। কিন্তু তিনি অল্পদিনেই অবসর গ্রহণ করেন। তারপর আসেন তপতীদি (শ্রীমতী তপতী রক্ষিত)। তিনি নতুন বইগুলোর কাজ করেন, তারপর আসেন বিশ্বনাথদা (শ্রী বিশ্বনাথ ঘোষ)। তিনিও নতুন বইয়ের কাজগুলো করেন। তারপর আসেন প্রেমাংশুবাবু (শ্রী প্রেমাংশু বশিষ্ঠ)। তিনিও নতুন বইয়ের কাজগুলোই করেন। অতএব পুরনো AP বইগুলোর কাজ বন্ধ হয়ে থাকে। তারপর আসেন স্বরূপ বাবু (শ্রী স্বরূপ রাজ)। এখান থেকে লাইব্রেরির কাজে প্রচণ্ড গতি আসে। স্বরূপবাবু খুবই দ্রুততার সঙ্গে পুরনো বইয়ের কাজে হাত দেন। নতুন ও পুরনো বইয়ের কাজ সমানে চলতে থাকে তা সত্ত্বেও এখনও প্রায় ৪০০০ এর বেশি বই পুরনো সিস্টেমে থেকে গেছে। তার অন্যতম কারণ হলো আমার অবসরজনিত শূন্যতা। প্রথমদিকে প্রবীরবাবুর সময় আমরা ৪-জন কর্মী ছিলাম প্রবীরবাবু, শান্তিবাবু (শ্রী শান্তিরঞ্জন দাস) এবং প্রবীরদা (শ্রী প্রবীর দাশগুপ্ত)। কিছুকাল পরে শান্তিবাবু অবসর গ্রহণ করেন, যদিও তিনি বইয়ের ইস্যু/রিটার্ন-এর কাজ করতেন। প্রবীরদা পুরনো বইয়ের কাজ কিছুটা করতেন। স্বরূপবাবু আসার পর হঠাৎ করে প্রবীরদার অকাল বিয়োগ ঘটে। তখন আমি আর স্বরূপবাবু দুজন পুরনো বইয়ের কাজ শুরু করি। যে পুরনো বই এখনও Dewey System-এ আনা হয় নি, কবে হবে জানিনা। কারণ মূল সমস্যা কর্মীর অভাব। যদি কেন্দ্রীয় গ্রন্থাগার অন্তত কিছু দিনের জন্য গ্রন্থাগার বিজ্ঞানের অভিজ্ঞতাসম্পন্ন আংশিক সময়ের দক্ষ কর্মী নিয়োগ করেন, তবে এই লাইব্রেরি আর উন্নত হতে পারতো।

অনেক প্রতিকূলতার মধ্যে দিয়ে এই গ্রন্থাগারকে এগোতে হয়েছে তার একটা বড় কারণ স্থানাভাব। জায়গার অভাবে বইগুলোকে বারেবারে এপাশ-ওপাশ নিচে-ওপরে করতে হয়েছে, কিন্তু সমস্যার সমাধান হয়নি। অনীশবাবুর (অধ্যাপক অনীশ দেব) সময় বই রাখার জায়গা খুবই অকুলান ছিলো। তিনি ছিলেন গ্রন্থাগারের ভারপ্রাপ্ত অধ্যাপক। শিক্ষকমণ্ডলীর সঙ্গে আলোচনা করে তিনি সিদ্ধান্ত নেন গ্রন্থাগারে মেজেনাইন ফ্লোর তৈরি হবে। খুবই দ্রুততার সঙ্গে সেই কাজ শেষ হয়। কয়েক হাজার জার্নাল উপরে স্থানান্তরিত করে বইগুলোকে আবার নিচে সাজানো শুরু হয়। সেই কাজও খুবই তাড়াতাড়ি শেষ হয়। বছর দুয়েক না যেতেই আবার সেই জায়গার সমস্যা। সেই সময় একটা সুখবর এলো রাসবিহারী শিক্ষা প্রাঙ্গণে তৈরি হচ্ছে সেন্ট্রাল জার্নাল লাইব্রেরী। সেই প্রকল্পও খুব তাড়াতাড়ি কার্যকর হলো। কয়েক হাজার জার্নাল সেখানে স্থানান্তরিত হয়ে গেল। মেজেনাইন ফ্লোর খালি হয়ে গেল। আবার AP system-এর ৪/৫ হাজার বই ওপরে তোলা ও সাজানোর কাজ সম্পন্ন হলো। ১০০০০ পুরনো বইয়ের অধিকাংশই Dewey system-এ চলে এসেছে। তবে জায়গার এখনও প্রয়োজন, স্থানাভাবের সমাধান অবশ্যই প্রয়োজন।

আমাদের গ্রন্থাগারে একটা বাড়তি চাপ হলো দানের বই। কয়েকজন বিশিষ্ট অধ্যাপক এবং প্রাক্তন ছাত্রছাত্রী বেশ কিছু বই দান করেছেন। তাঁদের মধ্যে উল্লেখযোগ্য অধ্যাপক ফণীন্দ্রনাথ ঘোষ, অধ্যাপক চন্দ্রশেখর ঘোষ, অধ্যাপক প্রফুল্লচন্দ্র মহান্তি। ছাত্রছাত্রী, অধ্যাপক এবং গবেষণা কাজে যুক্ত ব্যক্তিবর্গের কাছে বইগুলি খুবই গুরুত্বপূর্ণ ছিল। এই গ্রন্থাগারে যে বইয়ের রত্নভাণ্ডার লুকিয়ে আছে তা অনেকেরই অজানা। এই বিভাগের কোনো এক ছাত্র বিভিন্ন দেশ ঘুরে এসে বলেছিল, আমি দেশবিদেশের বহু গ্রন্থাগার দেখেছি কিন্তু আমাদের এই গ্রন্থাগারেই পরিষেবা সবচেয়ে ভালো মনে হয়েছে এবং মূল্যবান বইগুলি এখানে যেভাবে গোছানো রয়েছে অন্য বহু জায়গায় তা নেই। এখানে যে গুরুত্বপূর্ণ জ্ঞানভাণ্ডার গচ্ছিত আছে, তা বিশ্বের অনেক বড়ো গ্রন্থাগারে নেই।

আমি দীর্ঘ ৪৪ বছর আন্তরিকতার সঙ্গে কাজ করে অনুধাবন করেছি, বহু দেশবিদেশ থেকে অধ্যাপক, গবেষক, ছাত্রছাত্রী এখানে লেখাপড়া, গবেষণা এবং গবেষণার কাজে সহযোগিতার জন্য এসেছেন। প্রত্যেকেই বলে গেছেন এখানে পরিষেবা খুব ভালো, বই সাজানো রয়েছে সুন্দর এবং প্রয়োজনীয় বইয়ের ভাণ্ডারও প্রচুর। এই স্বীকৃতি গ্রন্থাগারের সমস্ত কর্মচারী পরম্পরা এবং শিক্ষকমণ্ডলীর প্রাপ্য বলে আমি মনে করি। কারণ সকলের সম্মিলিত সহযোগিতায় এই বিভাগকে এই সম্মানের আসনে বসাতে সাহায্য করেছে। একটি গর্বের বিষয় বলে শেষ করবো। গোপালবাবুর সময় অস্ট্রেলিয়া থেকে একজন গবেষক তাঁর গবেষণার কাজে সহযোগিতার জন্য একটা বিষয় জার্নাল থেকে প্রতিলিপি করে পাঠানোর জন্য অনুরোধ করেন। জার্নালটা ছিল বহুদিনের পুরনো। তখন অনেক জার্নালের কপি পুরো বছরের জন্য না-আসায় বেশ কিছু জার্নালই বাঁধানো হয়নি। বিচ্ছিন্ন কপি পড়ে ছিল। গোপালবাবু বললেন হরিবাবু একটু খুঁজে দেখুন না যদি পাওয়া যায়। আমি খুঁজে বের করি এবং জেরক্স করে পাঠানো হয়। তিনি কতো খরচ হবে তা জানাতে বলেছিলেন। গোপালবাবু দুদিনের মধ্যে একটি চিঠিসহ জেরক্সকপি পাঠিয়ে দেন, কোনো খরচ দিতে হবে না জানিয়ে। তাঁর কয়েকদিন পর সেই অস্ট্রেলিয়ান গবেষকের কাছ থেকে যে ধন্যবাদ ও শুভেচ্ছা এসেছিলো এবং গ্রন্থাগার কর্মী, ফলিত পদার্থবিজ্ঞান বিভাগ এবং কলিকাতা বিশ্ববিদ্যালয় সম্বন্ধে যেসব সুন্দর বিশেষণ-ভূষিত কথা ছিলো তা' আমাদের শ্লাঘার বিষয়। কর্মজীবনে এই প্রতিষ্ঠান থেকে পেয়েছি প্রচুর, শিখেছি অনেক, টাকার অঙ্কে তার মূল্যায়ন হয় না। কী কী দিতে পেরেছি সে বিচারের ভার থাকলো আমাদের অগণিত প্রিয় ছাত্রছাত্রী, শ্রদ্ধেয় শিক্ষকমণ্ডলী ও আমার প্রিয় সহকর্মীদের ওপর।

দীর্ঘ ৪৪ বছরের অভিজ্ঞতা একটা প্রবন্ধে লিপিবদ্ধ করা কখনও সম্ভব নয়। সচেতন মনে সংক্ষিপ্ত আকারে যেটুকু পারলাম প্রকাশ করলাম। কোনো ত্রুটি থাকলে সংশোধন করার অনুরোধ রইলো। এটি পড়ে যদি আপনাদের কিছুটা উপকার হয় বা জানতে সাহায্য করে তাহলে লেখা সার্থক হবে। সবার মঙ্গল হোক। ধন্যবাদ ও নমস্কার।

Haripada Nayak *joined the Department of Applied Physics (CU) as a Library Staff in 1975 and worked there till his transfer to the Department of Polymer Science & Technology (CU) in 2012. He continued in the Applied Physics Library in the evening section till 2019 even after his retirement in 2017.*

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Closing Ceremony Programme

Centenary Celebration of the Department of Applied Physics

সমাপ্তি উৎসব সূচি

1925 - 2024
Applied Physics
100 Glorious Years of Journey

বর্ষব্যাপী শতবার্ষিকী উদযাপনের সমাপ্তি পর্ব–
অভিভাষণ ও সাংস্কৃতিক উৎসব

শতবার্ষিকী প্রেক্ষাগৃহ, কলকাতা বিশ্ববিদ্যালয়, কলেজ স্ট্রীট ক্যাম্পাস

শনিবার, জানুয়ারি ২৫, ২০২৫

সময়	**অনুষ্ঠান**
অপরাহ্ন ২.০০ থেকে ৩.০০	বর্ষব্যাপী শতবার্ষিকী উদযাপনের সমাপ্তি উৎসব – অভিভাষণ পর্ব
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অপরাহ্ন ৩.৩০ থেকে ৪.৩০	**সাংস্কৃতিক অনুষ্ঠান পর্ব - আবৃত্তি** **পরিবেশনায়: শ্রীমতী ব্রততী বন্দ্যোপাধ্যায়**
অপরাহ্ন ৪.৩০ থেকে ৬.০০	ভারী জলখাবার ও চা
সন্ধ্যা ৬.০০ থেকে ৮.৩০	**সাংস্কৃতিক অনুষ্ঠান পর্ব – নাট্যানুষ্ঠান: পড়ে পাওয়া ষোল আনা** পরিবেশনায়: বেহালা ব্রাত্যজন নাটক, নির্দেশনা, অভিনয় কেন্দ্র: খরাজ মুখোপাধ্যায়

বর্ষব্যাপী শতবার্ষিকী উদযাপনের সমাপ্তি পর্ব–
৬৪তম পুনর্মিলন উৎসব

ফলিত পদার্থবিজ্ঞান বিভাগ, কলকাতা বিশ্ববিদ্যালয়, রাসবিহারী শিক্ষা-প্রাঙ্গণ

রবিবার, জানুয়ারি ২৬, ২০২৫

সময়	**অনুষ্ঠান**
সকাল ৯.৩০	রেজিস্ট্রেশন
সকাল ১০.০০ থেকে ১১.০০	সাংস্কৃতিক অনুষ্ঠান (বর্তমান ছাত্রছাত্রী ও শিক্ষাকর্মীদের অংশগ্রহণে)
সকাল ১১.০০ থেকে ১২.০০	সাংস্কৃতিক অনুষ্ঠান (প্রাক্তনীদের অংশগ্রহণে)
বেলা ১২.০০ থেকে ১.৩০	বার্ষিক সাধারণসভা (প্রাক্তনী সংঘ ও পুনর্মিলন কমিটি)
বেলা ১.৩০ থেকে ২.০০	সম্মিলিত আলোকচিত্র গ্রহণ
দুপুর ২.০০	পুনর্মিলন ভোজ

History, Context, Perspective of the Department of Applied Physics

Foundation of technical education in India was laid almost at the same time as in Europe but its growth was very restrictive and sluggish till India became Independent. Looking back to historical development of technical education - the entirety of 19th century witnessed gradual evolution of technical education centring primarily civil engineering in Roorkee, Pune and Calcutta. Engineering was yet not classified into several disciplines until specifically the electrical and communication era came into being as a prodigious part of the Second Industrial Revolution at the dawn of 20th century. This historical juncture had been the prelude to establishment of the Department of Applied Physics in 1925 within the University of Calcutta with the vision of producing technologists to make Indian Industries self-reliant. The celebration of the Centenary of one of the oldest technological departments of electrical & communication era with its ongoing advancement keeping pace with digital transformation is not only an occasion for retrospect; it is at the same time an effort to look forward. More so to keep pace with the awfully rapid development in the technological world.