

**Report and Concept Document**  
**2<sup>nd</sup> International Career Outreach Conference**  
**“Trends in Sustainable Design, Technology, Innovation & Enterprise”**  
**08<sup>th</sup> -11<sup>th</sup> December 2023**



Organized by  
Microsystem Design-Integration Lab  
Bidhan Chandra College, Asansol, WB, India  
In Association With  
Ming-Chi University of Technology, Taipei, Taiwan



08<sup>th</sup> -11<sup>th</sup> December 2023

## Report Preface

A series of career outreach workshops, a total of seven event, by the Microsystem Design-Integration Lab, Dept. of Physics, Bidhan Chandra College, Asansol, West Bengal, India, was organized in last few years, intended to help students thrive in a world of constant change, providing exposure, career-readiness and internship opportunities and professional career advisories at domestic and international level. Bidhan Chandra College, Asansol, West Bengal, is proud to enable Advanced Research, Design, Computational Facilities, and Google Workspace for Education, during the difficult times of pandemic, facilitating the teaching and learning with cloud based collaborative tools. After the successful: International Career Outreach Conference in November 2022 with 6 Keynotes from 4 countries, 2 Invited, 16 Technical Presentations and 35 Technical Posters; we are pleased to take a leap further by inviting the students, scholars, and faculties for three-day: 2<sup>nd</sup> International Career Outreach Conference “Trends in Sustainable Design, Technology, Innovation & Enterprise”, in blended mode. It is our pleasure to further inform, this year the event is co-hosted by Ming-Chi University of Technology, Taipei, Taiwan, as part of our on-going Memorandum of Understanding (MoU Period: 2023-2028).

Technical papers, under the broad subject areas of Applied & Natural Sciences and Engineering, related to Sustainable Design, Technology and Innovation, are included in this volume:

**Applied and Natural Sciences:** Physical, Chemical, Mathematical, Biological and Material Sciences.

**Design and Engineering:** Concepts in Electronics, Electrical, Biomedical, Computational Engineering, e.g. Microelectronics and Devices, Optoelectronics and photonics, Thin Film Electronics, Material and Process Engineering, Emerging Memories, Interconnect-3D Integrations-MEMS, Power-High-speed Devices and Materials, Quantum information Systems and Devices, Organic-Molecular-Bio-electronics, Hybrid and Renewable Energy Sources, Photovoltaics-Energy Harvesting-Battery-related Technology, Biomaterials-Biomedicine, Medical Imaging, Biomechanics, Computational Bioengineering, Integrated Microfluidics. Cyber-physical Systems, Communication Systems, Signal Analysis, Data Science, Artificial Intelligence and Machine Learning, Optical and Communication Systems, Cloud and Mobile Computing, Deep Learning, Networks & Securities, Intelligent Systems and Robotics, Internet of Things.

## Esteemed Keynote Speakers



*Dr. Goutam Kumar Dalapati,  
Sr. Scientist,  
Dept. of Mechanical Engineering,  
National University of Singapore;  
Chief Executive Officer,  
Sunkonnect Pte Ltd, Singapore*



*Prof. Sunil Karforma,  
Professor and Head,  
Dept. of Computer Science,  
Dean, Faculty Council for  
Post-graduate Studies in Science  
The University of Burdwan,  
India*



*Prof. Amlan Chakrabarti,  
Professor and Director,  
A.K. Choudhury School of IT,  
University of Calcutta  
CEO, Data Sc., AI and  
Futuristic Technologies,  
Dept. of Higher Education, GoWB*



*Dr. Lalit Garg,  
Associate Professor,  
Faculty of Information &  
Communication  
Technology,  
University of Malta  
(Virtual Talk)*



*Dr. Debabrata Samanta,  
Assistant Professor,  
Rochester Institute of  
Technology,  
Kosovo  
(Virtual Talk)*



*Dr. Chih-Yi Liu  
Research Fellow,  
Organic Electronics  
Research Center,  
Ming Chi University of  
Technology, Taiwan  
(Virtual Talk)*



*Dr. Sajal Biring,  
Associate Professor,  
Dept. of Electronics  
Engineering,  
Ming Chi University of  
Technology, Taiwan  
(Virtual Talk)*

## Organizing Committee

**Patron: Prof. Falguni Mukhopadhyay**, Hon'ble Principal, Bidhan Chandra College

**Chair: Dr. Goutam Mukherjee**, Convener, NAAC Committee;  
HOD, Dept. of Physics, Bidhan Chandra College

**Coordinator, IQAC: Dr. Saumen Chakraborty**, Dept. of Physics, Bidhan Chandra College

**Treasurer: Dr. Sujit Kr. Bera**, Dept. of Chemistry, Bidhan Chandra College

**Convener: Dr. Amit Banerjee**, Dept. of Physics, Bidhan Chandra College

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**Dr. Indubaran Mandal**, Dept. of Mathematics, Bidhan Chandra College

**Dr. Sreenita Ghosh**, Dept. of Zoology, Bidhan Chandra College

**Ms. Kasturi Chatterjee**, Dept. of Botany, Bidhan Chandra College

**Ms. Debdyuti Sengupta**, Dept. of Environmental Science, Bidhan Chandra College

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**Prof. W.K.S. Terence**, School of Electrical & Electronic Eng., Nanyang Technological University, Singapore

**Dr. Chih-Yi Liu**, Senior researcher, Organic Electronics Research Center, Ming Chi University of Technology, Taiwan

**Dr. Kai Chen, Senior Scientist**, Robinson Research Institute, Victoria University of Wellington, New Zealand

**Prof. Yi-Nan Lin**, Professor, Department of Electronic Engineering, Ming Chi University of Technology, Taiwan

**Dr. Mrinal Kanti Musib**, Dept. of Biomedical Engineering, National University of Singapore, Singapore

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**Prof. Joel J. P. C. Rodrigues**, Federal University of Piauí, Brazil; Instituto de Telecomunicações, Portugal

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**Dr. Arup Samanta**, Dept. of Physics, Indian Institute of Technology Roorkee

**Dr. Bholu Nath Pal**, Associate Professor, Indian Institute of Technology BHU

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**Dr. Tanmoy Basu**, TCG Centres for Research and Education in Science and Technology

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## Publication Committee

**Dr. Sajal Biring**, Dept. of Electronics Engineering, Ming Chi University of Technology, Taiwan

**Dr. Lalit Garg**, Associate Professor, Faculty of Information & Communication Technology, University of Malta, Malta

Organized by Microsystem Design-Integration Lab, Dept. of Physics, Bidhan Chandra College,  
Partially supported by the Device Development Programme (DDP),  
Department of Science & Technology (DST), Government of India.  
For further information on Collaboration, Scope of Research, and Internship  
Website: [www.bccollegeasansol.ac.in](http://www.bccollegeasansol.ac.in) || Email: [amit@bccollegeasansol.ac.in](mailto:amit@bccollegeasansol.ac.in)

**Active Research Project Currently:**

Competitive Research Grant under Device Development Programme (Technology Development Board),  
Department of Science & Technology (DST), Ministry of Science and Technology, Government of India.

**Microsystem Design-Integration Lab Resources and Design Capabilities:**

COMSOL Multiphysics with following packages: Wave Optics Module, Ray Optics Module, RF Module,  
AC/DC Module, Semiconductors Module, MEMS Module, Heat Transfer Module, Design Module, Material  
Library;

National Instruments Multisim Software; NI Ultiboard Software; NI LabVIEW Software and DAQs;

Siemens Solid Edge Software for 3D Design, Simulation;

Advanced Design and Computation Facility;

**Active collaboration:**

Advanced Device Research Division, Research Institute of Electronics, Shizuoka University, Japan;

Electrical and Computer Engineering, National University of Singapore;

Organic Electronics Research Center (OERC), Ming Chi University of Technology, Taipei, Taiwan;

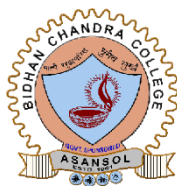
Memorandum of Understanding (MoU: 2023-28) with Ming-Chi University of Technology, Taipei, Taiwan;

Centre for Quantum Engineering, Research and Education, TCG Crest, Kolkata, India;

# PROGRAMME SCHEDULE

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Rochester Institute of  
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Kosovo  
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**Career Outreach Conference Supported by**



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**8<sup>th</sup> December 2023**

**Venue: Conference Room, Bidhan Chandra College, Asansol, West Bengal**

**Registration and Tea: 10:00 am**

**Opening Session: 10:30 am**

Welcome Address and Inaugural Speech by Dr. Falguni Mukhopadhyay,  
Hon'ble Principal, Bidhan Chandra College.

Memorandum of Understanding (MoU) Signing Ceremony  
Sunkonnect Pte Ltd (Singapore)

and

Microsystem Design-Integration Lab, Bidhan Chandra College (India)

on

Academic And Research Collaboration

**Technical Session I: 11:00 am - 01:30 pm**

Outline of Career Outreach Initiative at Bidhan Chandra College by  
Convener, Dr. Amit Banerjee, Physics Dept., Bidhan Chandra College

**Keynote Talks I-III**

followed by interactive session

by

Prof. Sunil Karforma, Professor and Head, Dept. of Computer Science,  
Dean, Faculty Council for Post-graduate Studies in Science, The University of Burdwan;

Prof. Amlan Chakrabarti, Professor and Director, A.K. Choudhury School of IT,  
University of Calcutta;  
CEO, Data Sc., AI and Futuristic Technologies, Dept. of Higher Education, GoWB;

Dr. Goutam Kumar Dalapati, Sr. Scientist, Dept. of Mechanical Engineering,  
National University of Singapore;  
Chief Executive Officer, Sunkonnect Pte Ltd, Singapore;

**Refreshments and Break-out Sessions**

**9<sup>th</sup> December 2023**

**Mode of Meeting: Virtual, Google Meet**

*Google Meet joining info*

*Saturday, December 9 · 10:00am – 4:30pm*

*Time zone: Asia/Kolkata*

*Video call link: <https://meet.google.com/kjc-ujtj-psy>*

**Technical Session II: 10:00 am - 12:30 pm (IST)**

**Keynote Talk**

**10:00 am - 10:45 pm**

by

Reserved TBA

**Oral Presentations: Track I & Track II**

**10:45 am - 01:30 pm**

**Technical Session III: 02:00 pm - 04:30 pm (IST)**

**Keynote Talk IV**

**02:00 pm - 02:45 pm (IST)**

by

Dr. Debabrata Samanta,  
Rochester Institute of Technology,  
Kosovo

**Keynote Talk V**

**3:00 pm - 3:45 pm (IST)**

by

Dr. Lalit Garg,  
Associate Professor,  
Faculty of Information & Communication Technology,  
University of Malta

**11<sup>th</sup> December 2023**

**Mode of Meeting: Virtual, Google Meet**

***Google Meet joining info***

***Monday, December 11 · 10:00am – 4:30pm***

***Time zone: Asia/Kolkata***

***Video call link: <https://meet.google.com/kjc-ujtj-psy>***

**Technical Session IV: 10:00 am - 12:30 pm (IST)**

**Keynote Talk VI**

**10:00 am - 10:45 pm**

by

Dr. Chih-Yi Liu

Research Fellow,

Organic Electronics Research Center,

Ming Chi University of Technology, Taiwan

**Keynote Talk VII**

**10:45 am - 11:30 pm**

by

Dr. Sajal Biring,

Associate Professor,

Dept. of Electronics Engineering,

Ming Chi University of Technology, Taiwan

**Oral Presentations: Track I & Track II**

**11:30 am - 12:30 pm**

**Technical Session V: 02:30 pm - 04:00 pm (IST)**

**Oral Presentations: Track I & Track II**

**02:30 pm - 03:30 pm**

**Announcement of Awards and Valedictory Session**

**3:30 pm-4:00 pm**

## आसनसोल के बीसी कॉलेज का ताइवान के ऑर्गेनिक इलेक्ट्रॉनिक्स रिसर्च सेंटर के साथ करार

**आसनसोल.** आसनसोल के बीसी कॉलेज के माइक्रोसिस्टम डिजाइन-इंटीग्रेशन लैब ने देश को सेमी कंडक्टर उद्योग से जोड़ने के लिए न्यू ताइपे शहर के ताइवान ताइपे के प्रमुख विश्वविद्यालयों में से एक मिंग-ची प्रौद्योगिकी विश्वविद्यालय और आसनसोल के बिधान चंद्र कॉलेज के बीच पांच साल (2023-2028) के लिए समझौता पर हस्ताक्षर किया गया. शुक्रवार को बीसी कॉलेज के माइक्रोसिस्टम डिजाइन- इंटीग्रेशन लैब द्वारा मिंग ची यूनिवर्सिटी ऑफ टेक्नोलॉजी, ताइपेई, ताइवान के सहयोग से ट्रेड्स इन सस्टेनबल डिजाइन - टेक्नोलॉजी, इनोवेशन एंड इंटरप्राइज, द्वितीय अंतरराष्ट्रीय कैरियर आउटरीच सम्मेलन के दौरान समझौते पर हस्ताक्षर किया गया. सम्मेलन में सिंगापुर के सनकनेक्ट पीटीइ लिमिटेड के डॉ. गौतम कुमार दलपति, बर्दवान यूनिवर्सिटी के प्रोफेसर सुनील करफोरमा, पश्चिम बंगाल उच्च शिक्षा विभाग के प्रोफेसर अम्लान चक्रवर्ती, यूनिवर्सिटी ऑफ माल्टा के डॉ ललित गर्ग, डॉ. देवव्रत सामंत, ताइवान के मिंग ती यूनिवर्सिटी ऑफ टेक्नोलॉजी के डॉ. ची-यी- लिउ तथा डॉ. सजल बिरिंग आदि वचुअल रूप से शामिल हुए. वहीं बीसी कॉलेज के माइक्रोसिस्टम डिजाइन इंटरगेशन लैब के पदाधिकारियों सहित कॉलेज प्राचार्य डॉ. फाल्गुनी मुखोपाध्याय ने इस पहल की काफी सराहना की. माइक्रोसिस्टम डिजाइन-इंटीग्रेशन लैब के सहायक प्रोफेसर तथा लैब निदेशक डॉ. अमित बनर्जी ने बताया कि एमओयू समझौते से विज्ञान और व्यावसायिक अध्ययन के छात्रों को मास्टर्स जैसे उच्च अध्ययन करने की सुविधा मिलेगी.

## बीसी कालेज में करियर सेमिनार का आयोजन

संवाद सहयोगी, बर्नपुर : आसनसोल बीसी कालेज के माइक्रो सिस्टम डिजाइन- इंटरगेशन लैब द्वारा मिंग ची यूनिवर्सिटी आफ टेक्नोलाजी ताइवान के सहयोग से शुक्रवार को सेमिनार का आयोजन किया गया। सेमिनार में देश के साथ विदेशों के कई प्रख्यात वक्ताओं ने शामिल होकर अपना विचार रखा। वक्ताओं में सिंगापुर के सनकनेक्ट पीटीई लिमिटेड के डा. गौतम कुमार दलपति, बर्द्धमान विश्वविद्यालय के प्रोफेसर सुनील करफोरमा, पश्चिम बंगाल उच्च शिक्षा विभाग के प्रोफेसर अमलान चक्रवर्ती उपस्थित थे। जबकि यूनिवर्सिटी आफ माल्टा के डा. ललित गर्ग, डा. देवव्रत सामंत, ताइवान के मिंग ची यूनिवर्सिटी आफ टेक्नोलाजी के डा. ची-यी- लिउ तथा डा. सजल बिरिंग आदि वर्चुअल रूप से शामिल हुए। वहीं बीसी कालेज के माइक्रो सिस्टम डिजाइन इंटरगेशन लैब के पदाधिकारियों व कालेज प्राचार्य डा. फाल्गुनी मुखोपाध्याय ने इस पहल की सराहना की।



# গবেষণায় মালয়েশিয়ার বিশ্ববিদ্যালয়ের সঙ্গে মউ চুক্তি স্বাক্ষর কেএনইউ-এর

নিজস্ব প্রতিনিধি, আসানসোল: পড়াশোনা ও গবেষণার ক্ষেত্রে নতুন দিগন্ত খুলে যাচ্ছে শিক্ষাঙ্গণের পড়ুয়াদের কাছে। মালয়েশিয়া থেকে সিঙ্গাপুর, জাপান থেকে তাইওয়ান সহ একাধিক দেশের বিশ্ববিদ্যালয়ের দরজা খুলে যাচ্ছে তাঁদের জন্য। বৃহস্পতিবার কাজি নজরুল বিশ্ববিদ্যালয় (কেএনইউ)-এর সঙ্গে মউ চুক্তি স্বাক্ষর করল মালয়েশিয়ার টেলর বিশ্ববিদ্যালয়। যৌথ গবেষণা থেকে পড়ুয়া ও ফ্যাকাল্টি আদানপ্রদান এই চুক্তি স্বাক্ষরিত হয়। চুক্তিগত। একই দিনে সিঙ্গাপুরের একটি বহুজাতিক বাণিজ্যিক প্রতিষ্ঠানের সঙ্গেও মউ চুক্তি করল আসানসোল বিসি রায় কলেজ। এখানকার পড়ুয়ারা সেখানে প্রতিষ্ঠানে গিয়ে ইন্টারশিপ করতে পারবেন। মিলবে চাকরির সুযোগও।

কাজি নজরুল বিশ্ববিদ্যালয়ের উপাচার্য দেবাশিস বন্দ্যোপাধ্যায় বলেন, ‘বিদেশের এই বিশ্ববিদ্যালয় এশিয়ার অন্যতম ভালো শিক্ষাপ্রতিষ্ঠান। তাঁদের সঙ্গে আমাদের এই মউ চুক্তির ফলে সমৃদ্ধ হওয়ার সুযোগ পাবেন আমাদের পড়ুয়ারা।’ বিশ্ববিদ্যালয় সূত্রে জানানো হয়েছে, বিদেশের এই বিশ্ববিদ্যালয়টি ইঞ্জিনিয়ারিং ক্ষেত্রে অত্যন্ত ভালো কাজ করে। নানা উল্লেখযোগ্য গবেষণার কাজও রয়েছে সেই তালিকায়। বিশ্ববিদ্যালয়ের অধীনেও মাইনিং, মেটালজি সহ একাধিক গুরুত্বপূর্ণ ইঞ্জিনিয়ারিং বিভাগ রয়েছে।

অন্যদিকে আসানসোলের বিসি রায় কলেজের ফিজিক্স বিভাগে কেন্দ্রীয় সরকারের অর্থে মাইক্রোসিস্টেম ডিজাইন ইন্টিগ্রেশন ল্যাব গড়ে উঠেছে। সেমি কন্ডাক্টর, ফোটন সহ পদার্থবিদ্যার আধুনিকতম বিষয়গুলি নিয়ে উল্লেখযোগ্য

গবেষণা চলেছে এখানে। এর বিশেষত্ব হল, শুধু ফিজিক্স নয় ম্যাথমেটিক্স, কেমিস্ট্রি, ইলেকট্রনিক্স সহ নানা বিষয়ের পড়ুয়ারা এই ল্যাবের নানা প্রজেক্টে কাজ করার সুযোগ পাচ্ছেন। ইতিমধ্যেই একাধিক গবেষণা নামজাদা সায়েন্স জার্নালে প্রকাশ পেয়েছে। বিসি রায় কলেজের এই আধুনিক গবেষণার জন্য মউ চুক্তি স্বাক্ষরিত হয়েছে তাইওয়ানের মিংচি ইউনিভার্সিটি অফ টেকনোলজির (এমসিটিইউ) চুক্তি অনুযায়ী দুই দেশের পড়ুয়ার একে অপরের শিক্ষাপ্রতিষ্ঠানে গিয়ে গবেষণা ও শিক্ষার আদানপ্রদান করতে পারবেন। মঙ্গলবার আবার সেই ল্যাবের সঙ্গে মউ চুক্তি স্বাক্ষরিত হল সিঙ্গাপুরের একটি বাণিজ্যিক প্রতিষ্ঠানের। যারা সেমি কন্ডাক্টর, সোলার এনার্জি নিয়ে নানা সামগ্রী তৈরি করে।

কলেজের ফিজিক্সের অধ্যাপক ও ল্যাবের কো-অর্ডিনেটর অমিত বন্দ্যোপাধ্যায় বলেন, ‘সেমি কন্ডাক্টর, এআই, আইওটির মতো আধুনিক সামগ্রীর গবেষণা ও প্রস্তুতিতে যে দেশগুলি এগিয়ে রয়েছে তাঁদের কাছে প্রতিভাবান পড়ুয়ার অভাব রয়েছে। তাঁরা তাকিয়ে থাকে ভারতের দিকে। আমাদের পড়ুয়াদের কাছে সুযোগ রয়েছে নিজেদের দক্ষতা প্রমাণ করে সুপ্রতিষ্ঠিত হওয়ার। সেই কাজই আমরা নিরন্তর করে চলেছি নানা গবেষণা ও সেমিনারের আয়োজন করে।

এদিন কলেজের সঙ্গে বেসরকারি সংস্থার মৌ চুক্তিতে কলেজের হয়ে স্বাক্ষর করেন অধ্যক্ষ ফাল্গুন মুখোপাধ্যায়। তিনি বলেন, ফিজিক্স, কেমিস্ট্রি আলাদা বিষয়, এই ধরন। এখন অতীত। আধুনিক বিজ্ঞানে সবই এক। এখন আধুনিক গবেষণা হচ্ছে। বিভিন্ন সংস্থার সঙ্গে আমরা যুক্ত হচ্ছি।

# 2<sup>nd</sup> International Career Outreach Conference

“Trends in Sustainable Design, Technology, Innovation & Enterprise”

8-11<sup>th</sup> December 2023



Organized by  
Microsystem Design-Integration Lab  
Bidhan Chandra College, Asansol, WB, India

In Association With  
Ming-Chi University of Technology, Taipei, Taiwan















*Dr. Debabrata Samanta,  
Assistant Professor,  
Rochester Institute of  
Technology,  
Kosovo  
(Virtual Talk)*



● Debabrata Samanta, Ph.D. (Presenting)

The screenshot shows a PowerPoint presentation in progress. The slide title is "Virtual Reality – New Learning Approach". The main text on the slide reads: "Welcome to the world of virtual reality! Discover the fascinating role that image processing plays in converting 2D visuals to immersive 3D experiences." Below this, the presenter's name and affiliation are listed: "Debabrata Samanta, Ph.D. Program Head & Assistant Professor Dept. of Computing and Information Technologies Rochester Institute of Technology, Kosovo, Europe." To the right of the text is a large image of a black VR headset. The PowerPoint interface includes a slide navigation pane on the left and a top menu bar with options like File, Home, Insert, Design, Transitions, Animations, Slide Show, Review, View, Help, and Format.

Saumen Chakraborty

Sujit Kumar Bera

Debabrata Samanta, Ph.D.

Seminar BC College





*Dr. Debabrata Samanta,  
Assistant Professor,  
Rochester Institute of  
Technology,  
Kosovo  
(Virtual Talk)*



Debabrata Samanta, Ph.D. (Presenting)

031.wmv - VLC media player  
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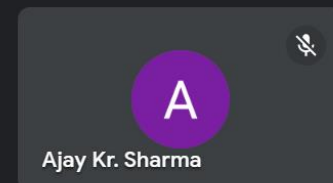
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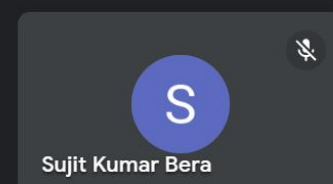
Debabrata Samanta, Ph.D.



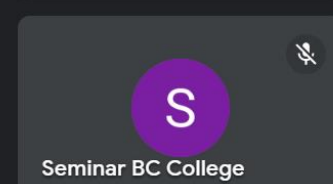
Saumen Chakraborty



Ajay Kr. Sharma



Sujit Kumar Bera



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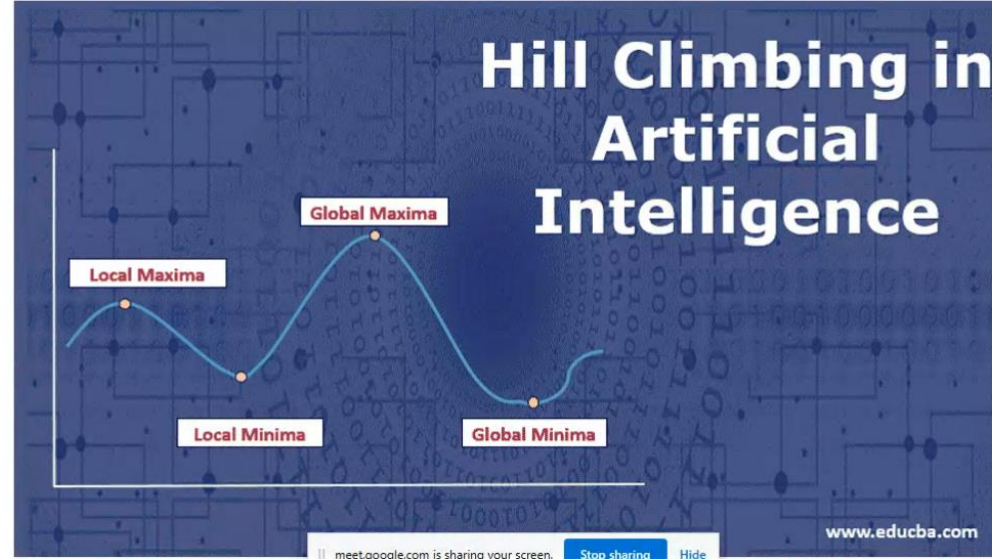


*Dr. Lalit Garg,  
Associate Professor,  
Faculty of Information &  
Communication  
Technology,  
University of Malta  
(Virtual Talk)*

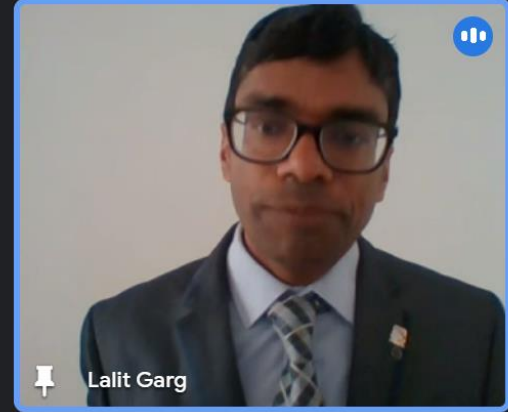


Lalit Garg (Presenting)

# Reality vs Perception



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Participant avatars and names:

- Sudip Chakrab...
- Saumen Chakr...
- Souvik Chakra...
- Ajay Kr. Sharma
- Debashish Muk...
- Sujit Kumar Bera
- 3 others
- Seminar BC Co...



*Dr. Lalit Garg,  
Associate Professor,  
Faculty of Information &  
Communication  
Technology,  
University of Malta  
(Virtual Talk)*

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# Digital Twin of Earth & Satellite4Health

SATELLITE4HEALTH

UNIVERSITY OF MALTA  
L-Università ta' Malta

GOVERNMENT OF MALTA  
MINISTRY FOR RESEARCH,  
INNOVATION AND THE CO-ORDINATION  
OF POST COVID-19 STRATEGY

Xjenza The Malta Council for  
Science & Technology

NATIONAL SPACE FUND

Xjenza The Malta Council for  
Science & Technology

GOVERNMENT OF MALTA  
MINISTRY FOR RESEARCH,  
INNOVATION AND THE CO-ORDINATION  
OF POST COVID-19 STRATEGY

NATIONAL SPACE FUND

L-Università ta' Malta

Sudip Chakrab... Saumen Chakr... Apurba Parama... Ajay Kr. Sharma SkMd Samim A... Sujit Kumar Bera Kanika Ghosh Seminar BC Co...

3:38 PM | 2nd International Career Outreach Co...

10





*Dr. Sajal Biring,  
Associate Professor,  
Dept. of Electronics  
Engineering,  
Ming Chi University of  
Technology, Taiwan  
(Virtual Talk)*



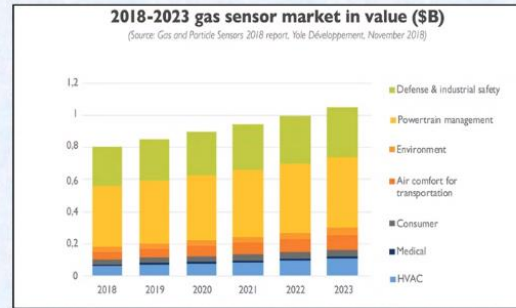
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sajal biring (Presenting)

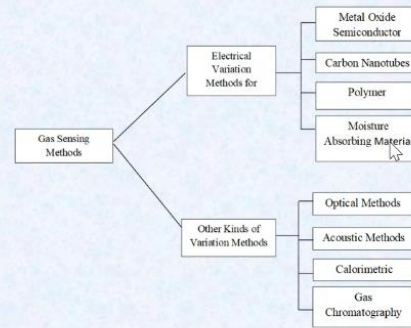
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明志科技大學  
MING CHI UNIVERSITY OF TECHNOLOGY

## Introduction



### Transducing Methods



**Materials**

**Indicator**

**Matrix**

**Substrate**

3/21



sajal biring



Genanew Mulug...

L

Liu Chih-Yi

S

ignou 2855

S

Souvik Chakrabo...

Ethiopia Ethiopia

D A

Debichhanda De

11 others

S

Seminar BC College





*Dr. Sajal Biring,  
Associate Professor,  
Dept. of Electronics  
Engineering,  
Ming Chi University of  
Technology, Taiwan  
(Virtual Talk)*



s sajal biring (Presenting)

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MING CHI UNIVERSITY OF TECHNOLOGY

### Motivation

#### Optical Gas Sensors

Year	World	Taiwan
2010	40000	5000
2011	42000	5000
2012	44000	5000
2013	46000	5000
2014	48000	5000
2015	50000	5000
2016	52000	5000
2017	50000	5000
2018	48000	5000
2019	45000	5000
2020	40000	5000

#### Electrical Gas Sensors

Year	World	Taiwan
2010	50000	5000
2011	52000	5000
2012	54000	5000
2013	56000	5000
2014	58000	5000
2015	60000	5000
2016	58000	5000
2017	56000	5000
2018	54000	5000
2019	50000	5000
2020	40000	5000

**Improving Sensitivity**

- Synthesized novel materials
- Indicator – analyte interaction area increment → Application of nanotechnology

4/21

Grid of participant avatars and names:

- Souvik Chakrabo...
- Ethiopia Ethiopia
- ignou 2855
- sajal biring
- Debichanda De
- Debashish Mukh...
- Apurba Paramanik
- 11 others
- Seminar BC College







*Dr. Chih-Yi Liu  
Research Fellow,  
Organic Electronics  
Research Center,  
Ming Chi University of  
Technology, Taiwan  
(Virtual Talk)*



L Liu Chih-Yi (Presenting)

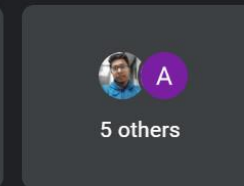
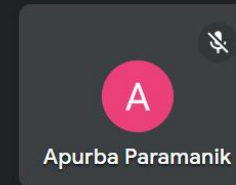


# Bio- and Chemical Sensing Based on Surface-Enhanced Raman Scattering

Dr. Chih-Yi Liu  
Organic Electronics Research Center



勤勞扶實 Ming Chi University of Technology



10:33 AM | 2nd International Career Outreach C...





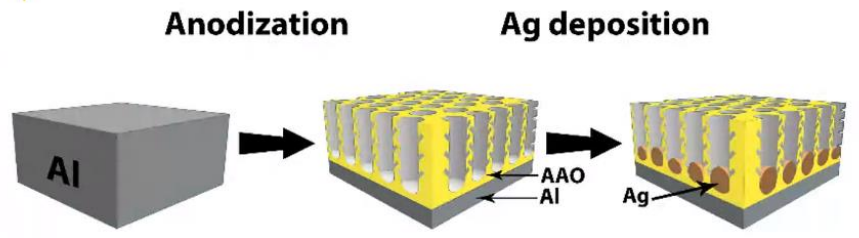


*Dr. Chih-Yi Liu  
Research Fellow,  
Organic Electronics  
Research Center,  
Ming Chi University of  
Technology, Taiwan  
(Virtual Talk)*



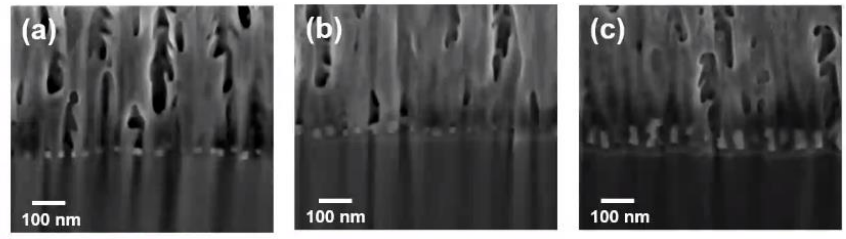
L Liu Chih-Yi (Presenting)

## Ag-Filled AAO Films as Powerful SERS Substrates



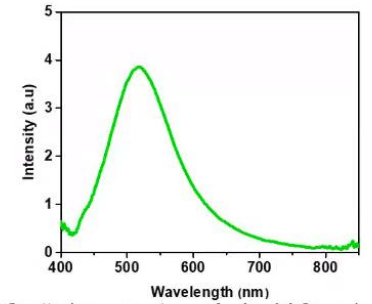
Element	Atomic concentration (%)	Weight concentration (%)
Aluminum	48.79	57.84
Oxygen	49.68	34.93
Silver	1.52	7.23

Composition of the SERS substrate with 13 deposition cycles by EDS investigation.

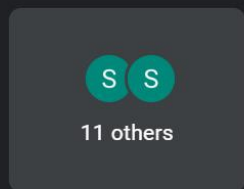
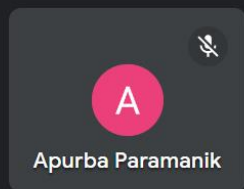
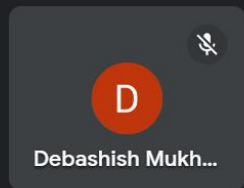
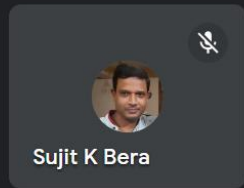


Cross-sectional SEM micrographs of SERS substrates with Ag-deposition cycles of (a) 6, (b) 13, and (c) 39.

C. Y. Liu, et al., Biosensors, 12, 807 (2022).



Scattering spectra of Ag-AAO substrate fabricated by 13 cycles of Ag deposition.



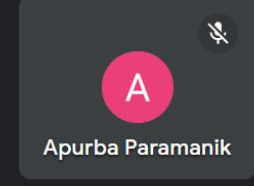
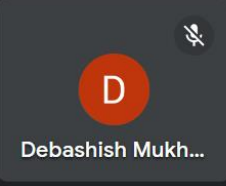
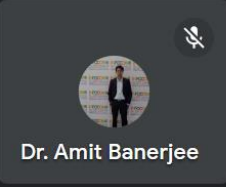
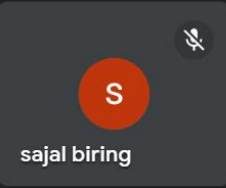


*Prof. Amlan Chakrabarti,  
Professor and Director,  
A.K. Choudhury School of IT,  
University of Calcutta  
CEO, Data Sc., AI and  
Futuristic Technologies,  
Dept. of Higher Education, GoWB*

Amlan Chakrabarti Calcutta University (Presenting)

# Introduction to Data Science

**Prof. (Dr.) Amlan Chakrabarti**  
**Dist. Speaker IEEE Computer Society, SMIEE**  
**Director, School of Information Technology**  
**University of Calcutta, India**



11:45 AM | 2nd International Career Outreach Co...



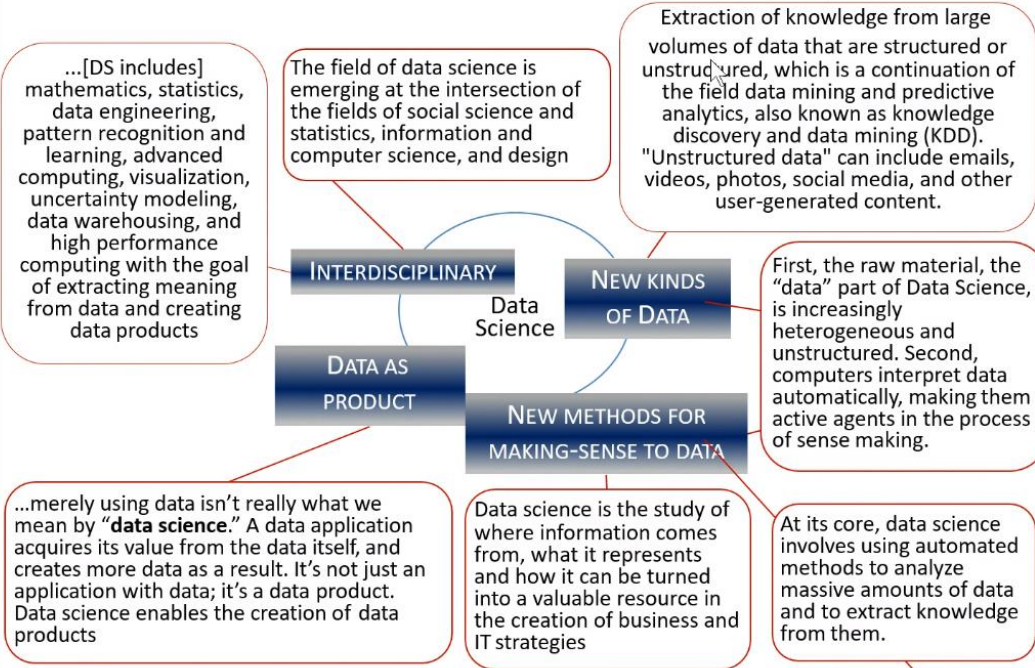
21







# What is Data Science?



*Prof. Amlan Chakrabarti,  
Professor and Director,  
A.K. Choudhury School of IT,  
University of Calcutta  
CEO, Data Sc., AI and  
Futuristic Technologies,  
Dept. of Higher Education, GoWB*

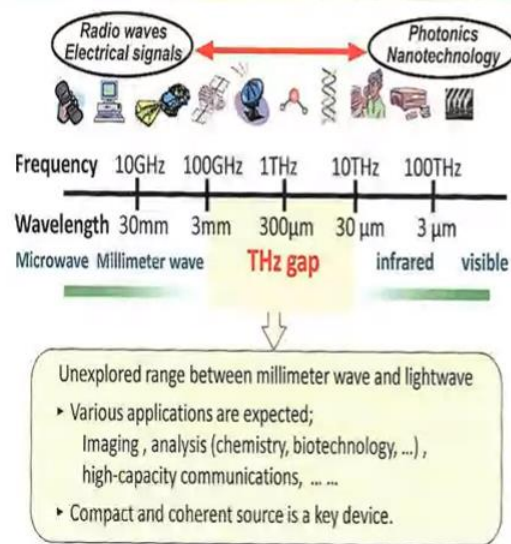


# THz Imaging Technology to Assess Solar Cell Degradation

## Background – Terahertz Wave

•Terahertz technology operates in the electromagnetic spectrum between microwave and infrared wavelengths, typically from 0.1 to 10 THz.

•This region offers unique advantages for inspecting solar cells, as it can penetrate many non-conductive materials, including organic and inorganic thin films used in solar cell fabrication.



Sudip Chakrabor...

Souvik Chakrab...

Ajay Kr. Sharma

Debashish Mukh...

Harishchandra C...

Seminar BC Coll...



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**BEST PAPER CERTIFICATE**

**The Best Paper Award** for originality of research work and outstanding presentation is presented to **Humaidi, of Department of Mechanical Engineering, Ming Chi University of Technology, New Taipei City, Taiwan** for the title **“Detecting gaseous ammonia effectively by Ag deposited nanoporous AAO substrate”** endorsed by session chair and technical committee, in the 2<sup>nd</sup> International Career Outreach Conference “Trends in Sustainable Design, Technology, Innovation & Enterprise”, organized by the Microsystem Design-Integration Lab, Bidhan Chandra College, Asansol, India, in association with Ming-Chi University of Technology, Taipei, Taiwan.

**Dr. Amit Banerjee,**  
Convener,  
2<sup>nd</sup> International Career Outreach Conference

**Dr. Falguni Mukhopadhyay,**  
Principal,  
Bidhan Chandra College, Asansol, India



**2<sup>nd</sup> International Career Outreach Conference**  
**“Trends in Sustainable Design, Technology, Innovation & Enterprise”**  
**8-11<sup>th</sup> December 2023**



Organized by  
Microsystem Design-Integration Lab  
Bidhan Chandra College, Asansol, WB, India  
In Association With  
Ming-Chi University of Technology, Taipei, Taiwan



**CERTIFICATE OF PARTICIPATION**

This is to Certify that **Endalamaw Ewnu Kassa, of Department of Electronic Engineering, Ming Chi University of Technology, New Taipei City, Taiwan** has participated and presented following tile (poster/oral): **“Optimization of Selectivity and Sensitivity of Perovskite-Based ammonia Gas Sensors using binary solvent matrices and its Performance Analysis”** in the 2<sup>nd</sup> International Career Outreach Conference “Trends in Sustainable Design, Technology, Innovation & Enterprise”, organized by the Microsystem Design-Integration Lab, Bidhan Chandra College, Asansol, India, in association with Ming-Chi University of Technology, Taipei, Taiwan.

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Convener,  
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**Dr. Falguni Mukhopadhyay,**  
Principal,  
Bidhan Chandra College, Asansol, India

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**LETTER OF GRATITUDE**

This **Letter of Gratitude** is presented to  
**Dr. Lalit Garg, Faculty of Information & Communication Technology, University of Malta**  
for delivering a **Keynote Talk** in the 2<sup>nd</sup> International Career Outreach Conference  
“Trends in Sustainable Design, Technology, Innovation & Enterprise”, organized by the  
Microsystem Design-Integration Lab, Bidhan Chandra College, Asansol, India,  
in association with Ming-Chi University of Technology, Taipei, Taiwan.  
We very much appreciate your consideration to share your vast knowledge, domain expertise and  
opportunity to interact.

**Dr. Amit Banerjee,**  
**Convener,**  
**2<sup>nd</sup> International Career Outreach Conference**

**Dr. Falguni Mukhopadhyay,**  
**Principal,**  
**Bidhan Chandra College, Asansol, India**

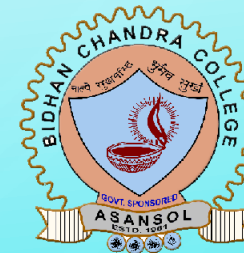
# Esteemed Delegate

**2<sup>nd</sup> International Career Outreach Conference**  
**“Trends in Sustainable Design, Technology, Innovation & Enterprise”**

**8<sup>th</sup> -11<sup>th</sup> December 2023**



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**Microsystem Design-Integration Lab**  
**Bidhan Chandra College, Asansol, WB, India**



In Association With  
**Ming-Chi University of Technology, Taipei, Taiwan**



Name	Email	Affiliation (Dept., Institution,City/State, Country)	Designation	Phone number	Registration Fee Paid ?
Dr. Amit Banerjee	amitbanerjee.nus@gmail.com	BC College Asansol	Faculty	NA	No
Mriganka Nad	mrigankanad112@gmail.com	Physics, Acharya Prafulla Chandra College, Kolkata	Student PG	9609674695	No
ASHIS SOREN	sorenashis5@gmail.com	Physics.,Bidhan Chandra,Asansol,India	Student UG	9547141372	No
Ravi Thakur	ravithakur102003@gmail.com	Physics	Student UG	9800197986	No
Bhaskar Chatterjee	bhaskar.rcpur@gmail.com	Department of Mathematics, Bidhan Chandra College,Asansol, West Bengal	Faculty	09064521540	No
Saumen Chakraborty	saumen@bccollegeasansol.ac.in	Department of Physics, Bidhan Chandra College, Asansol-4, WB, India	Faculty	9434522622	No
Indubaran Mandal	indubaran707@gmail.com	Department of Mathematics, Bidhan Chandra College, Asansol, West Bengal, India.	Faculty	7607264999	Yes
Sudip Chakraborty	sudip.chak.ju@gmail.com	Mizoram, Chaltlang, Aizawl 796012, Mizoram, India	Researcher	8918145560	Yes
Kalan Mal	kmsvc08@gmail.com	Department of Physics, Suri Vidyasagar College, Suri/West Bengal, India	Faculty	9547997033	Yes
Dr. Shilpi Show Mandal	ssurosa@gmail.com	Department of Physics, Banwarilal Bhalotia College, Asansol, West Bengal, India	Faculty	9635288847	Yes
Avinaba shaw	avinabashaw173@gmail.com	Physics, Bidhan chandra college asansol	Student UG	9382670219	Yes
Dr Sonjoy Mondal	sonjoymondal2009@gmail.com	Dept of Physics, Sidho-Kanho-Birsha University, Purulia West Bengal, India	Faculty	9476255689	No
Rajib Mahato	physikrajib@gmail.com	Kazi Nazrul University	Student PG	7468855763	No
Heena parween	heenaiqbal5521@gmail.com	Mathematics department, Asansol Bidhan Chandra College (India)	Student UG	9883761374	No
Atri sinha	sinhaatri856@gmail.com	Physics, Bidhan Chandra college, asansol/West Bengal, India	Student UG	7001387141	No
EBASHISH MUKHERJEE	ebashishmukherjee486@gmail.com	PHYSICS,BIDHAN CHANDRA COLLEGE,ASANSOL/WEST BENGAL,INDIA	Student UG	9563072237	No
Souvik chakraborty	souvikchakraborty415@gmail.com	Physics, Bidhan Chandra College, Asansol/West Bengal, India	Student UG	9735240602	No
Aman Kumar Singh	singhviaman.2003@gmail.com	BIDHAN CHANDRA COLLEGE	Student UG	8617508472	Yes
Ziqra Zain	ziqrazain316@gmail.com	Mathematics	Student UG	8918684331	Yes
Syed Aman Kabir	syedamankabir7@gmail.com	Bidhan Chandra College, Asansol	Student UG	8345951792	No
Uday Narayan Mukherjee	udayjonty12@gmail.com	Bidhan chandra college,asansol	Student UG	8101410329	No
Saad Ahmad Firdousi	syedsaad1407@gmail.com	Bidhan chandra college , Asansol	Student UG	8609380116	No
Vidushi Sharma	vidushi8918@gmail.com	Bidhan Chandra College, Asansol	Student UG	9832551441	No
Shahbaz khan	shahbazkhan270103@gmail.com	Bidhan chandra college asansol	Student UG	7427991797	No
Md Mahtab Alam	mdmahtabalam215@gmail.com	Bidhan Chandra college Asansol	Student UG	7063124004	No
ARINDRAJIT DAS	bonidas407@gmail.com	Bidhan Chandra College,Asansol.	Student UG	7384941170	No
Ayantika Biswas	ayantikabiswas.asl@gmail.com	Bidhan Chandra College, Asansol	Student UG	9474910479	No
Snehasree Manna	snehasreemanna6@gmail.com	Bidhan Chandra college, Asansol	Student UG	7601821066	No
MD AFSAR ANSARI	mdafsaransari.3786@gmail.com	Bidhan Chandra college, Asansol	Student UG	7047241179	No
Sanghamitra Ghosh	sanghamitrag01@gmail.com	Bidhan chandra college asansol	Student UG	9749392336	No
Manisha sikdar	sikdarmanisha37@gmail.com	Bidhan Chandra college asansol	Student UG	8436707312	No
Abdul Rahman	abduhrahmanst123@gmail.com	Bidhan Chandra College , Asansol	Student UG	8927767775	No
Biswajit Mukherjee	iswajitmukherjee2022@gmail.com	Bidhan Chandra college	Student UG	+917029002378	No
Priyanka Basu Kannan	priyankabasu2003@gmail.com	Bidhan Chandra College, Asansol	Student UG	8927593812	No
Rahul Kumar yadav	rahulyadav953202@gmail.com	Bidhan Chandra college Asansol	Student UG	8604651108	No
Pratima Patwa	pratimapatwa31@gmail.com	Bidhan Chandra College Asansol	Student UG	7029042700	No
Yash diwan	devdiwan10@gmail.com	Bidhan Chandra College asansol	Student UG	7001097073	Yes
Aftab Alam	altaf76762@gmail.com	Bidhan Chandra college Asansol	Student UG	7865054363	No
Suman Bouri	suman.bouri.420@gmail.com	B.C. College Asansol	Student UG	7865834717	No
Debjani Bose	bose0737@gmail.com	Bidhan Chandra college, Asansol	Student UG	7047742329	No
Manash kumar Shaw	manashkumarshaw30@gmail.com	B.C. College Asansol	Student UG	9932207146	No
Rishav kumar Verma	Vermarishav190@gmail.com	BC College Asansol	Student UG	7063031512	No
MD SAIFULLAH ANSARI	saifulahsaifu2003@gmail.com	BC college Asansol	Student UG	8927469087	No
Md Shaqib Wasi	shaqibwasi123@gmail.com	BC COLLEGE ASANSOL	Student UG	9647814604	No
Nawej Akhtar	nawejakhtar2@gmail.com	BIDHAN CHANDRA COLLEGE, ASANSOL	Student UG	8797137346	No
Satya Kumar modi	satyamodi2312@gmail.com	Bidhan Chandra college asansol	Student UG	7992484066	No
MD SHAHAN KHAN	Shahan.aiak09@gmail.com	BIDHAN CHANDRA COLLEGE, ASANSOL	Student UG	9749475005	No
Dinabandhu Pandit	dnabandhupanditkelahi@gmail.com	Bidhan Chandra college, Asansol	Student UG	8877817120	No
md misbahuddin ansari	misbadon@gmail.com	BC college Asansol	Student UG	7431931004	No
Sandeep Mahato	sandeepss8084@gmail.com	Bc college asansol	Student UG	8388865845	No
Ankit shaw	shawankit668@gmail.com	Bc college Asansol	Student UG	9749364937	No
Anisha kumari	ermaanishakumari18@gmail.com	BC college asansol	Student UG	8509364458	No
Ankush Sharma	ankushstar121@gmail.com	Bidhan chandra college ,Asansol	Student UG	9064704451	No

Hrishi kesh Routh	hrishikeshrouth728@gmail.com	Bc.collage ASANSOL West bangal	Student UG	9609213337	No
Anikit show	anikitshow@gmail.com	Bc collage asansol.	Student UG	8927875531	Yes
MD NEHAL AKHTAR	nehalakhar007@gmail.com	BC college asansol	Student UG	8327085168	No
Jayant Mehta	jayantmehta12439@gmail.com	BC collage asansol	Student UG	6296569011	No
Rahul Raj Patra	rrajpatra170@gmail.com	Bhidhan Chandra college, Asansol	Student UG	9339297568	No
Md Azimul Haque	mdazimulhaque2021@gmail.com	BC collage Asansol	Student UG	9647144703	No
Hridyeesh Burnwal	hridyeeshburnwal@gmail.com	B.c. college asansol	Student UG	6295757062	No
Jayatri Barat	jayatribarat@gmail.com	B. C college, Asansol	Student UG	9832966303	No
Rabi Shankar Pandey	Shankarrabi518@gmail.com	BC College Asansol	Student UG	8167859732	No
Sahil Raza	sahilraza8653@gmail.com	Bidhan Chandra college, Asansol	Student UG	9903860012	No
Md owais hasan	hohammedowais3101@gmail.com	Bc collar asansol	Student UG	9153122016	No
Preose Chakraborty	chakrabortypreose@gmail.com	Bidhan Chandra college Asansol	Student UG	9382427644	No
Adnan akhtar	adnanakhtar664@gmail.com	BC COLLEGE ASANSOL	Student UG	9064787838	No
Sk Sahil Islam	skislamsahil786@gmail.com	B C College,Asansol	Student UG	8116475397	No
Aloke Kumar Pathak	lokekumarpatak005@gmail.com	BC College Asansol	Student UG	7866044022	No
Md abid raza khan	sahilkhan29053@gmail.com	BC COLLEGE ASANSOL	Student UG	6295983726	No
SUBHAJIT BANERJEE	banerjeesubhajit27@gmail.com	BC COLLEGE ASANSOL	Student UG	8637505295	No
Abhilasha sakshi roy	abhroy112004@gmail.com	BBA, b.c. college, Asansol west Bengal, India	Student UG	7001546917	No
Zaid parwez	zaidmaxx69@gmail.com	B.C.college Asansol	Student UG	9382101938	No
Aditya upadhyay	www.adityakumar998@gmail.com	Bidhan chandra college Asansol	Student UG	9382388312	No
Snigdha Roy	snighdharoy651@gmail.com	Bidhan Chandra College, Asansol	Student UG	7478757945	No
Beauty Kumari Ray	beautykumariray2002@gmail.com	Asansol	Student UG	9883726588	No
Ankit Srivastava	whoankitsrivastabm@gmail.com	BC COLLEGE ASANSOL	Student UG	6294632698	No
Arti Prasad	artiprasad816@gmail.com	B.c. college asansol	Student UG	8927714893	No
MD FAISAL	faisalansar455@gmail.com	BC COLLEGE, ASANSOL	Student UG	08927043663	No
APURBA DAS	apurbadas2221105@gmail.com	Bidhan Chandra College,Asansol	Researcher	7908020534	No
Nazia parween	naziakhan07160716@gmail.com	Department of professional study,Bidhan Chandra College, Asansol West Bengal India	Student UG	08250976157	No
Hamza Irfan	harismedia12@gmail.com	Bidhan Chandra College,Asansol	Student UG	8509583654	Yes
Aastha Kumari Shaw	aasthashaw26@gmail.com	West Bengal India	Student UG	9907269406	Yes
KRISHNA PAUL	pdas16983@gmail.com	Bidhan Chandra College, Asansol	Student UG	6297485483	No
Sukanya pal	sukanyapal008@gmail.com	West Bengal	Student UG	+917908153522	No
Tancesa Perween	tancesaperween@gmail.com	(Bidhan Chandra college) ASANSOL / WEST BENGAL, INDIA	Student UG	6296666077	No
Susmita dutta	susmitadutta88444@gmail.com	West Bengal INDIA	Student UG	9832610742	No
Awzan firoz	firozawzan8@gmail.com	Bidhan chandra college, Asansol	Student UG	9867262213	No
Manish karmakar	sagarkarmakar83356@gmail.com	West Bengal, India	Student UG	6294939643	No
Tania Sinha	sinhatania2003@gmail.com	Bidhan Chandra College, Asansol	Student UG	7261821552	No
Tasmiya Perween	tasmiyaperween2@gmail.com	(Bidhan Chandra college, Asansol/West Bengal, India)	Student UG	8617445657	No
Sinchana saha	sahasinchana500@gmail.com	Dep : BBA, institutions: bidhan chandra collage, city : Asansol	Student UG	9883448306	No
Abhijeet singh	abhijeet9999.2003@gmail.com	Asansol	Student PG	8116474069	Yes
Souvik Banerjee	sbbanerjee50@gmail.com	Bidhan Chandra college Asansol	Student UG	9832831982	No
Md Shafiur Rahman	mdshafiurrahman251@gmail.com	Bidhan Chandra college asansol	Student UG	8250382406	No
Sayan Mondal	sayanmondal6544@gmail.com	Bidhan Chandra College, Asansol	Student UG	9064167881	No
Mohammad zahid Khan	zahidkhan000107@gmail.com	Bidhan Chandra college Asansol	Student UG	7699383664	No
Nafisha Alam	nafisha06dzas@gmail.com	Bidhan Chandra College asansol	Student UG	8389088399	No
Indrajit Shaw	kumarbhai7752@gmail.com	Bidhan Chandra College, Asansol	Student UG	7478477235	No
Junaid Akhtar	junaidism8101@gmail.com	B.B.A, Bidhan Chandra College, Asansol, West Bengal, India	Student UG	8101291896	No
Kashish Ranjan	kashishranjan54@gmail.com	Bidhan Chandra College, Asansol	Student UG	6290166957	No
Sohan Roy	1rijuroy2004@gmail.com	Bidhan Chandra College, Asansol	Student UG	9907486950	No
Ritika Das	ritikad822@gmail.com	Bidhan Chandra College, Asansol	Student UG	8250247051	No
Aryan Roy	drop2aryan@gmail.com	BBA	Student UG	6295148458	No
Arbaz Anjum	arbazanjum706@gmail.com	BBA, Bidhan Chandra College, Asansol/West Bengal, India	Student UG	7063407706	No
Sunny Singh	ss3856548@gmail.com	BBA	Student UG	9507038471	No
Khushboo Agarwal	hushboogarwal2004@gmail.com	Bidhan Chandra College	Student UG	6296663157	No
Suvankar nayak	nayakmithu160@gmail.com	Asansol (Burnpur) W. B	Student UG	8250097223	No
Satyajit Singh	singhsatyajit622@gmail.com	BBA; BIDHAN CHANDRA COLLEGE; ASANSOL	Student UG	9002054304	No
Saurabh Kumar shaw	urabhkumarshaw2003@gmail.com	BBA., Kazi Nazrul University, West bengal, India	Student UG	7679722341	Yes
Animesh Chand	chandanimesh390@gmail.com	Asansol	Student UG	07047987999	No
Ankit jha	ankitckd16@gmail.com	BBA, Bidhan chandra college, Asansol,India	Student UG	9608566612	No

MD ARHAM HASAN	arhamhasan100@gmail.com	BBA/BIDHAN CHABDRA COLLEGE/ASANSOL/ WEST BENGAL/INDIA	Student UG	9775506060	No
Debjyoti Bhattacharjee	aryabhattacharjee@gmail.com	Bidhan Chandra College, Asansol	Student UG	8759443480	No
Priyotosh Bauri	bauripriyotosh@gmail.com	Rupnarayanpur	Student UG	8101737509	No
IYA KUMARI MATHU	priyamathuri5june@gmail.com	BIDHAN CHANDRA COLLEGE, ASANSOL	Student PG	9771701139	No
Ajay Mahato	ajaymahato7671@gmail.com	Mathematics, Bidhan Chandra College, Asansol, West Bengal, India	Student UG	+917679280919	Yes
Shilpi Dutta	shilpidutta@gmail.com	BBA, Bidhan Chandra College, Asansol, India	Student UG	7541055527	No
Rishikesh Choudhury	rishikeshch7890@gmail.com	Physics , bidhan chandra college, Asansol , west bengal , India	Student UG	09475758965	Yes
Aditya Kumar Singh	adityasingh82391@gmail.com	BBA, Knu University, Asansol/West Bengal, India	Student UG	6294208874	No
Shibu prasad	shibuprasad2003@gmail.com	BBA , KNU UNIVERSITY, ASANSOL WEST BENGAL	Student UG	6296574800	No
Chhaya Kumari Thakur	Chhayathakur554@gmail.com	Bidhan Chandra collage,Asansol	Student UG	99074 16751	No
Syed Saahil Rashid	saahilrashid08@gmail.com	BBA , Bidhan Chandra college ,, Asansol	Student UG	7001666967	No
Abdul Aziz Mustafa	abdulazizmustafa543@gmail.com	BIDHAN CHANDRA COLLEGE,ASANSOL,WEST BENGAL, INDIA	Student UG	7478977993	No
Md . Asif ali	mdasif843asn@gmail.com	( B.B.A ) Bidhan Chandra collage , Asansol , W.B , India	Student UG	8436050580	No
Aritra Saha	aritrosaha82@gmail.com	Bidhan Chandra College Asansol	Student UG	7001598891	No
Srutu roy	rsrutu1@gmail.com	Bidhan Chandra collage, Asansol	Student UG	6294257137	No
Prachi Agarwal	prachiagarwal.0224@gmail.com	BBA, Bidhan Chandra College, Asansol, West Bengal, India	Student UG	9002951072	No
AMAN KUMAR HELA	amanhela78@gmail.com	Bidhan Chandra college, Asansol	Student UG	8927945575	No
Biman Mondal	mandalbiman75@gmail.com	Mathematics department, BC College, Asansol, West Bengal, India	Student UG	8158907807	Yes
Bibek kr Mondal	bibekumar275@gmail.com	Bba , bc college , Asansol	Student UG	9832307677	No
ASMIT THAKUR	asmitthakur522@gmail.com	Bidhan Chandra College ,Asansol ,WB	Student UG	8927544766	No
Ankit Kumar Gupta	guptaankitkumar704@gmail.com	Bidhan chandra college	Student UG	9883765910	No
Mahwes Mumtaz	mahwesmumtaz@gmail.com	Bidhan chandra college	Student UG	7699318820	No
Rakhi Nag	nagrakhi141@gamil.com	Dhanbad jharkhand India	Student UG	9279243292	No
Archana Singh	sarchana5655@gmail.com	Bidhan Chandra college, asansol, paschim bardhaman, west bengal	Student UG	7001924898	No
Gurjeet singh	mr.gurjeet444@gmail.com	Bidhan chandra college , Asansol	Student UG	8637821002	No
Md kaif khan	khan.kaif2703@gmail.com	Bidhan chandra college, Asansol	Student UG	8918789454	No
Samridhhi	samriddhishaw07@gmail.com	Bidhan chandra college, Asansol	Student UG	7047684274	No
BORSHA NANDI	borshanandi05@gmail.com	Bidhan Chandra College, Asansol	Student UG	7063572202	No
Nyasha Bharti	nyashabharti06@gmail.com	BBA, Bidhan Chandra College, Asansol, West Bengal, India	Faculty	6372939008	No
Rajdip Chatterjee	rajdipchat@gmail.com	BCA,B C college, ASANSOL, WEST BENGAL,INDIA	Faculty	+918373091033	No
Shams Raza	shamsraza8820@gmail.com	Bidhan Chandra College (Asansol)	Student UG	8170975211	No
Tanushree Maji	majitanushree09@gmail.com	Bidhan Chandra college, asansol	Student UG	9564684895	Yes
Md kaif Ansari	mdansarikai2004@gmail.com	Bidhan Chandra college,Asansol/west bangal	Student UG	7479187499	No
Abu Sahzeb	sahzebsiddiqui0@gmail.com	Asansol	Student UG	9064556150	No
Anamika Bauri	anamikabauri2004@gmail.com	Bidhan Chandra College, Asansol	Student UG	9749060396	No
Chandan singh kushwaha	cs754143@gmail.com	bachlore in bussiness administration,kazi nazrul university,asansol,west bengal,india	Student UG	6294617715	No
Kalayani paul	kalyanip797@gmail.com	BBA,bidhan chandra college , Asansol India	Student UG	9064592428	No
ZAFAR HUSSAIN	saif7362972277@gmail.com	ASANSOL WEST BENGAL INDIA	Student UG	7362972277	No
Swayam Singh	swayamsingh500@gmail.com	BBA,BIDHAN CHANDRA COLLEGE ASANSOL	Student UG	7430912684	No
Sangam Kumar Baranwal	nwal.sangamkumar2005@gmail.com	Bidhan Chandra college, Asansol	Student UG	6295587003	No
Malay kumbhakar	malaykumbhakar1@gmail.com	BC college asansol	Student UG	8207064799	No
Md Arshad	marshad6026288@gmail.com	Bidhan Chandra College, Asansol	Student UG	6295507964	Yes
Priyanshu kumar	priyanshukumar7400@gmail.com	BBA,bidhan Chandra, collage,asansol,West Bengal,India .	Student UG	6200811343	No
Apurba Paramanik	apurbaphysics3@gmail.com	Department of Physics, Bidhan Chandra College, Asansol	Faculty	8240967431	No
DONA BOURI	donabouril7@gmail.com	B.C College, Asansol/West Bengal, India	Student UG	7718440198	No
Nimmi Singh	nimmis3329@gmail.com	BBA, Bidhan Chandra College, West Bengal, India	Student UG	9508974664	No
Ritik Tewari	ritiks542100@gmail.com	Asansol	Faculty	9749920543	No
Rahul Rajbhar	spiderworld1200@gmail.com	Asansol	Faculty	8101910377	No
Imran Nazir	imranazir8116@gmail.com	BC college Asansol	Student UG	9002951358	No
Neelkantha Gorai	gorainilkantha83@gmail.com	Mathematics Department	Student UG	6295373405	Yes
Nisha Singh	niludavi134@gmail.com	West Bengal India	Student UG	8388994236	No
Soumendra Nath Ruz	ruzfromju@gmail.com	Department of Physics, Ramananda Centenary College, Lulara, Pancha, Purulia, West Bengal, Pin - 723151	Faculty	9046871710	Yes
Bijendra Kumar paswan	bijendarkumarp44@gmail.com	(Physics,Bidhan Chandra College ,Asansol/ West Bengal ,India )	Student UG	8653091916	Yes
Syed Shahzaman Quadir	shahzaman87688@gmail.com	BBA, Bidhan Chandra College, Asansol, West Bengal, India	Student UG	8768841746	No
Md shahim Reza	shahimreza588@gmail.com	BBA,knu, West Bengal, India	Student UG	8170882636	Yes
Babita Kumari	9bkumari@gmail.com	BBA , BIDHAN CHANDRA COLLEGE , ASANSOL	Student UG	9091180713	No
Nawaz Akram	nawazakram547@gmail.com	West Bengal	Student UG	6296536453	Yes
Rahat parween	parweenrahat196@gmail.com	West Bengal	Student UG	7699144390	Yes

Akanksha Choudhary	ankshachoudhary40381@gmail.c	BBA HONS	Student UG	7063808660	No
Dr. Subhashis Samanta	ubhashissamanta.iacs@gmail.cor	Department of Forensic Science & Technology, Maulana Abul Kalam Azad University of Technology, West Bengal, India	Faculty	9804303256	No
Hriday Mondal	mhriday276@gmail.com	Bidhan chandra college,asansol	Student UG	8900745907	No
Genanew Mulugeta Kassa	genemulu8@gmail.com	Innovative Technology of Biomedical Engineering and Medical Devices, Ming Chi University of Technology, New Taipei, Taiwan	Student PG	+251972948094	No
Debichhanda De	debichhandade@gmail.com	Electronic engineering, Ming Chi University of Technology, New Taipei City, Taiwan	Student PG	886-984005374	No
HUMAI DI	humaiditzy@gmail.com	Department of Mechanical Engineering, Ming Chi University of Technology, New Taipei City	Faculty	0960959540	No
Dr Kanika Ghosh	ghosh.kanika7@gmail.com	Dept of chemistry, Bidhan Chandra College, Asansol, India	Faculty	09734097075	No
Endalamaw Ewnu Kassa	alexewnu4@gmail.com	Ming Chi University of Technology	Student PG	0933199611	Yes
Anurag Mandal	anuragmandal0810@gmail.com	Department of Mathematics	Student UG	8340558299	No
Parwez Alam	alamp4094@gmail.com	Bidhan Chandra college	Student UG	7701966361	No
Syed Md Faisal Hammad	hammadfaisal001@gmail.com	BBA,Bidhan Chandra College,Asansol/West Bengal,India	Researcher	9933902488	No
AP SHANKAR DAS RAI	prithwishikadas@gmail.com	BBA,Bidhan Chandra College/ Asansol/West Bengal, India	Faculty	8,90,01,66,28,19,43,45,00,000	No
RAJYOTI CHAKRABORTY	subhrajyoti3@gmail.com	B.Com,Bidhan Chandra College, Asansol /West Bengal,India	Researcher	8637827313	No
Sudipta Banerjee	banerjeesudipta1999@gmail.com	Department of Physics, University of Kalyani	Student PG	7872131574	No
Md Faizan Wasim	wasimfaizan123@gmail.com	Bidhan chandra collage, Asansol, West bengal	Student UG	6290055738	No
Md Farhan Akhter	frhn54518@gmail.com	Bidhan Chandra College (Asansol)	Student UG	9064454043	No