

**National Level Hands-on Training Program**  
**On**  
**“Advanced Analytical and Imaging Techniques”**

**Organized by**  
**Department of Zoology, NEHU, Shillong**  
**And**  
**Sophisticated Analytical Instrument Facility (DST-SAIF) Centre**  
**In association with**  
**JSS Academy of Higher Education and Research (JSS AHER), Mysuru**

**Sponsored by**  
**The Department of Science and Technology, (DST-STUTI) scheme,**  
**Government of India**

## Program Schedule

<b>Day 1(Time)</b>	<b>November 1, 2022: Tuesday</b>	<b>Resource Persons</b>	<b>Group (Practical)</b>
8.45 – 9.15 am	Pre-training test		
9.15 – 9.30 a.m.	Registration of the participants		
9.30-10.00 a.m.	Inauguration		
10.00 – 11.00 a.m.	Tea Break		
11.00 – 12.00 p.m.	Lecture 1	Prof. N. Saha 'Principle and applications of Confocal Laser Scanning Microscope in Biological Research'	
12.00 – 12.15 p.m	Interactive Session		
12.15 – 1.15 p.m.	Lecture 2	Prof. B.Roy 'Working Principle and Application of SEM and TEM on Drug Discovery, Toxicology and Taxonomy'	
1.15-2.15 p.m.	Lunch		
2.15- 5.0 p.m	Practical		I & II Confocal Laser Scanning Microscope Lab
<b>Day 2 (Time)</b>	<b>November 2, 2022: Wednesday</b>		
10.00 – 11.00 a.m.	Lecture 1	Dr. Manas Santra, NCCS, Pune 'Tools in determining protein-protein interaction and its biological application'	
11.00 – 11.15 a.m.	Interactive Session		
11.15 – 11.30 a.m.	Tea Break		
11.30 – 12.30 p.m.	Lecture 2	Dr. Manas Santra, NCCS, Pune 'Principle of western blot technique & its application in biological application'	

12.30 – 1.00 p.m.	Interactive Session			
1.00 – 2.00 p.m.	Lunch			
2.00 – 5.00 p.m.	Practical		<b>I &amp; II Biochemical Lab (western blot analysis)</b>	
<b>Day 3 (Time)</b>	<b>November 3, 2022: Thursday</b>			
10.00 – 11.00 a.m.	Lecture 1	Dr. B.Das  ‘Over expression and purification of recombinant mitochondrial glycerol 3 phosphate dehydrogenase, an enzyme involved in glucose homeostasis in human’		
11.00 – 11.15 a.m.	Interactive Session			
11.15 – 11.30 a.m.	Tea Break			
11.30 – 12.30 p.m.	Lecture 2	Prof. S.Ghosh ‘Expression analysis of stomach cancer and matched normal tissues to correlate with DNA methylation status’		
12.30 – 1.00 p.m.	Interactive Session			
1.00 – 2.00 p.m.	Lunch			
2.00 – 5.00 p.m.	Practical		<b>I Chromato graphy &amp; Purificatio n of Proteins Lab</b>	<b>II qPCR/RTPCR Lab</b>
<b>Day 4 (Time)</b>	<b>November 4, 2022: Friday</b>			
10.00 – 11.00 a.m.	Lecture 1	Dr. Timir Tripathi ‘Circular Dichroism Spectroscopy: Principle and Methods’		
11.00 – 11.15 a.m.	Interactive Session			
11.15 – 11.30 a.m.	Tea Break			

11.30 – 12.30 p.m.	Lecture 2	Dr. Timir Tripathi 'Circular Dichroism Spectroscopy: Applications'		
12.30 – 1.00 p.m.	Interactive Session			
1.00 – 2.00 p.m.	Lunch			
2.00 – 5.00 p.m.	Practical		II Chromato graphy & Purificatio n of Proteins Lab	I C.D.Spectroscopy Lab
<b>Day 5</b>	<b>November 5, 2022: Saturday</b>			
10.00 – 11.00 a.m.	Lecture 1	Dr.P.S.Dkhar 'Principle and application of ICP-OES'		
11.00 – 11.15 a.m.	Interactive Session			
11.15 – 11.30 a.m.	Tea Break			
11.30 – 12.30 p.m.	Lecture 2	Prof. Uma Shankar 'Scanning Electron Microscopy and its Applications'		
12.30 – 1.00 p.m.	Interactive Session			
1.00 – 2.00 p.m.	Lunch			
2.00 – 5.00 p.m.	Practical		II C.D.Spect roscopy Lab	I qPCR/RTP CR Lab
<b>Day 7</b>	<b>November 7, 2022: Monday</b>			
9.00 – 11.00 a.m.	Practical 1	Mr. Juston P. Nongkynrih EM & ICP-OES Lab	I EM Lab	II ICP-OES Lab
11.00 – 11.30 a.m.	Tea Braek			
11.30 – 1.30 p.m.	Practical 2	Mr. Juston P. Nongkynrih EM & ICP-OES Lab	II EM Lab	I ICP-OES Lab

1.30 – 2.00 p.m.	Lunch		
2.30 - 3.00 p.m	Post Training Assessment		
3.00 onwards	Valedictory Function		

### List of Participants

Sl.No	Name	Email address
1	Mohammed Suhail Shaik	
2	Sushilkumar Samandram	
3	Sorokhaibam Mexico Singh	
4	Sangita Das	
5	Pruthvi G R	
6	Rubina Roy	
7	Hemeshwor Singh Nongthombam	
8	Nithya S D	
9	Indira Gahatraj	
10	DHANESHWAREE ASEM	
11	Khirod Sankar Das	
12	VIKRAM P R HEMANTH	
13	Kalpana Singh	
14	MEBANPHIRA WARJRI	
15	Nangwanbiang Kurbah	
16	Thoudam Bishaya Devi	
17	Prof. (Dr.) Biswajit Basu	
18	Shayantani Das	
19	Minerva Lollen	
20	Endrea Moirangthem	
21	NINGTHOUJAM RANJANA DEVI	
21	Kasturi Dutta KD	

22	Rajashree Deka	
23	MADHUBANTI DAS	
24	Partha Pratim Sarma	
25	Chakrapani kota	

## **Training programme on “Advanced Analytical and Imaging Techniques”**

The DST STUTI Training programme on “Advanced Analytical And Imaging Techniques” organized at North Eastern Hill University (NEHU), Shillong focussed to provide participants with the basic knowledge and skills required to work and apply various techniques like Scanning Electron Microscope(SEM),Tunnelling Electron Microscope(TEM),Inductively Coupled Plasma Atomic Emission Spectroscopy(ICP-AES),Confocal microscopy, Circular Dichroism Spectroscopy, Western blotting ,Polymerase Chain Reaction(PCR), Real-time quantitative Polymerase Chain Reaction(RT-qPCR) etc. For the training programme, more than 120 applications were received out of which 30 participants were selected.



### **Inauguration of the DST STUTI training program**

The inauguration of the training programme titled “Advanced Analytical And Imaging Techniques” was held on 1<sup>st</sup> November 2022 at the auditorium. The Vice Chancellor of North Eastern Hill University (NEHU) presided over the programme. Prashant M Vishwanath, Dean (Research), JSS Academy of Higher Education and Research, Mysuru has briefed about how JSS AHER has been organizing the workshops on different topics and in collaboration with various reputed universities. He also insisted the participants to make the best utilization of the present training programme.

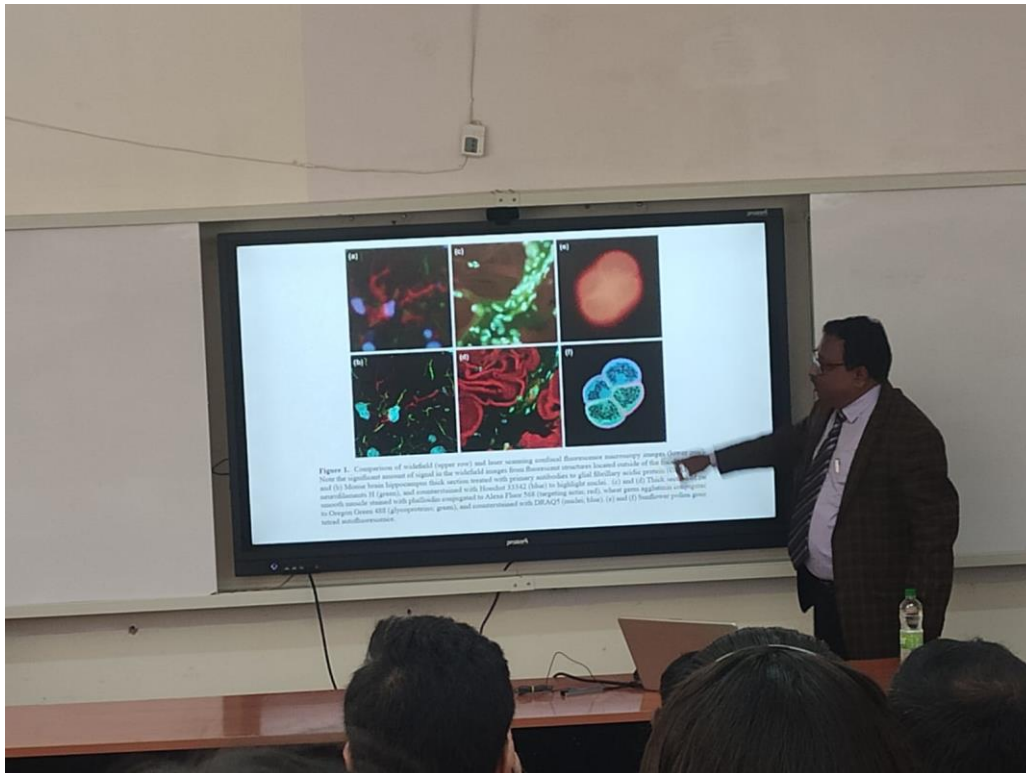
The schedule of the programme included two-three sessions per day with resource lectures in the first & second session followed by hands on training for the third session. The participants were offered working tea and lunch at the respective venues of the sessions.



### **Day 1 (01-11-2022)**

The day one started with a lecture by Prof. Saha, Department of Zoology, North-Eastern Hill University Shillong. He gave talk about “Principle and applications of Confocal Laser Scanning Microscope in Biological Research”. This was followed by the second lecture which was delivered by Prof. B.Roy Department of Zoology, North-Eastern Hill University Shillong. He gave talk about “Working Principle and Applications of SEM and TEM on Drug Discovery, Toxicology and Taxonomy”. The afternoon practical session included the demonstration of the working mechanism and explanation of the different mechanical parts of Confocal Laser Scanning Microscope by the technical experts of the SAIF centre of NEHU, Shillong.





Prof. Saha, delivering his talk about Confocal Laser Scanning Microscope

Prof. Saha spoke on the basics of Confocal Laser Scanning microscopy, its parts and the working principle of the confocal laser microscopy. He also added on types of filters and applications of Confocal Laser Scanning Microscope.



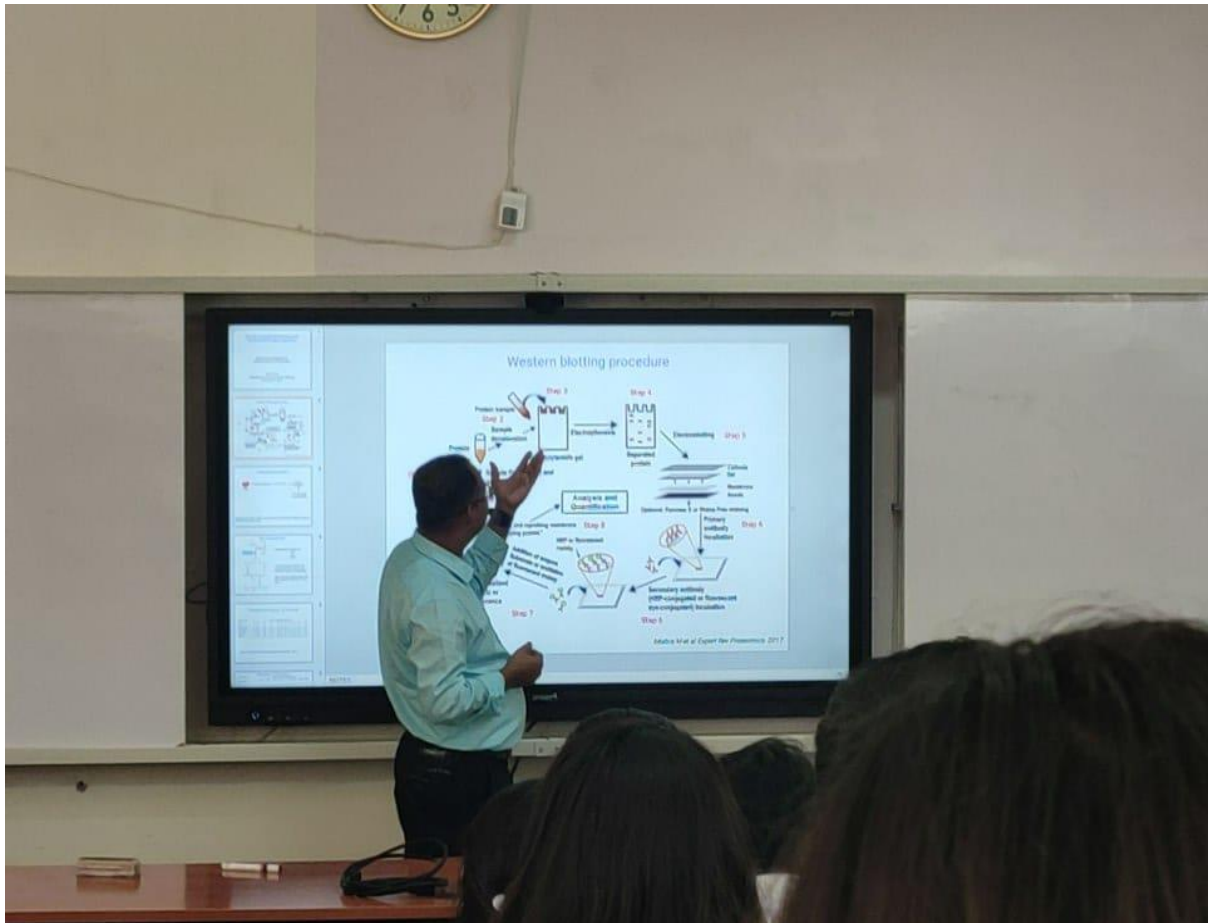
Prof. Roy delivering his lecture on “Working Principle and Application of SEM and TEM on Drug Discovery, Toxicology and Taxonomy”.



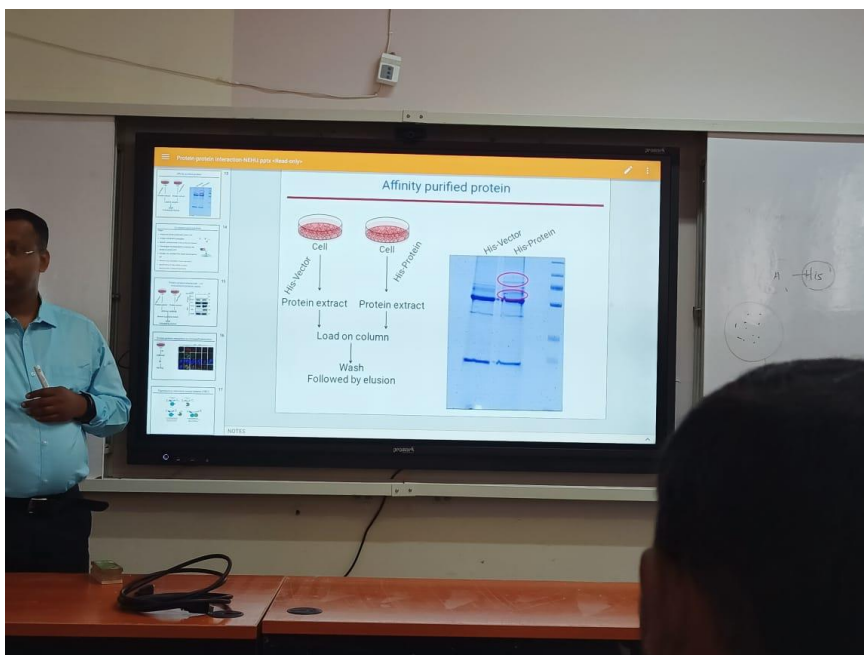
Description about the the mitochondrial localization of arginases by Prof. Roy

## Day 2 (02-11-2022)

The day two started with resource lecture on “Tools in determining protein- protein interaction and its biological application” by Dr. Manas Santra , Scientist F, National Centre for Cell Science Complex . He spoke on protein structures, their interactions and the forces involved in the protein-protein interaction. He also gave another talk on “Principle of western blot technique & its application in biological application” in which he explained the principle, complete procedure of the western blotting and the applications of western blotting technique. The afternoon session was also covered by Dr. Manas Santra who assisted the hands on of the gel electrophoresis and demonstrated western blotting technique to the participants.



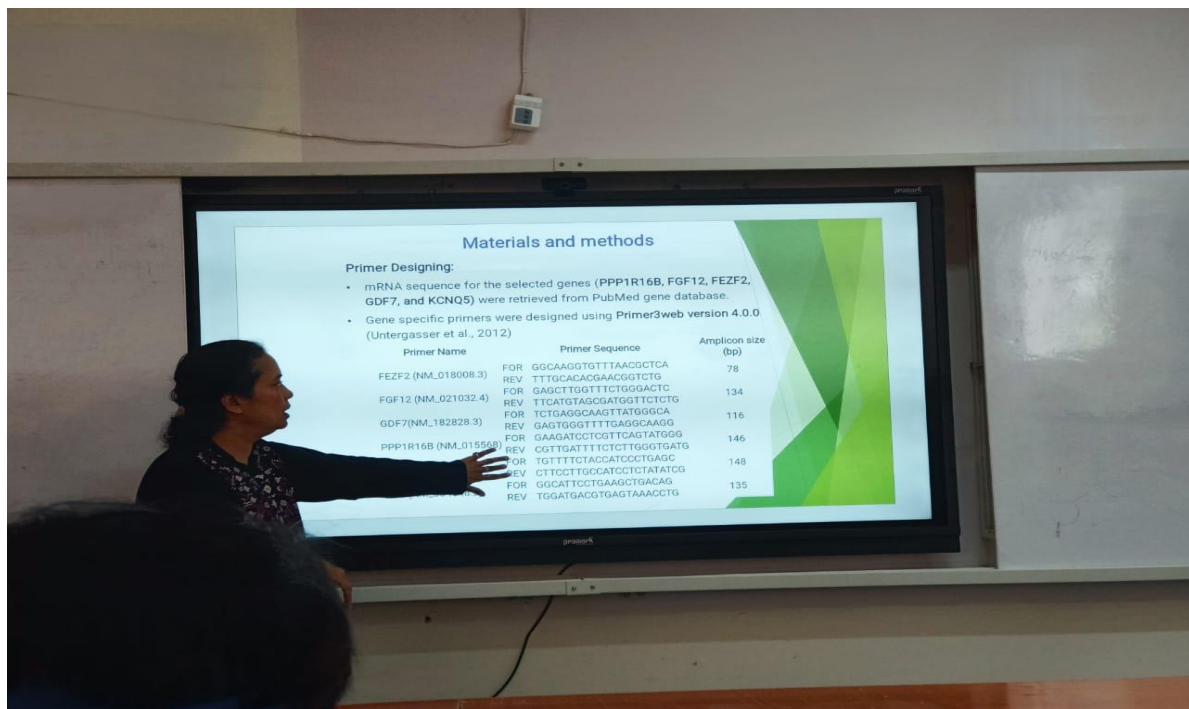
A talk by Dr. Manas Santra on “Western Blotting Technique”



Dr. Manas Santra explaining about western blot analysis

### Day 3 (03-11-2022)

The day started with a lecture session by Dr. B.Das, “ Over expression and purification of recombinant mitochondrial glycerol-3 phosphate dehydrogenase, an enzyme involved in glucose homeostasis in human”. He spoke about purification of proteins and its significance, primary, secondary, tertiary, and quaternary structure of protein. He also briefed on choice of column, legend, cell lysate, washing and few other important things to be considered before going for protein purification procedure. Next session was on ‘Expression analysis of stomach cancer and matched normal tissues to correlate with DNA methylation status’ delivered by Prof. S.Ghosh in which he talked about cancerous cells, characteristics of cancerous cells, proto oncogenes, tumour suppressor genes and epigenetic changes like DNA methylation, Histone modification etc. The practical session conducted chromatography and purification techniques of proteins, where the participants were familiarized with various procedures of the techniques. The methodologies of qPCR/RTPCR were also explained and demonstrated by the resource faculty to the participants and assisted by research scholars of NEHU.



A talk by Prof. S.Ghosh on “ Primer designing”

#### **Day 4 (04-11-2022)**

A lecture session on “Circular dichroism spectroscopy: Principle and Methods” by Dr Timir Tripathi, Regional Director, IGNOU, Kohima. He elaborated on the sample preparation, operating of the software, data analysis part as well as applications of the Circular dichroism spectroscopy. Followed by lab session that included the continuation of the previous day hands on of various chromatographic and purification techniques of proteins.



**Demonstration of the qPCR/RTPCR techniques by the research scholars of NEHU**

#### **Day 5 (05-11-2022)**

The Theoretical session on principle and application of ICP-OES was delivered by Dr P S Dkhar Senior Technical Assistant, TEM Lab, SAIF NEHU. Next session on “Scanning Electron Microscopy and its Applications” by Prof Uma shankar. He spoke on the basics of Scanning Electron Microscopy (SEM), its working principle and the applications. The practical session was engaged on the demonstration of the same.

### **Day 6 (06-11-2022)**

On the seventh day, there were lab sessions on Inductively coupled plasma-optical emission spectroscopy (ICP-OES), which was followed by a written test to assess participants knowledge gained through the workshop. Finally, the training program was concluded by valedictory function where the participants were given the certificates of participation.



Photograph of the trip to Cherrapunji

### **Day 7 (07-11-2022)**

On the 7<sup>th</sup> day the participants were taken to Cherrapunji and nearby places as a part of field visit. They were mesmerized with the beautiful nature of North Eastern State. They got an opportunity to visit Rock Garden, Seven sister falls and also Tea garden.