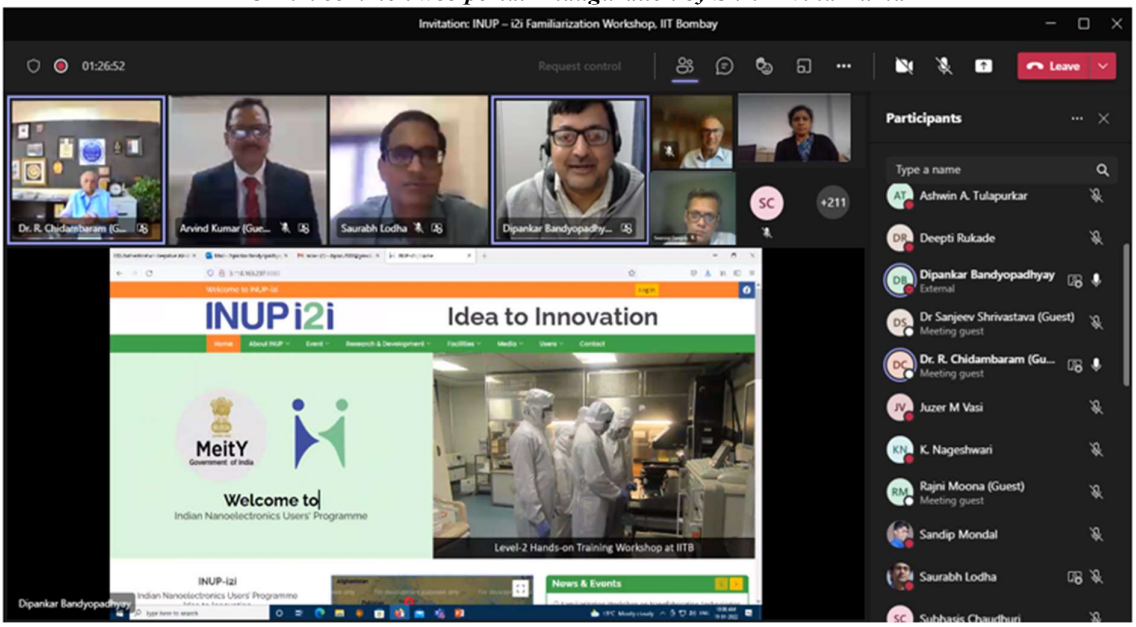
INUP- i2i Familiarization Workshop on Nanofabrication Technologies, IIT Bombay

January 19 – 21, 2022

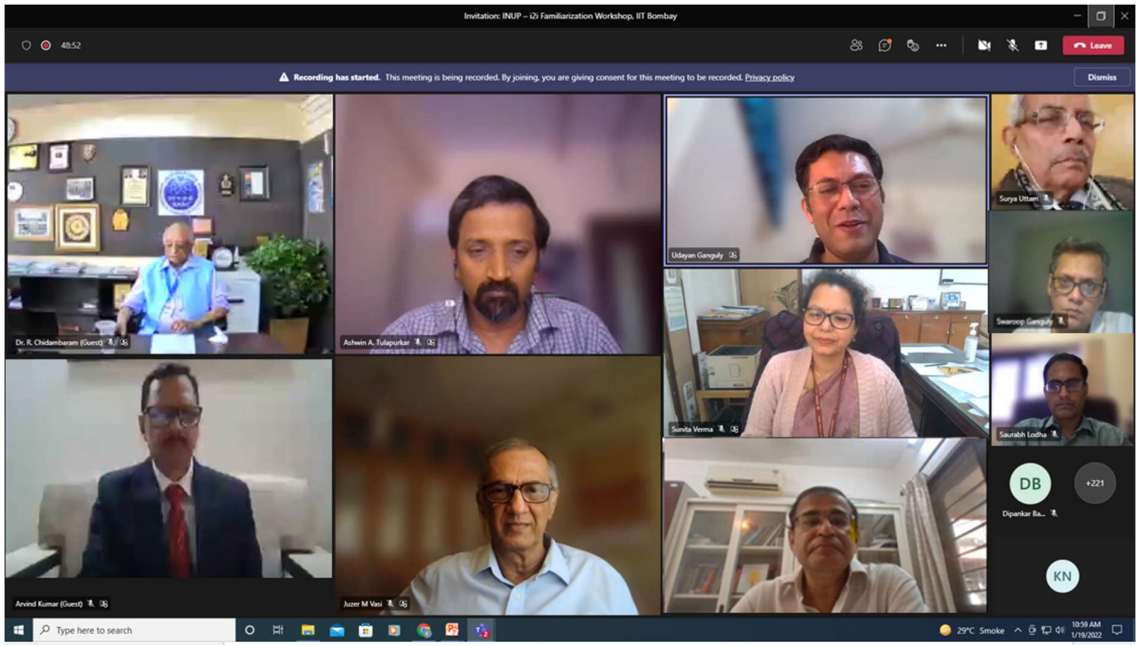
Indian Nanoelectronics Users' Programme - Idea to Innovation (INUP-i2i), IIT Bombay organized its first Familiarization Workshop on Nanofabrication Technologies during January 19 - 21, 2022 using a virtual online platform through Microsoft Teams Meetings. The highlight of the workshop was the Inauguration of the "INUP-i2i common web portal" for all the host institutes. This three-day online workshop began with an inaugural ceremony on January 19, 2022. The program started at 09:30 AM with the welcome address by Prof. Subhasis Chaudhuri, Director, IIT Bombay where he warmly welcomed the third phase of this very successful INUP program. The guest of honour, Dr. R. Chidambaram, Former Principal Scientific Advisor, Govt. of India highlighted the importance of INUP Program and its success during the first two phases. The INUP-i2i common website portal was inaugurated by Shri Arvind Kumar, DG (STQC) & Group Coordinator, R&D in Electronics, R&D in Cyber Security, MeitY, Govt. of India. Prof. Dipankar Bandyopadhyay, PI, INUP-i2i, IIT Guwahati gave an overview of this common INUP-i2i web portal. Following the inauguration, the audience was addressed by Smt. Sunita Verma, Scientist 'G'/Sr. Director, Microelectronics, Nanotechnology and Medical Electronics & Health Informatics Divisions, MeitY, Govt. of India who has been a pioneer support and pillar for the INUP from MeitY. The special guests from MeitY, Dr. Sangeeta Semwal, Scientist 'D', Nanotechnology Initiatives Division, R&D in Electronics Group, Ministry of Electronics and Information Technology and Dr. S. P. Uttam were present at the inaugural function.

Later, Prof. J. Vasi, who is the founder PI, INUP IITB shared his experience from the initial small discussion of the INUP program to its journey till the very successful programme as it is today. An introductory overview on INUP-i2i at IIT Bombay was summarised by Prof. Ashwin Tulapurkar, PI, INUP-i2i IITB. The inaugural session was concluded with the vote of thanks by Prof. Udayan Ganguly, PI, INUP-i2i, IIT Bombay. In addition to 217 participants from 122 Institutes across India, the Principal Investigators from the six host Institutes (IISc, IITB, IITKgp, IITD, IITM, IITG) had attended the workshop and inauguration ceremony.

INUP-i2i common web portal Inauguration by Shri Arvind Kumar



Overview of INUP-i2i common web portal by Prof. Dipankar Bandyopadhyay, PI- INUP-i2i IITG



Dignitaries present at the IUP-i2i Inaugural ceremony

The inaugural session was followed by technical sessions which covered the following nine themes. The lectures were delivered by IITB faculty members from various departments.

- Logic & Memory Devices
- MEMS & Microfluidics
- Compound Semiconductor Devices
- Sensors
- Organic Electronics
- 2D Materials & Devices
- Photovoltaics
- Spintronics
- Quantum Computation and Electronics

Apart from the technical session, the participants were given a detailed overview of IITBNF research infrastructure and the procedure to avail the IITBNF facilities through INUP-i2i. There were poster presentations held everyday immediately after the technical sessions from 6pm to 8pm. The participants were divided into different groups and the poster session was conducted.

To assess the enthusiasm among the audience, a multiple choice question (MCQ) test was conducted on the last day of the workshop (January 21, 2022) based on the lectures given by IITB faculty members.

The programme schedule of the workshop is as follows;

Ministry of Electronics & Information Technology, Government of India

INUP i2i

Indian Nanoelectronics Users' Programme – Idea to Innovation
A project of MeitY, Govt. of India

INUP-i2i FAMILIARIZATION WORKSHOP ON NANOFABRICATION TECHNOLOGIES, IIT Bombay

January 19-21, 2022

Programme Schedule

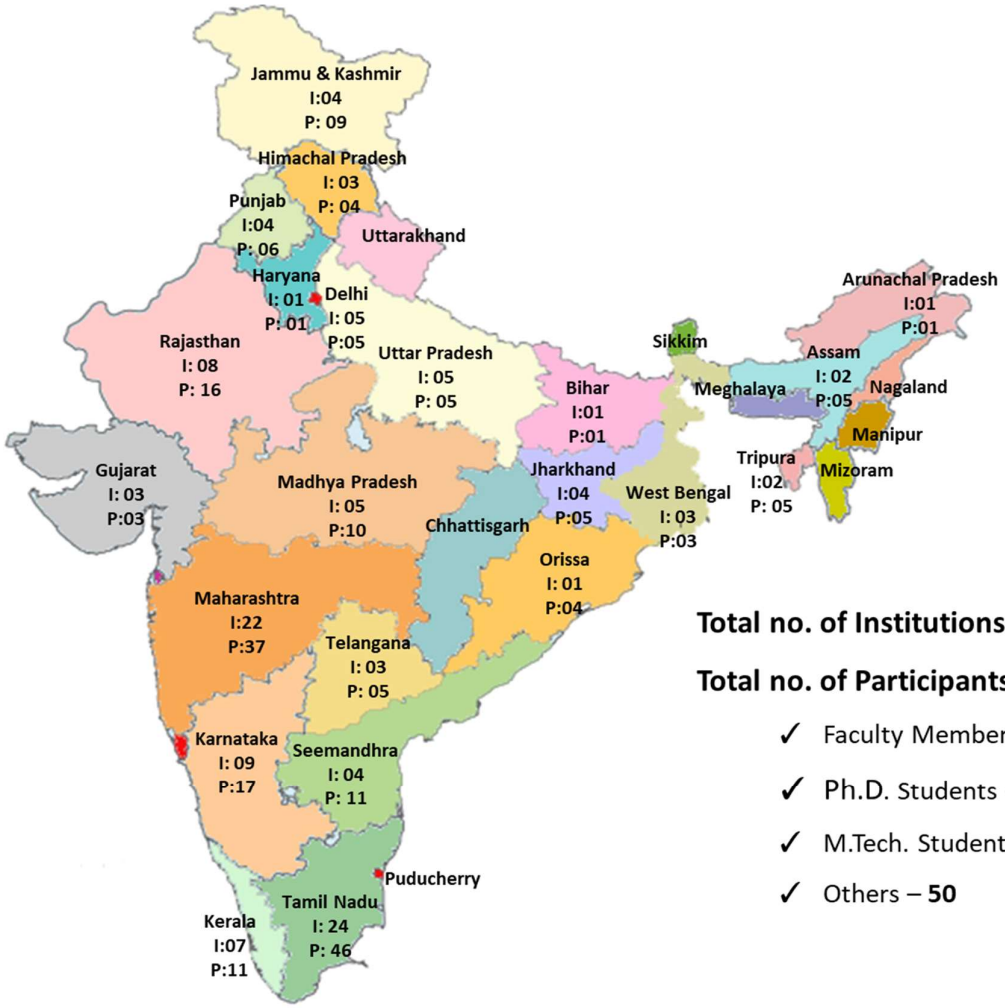
	Wednesday (January 19, 2022)	
	Prof. Saurabh Lodha, PI, INUP-i2i, IITB (Compere)	
0930 - 0940	Welcome address by Prof. Subhasis Chaudhuri - Director, IIT Bombay	
0940 - 1000	Address by Guest of Honor Dr. R. Chidambaram - Former Principal Scientific Advisor, Govt. of India	
1000 - 1020	Inaugural Address by Chief Guest Shri Arvind Kumar, DG (STQC) & Group Coordinator, R&D in Electronics, R&D in Cyber Security, MeitY, Govt. of India	
1020 - 1025	Inauguration of INUP-i2i common web portal by Chief Guest Shri Arvind Kumar, DG (STQC) & Group Coordinator, R&D in Electronics, R&D in Cyber Security, MeitY, Govt. of India	
1025 - 1035	Introduction to INUP-i2i portal by Prof. Dipankar Bandyopadhyay, PI, INUP-i2i, IIT Guwahati	
1035 - 1050	Address by Smt. Sunita Verma, Scientist 'G' / Sr. Director, Microelectronics, Nanotechnology and Medical Electronics & Health Informatics Divisions, MeitY, Govt. of India	
1050 - 1105	Address by Prof. J. Vasi, IIT Bombay, founding PI, INUP IITB	
1105 - 1120	Introduction to INUP-i2i at IITB by Prof. Ashwin Tulapurkar, PI, INUP-i2i, IITB	
1120 - 1125	Vote of Thanks by Prof. Swaroop Ganguly, PI, INUP-i2i, IITB	
	Theme 1: Logic & Memory Devices	
1130 – 1215	Of Neurons and Synapses: RRAM based Neuromorphic Engineering	Prof. Udayan Ganguly
1215 – 1300	Memory Technology to Mimic Biological Neuron	Prof. Sandip Mondal
1300 – 1400	Lunch Break	
	Theme 2: MEMS & Microfluidics	
1400 – 1445	Microfluidic devices for healthcare applications	Prof. Debjani Paul
1445 – 1530	Role of MEMS in Fuel Cell Technology	Prof. Richard Pinto
	Theme 3: Compound Semiconductor Devices	
1530 – 1615	Fabrication of GaN transistors	Prof. Dipankar Saha
1615 – 1700	III-Nitride semiconductors: Growth to Devices	Prof. Apurba Laha

1700 – 1745	ISTEM	Dr. Sanjeev Kumar Shrivastava
1745 – 1630	Poster presentation (participants)	

Thursday (January 20, 2022)		
	Theme 4: Sensors	
0930 – 1015	CMOS compatible NEMS/MEMS for power gating and power management applications	Prof. Maryam Shojaei
1015 – 1100	Functionalization of microfabricated surfaces	Prof. Soumyo Mukherji
1100 – 1145	Porosity tailored hard nanocarbons: from science to applications	Prof. C. Subramaniam
1145 – 1230	Introduction to Microsystems Packaging	Prof. Pradeep Dixit
1230 - 1330	Lunch Break	
	Theme 5: Organic Electronics	
1400 – 1445	Organic and Perovskite Optoelectronic Device Research @ IITBNF	Prof. Dinesh Kabra
1445 – 1530	Flexible and Printed Electronics	Prof. Dipti Gupta
	Theme 6: 2D Materials & Devices	
1530 – 1615	Few-layer TMDs for high performance photodetection	Prof. Saurabh Lodha
1615 - 1700	Controlling epitaxial growth of layered transition metal dichalcogenides	Prof. Tanushree H. Choudhury
1700 - 1830	Poster presentation (participants)	

Friday (January 21, 2022)		
	Theme 7: Photovoltaics	
0930 – 1015	Crystalline silicon solar cell research at NCPRE	Prof. Anil Kottantharayil
1015 – 1100	Recombination Processes in Semiconductors	Prof. B.M. Arora
1100 – 1130	What can we learn from optical absorption experiments?	Prof. K.L. Narasimhan
	Theme 8: Spintronics	
1130 – 1215	Spin-based devices and phenomena	Prof. Ashwin Tulapurkar
1215 - 1300	The NEGF technique for nanoscale device simulation	Prof. Bhaskaran M
	Lunch Break	
	Theme 9: Quantum Computation and Electronics	
1400 – 1445	Materials and Nanoelectronic Devices for Semiconductor Spin Quantum Computing	Prof. Suddhasatta Mahapatra
1445 - 1530	Diamond based quantum technologies	Prof. Kasturi Saha
1530 – 1615	An Overview of IITBNF Research Infrastructure	Dr. Deepti Rukade
1615 – 1700	How to avail IIITBNF Facilities through INUP-i2i?	Dr. K. Nageswari
1700 – 1730	MCQ Test	
1730 – 1830	Poster presentation (participants)	

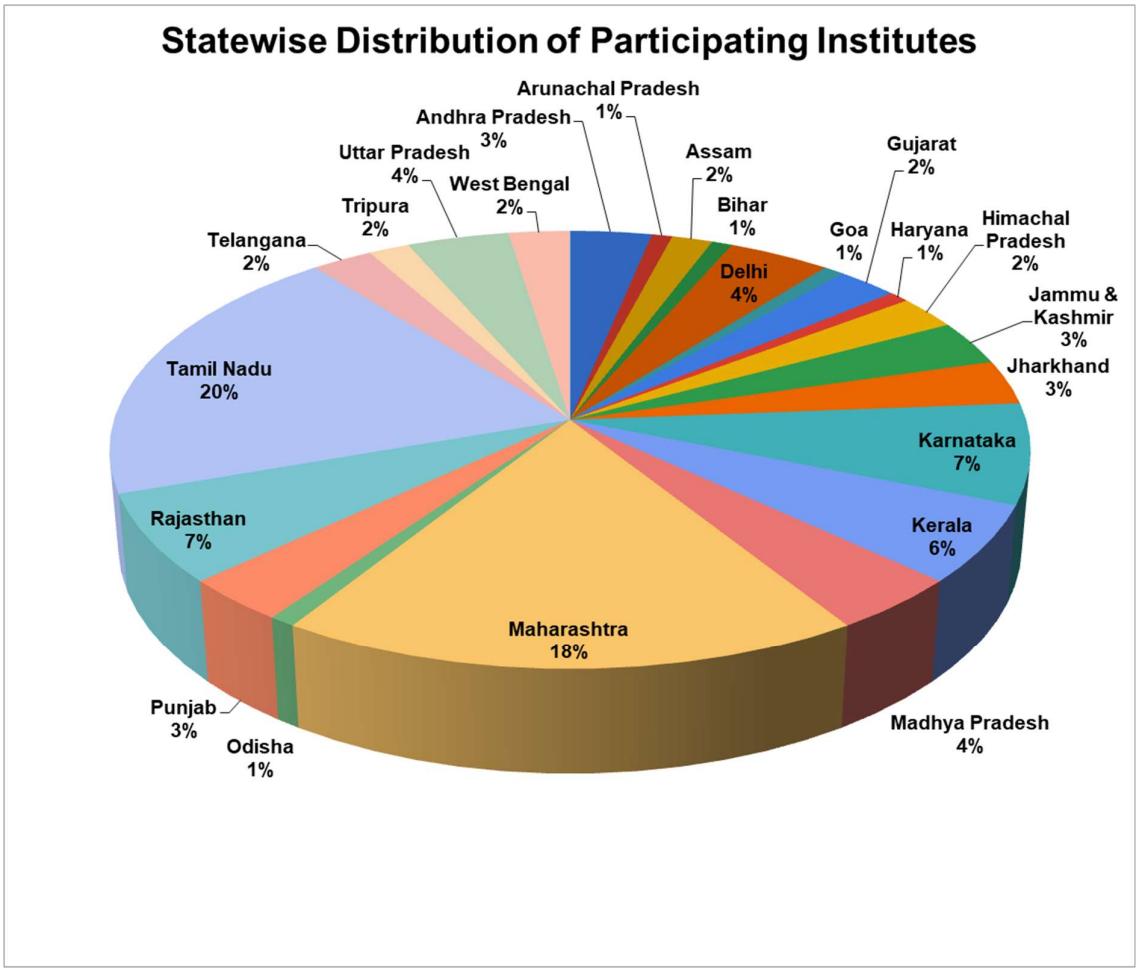
Map depicting the participation distribution across India

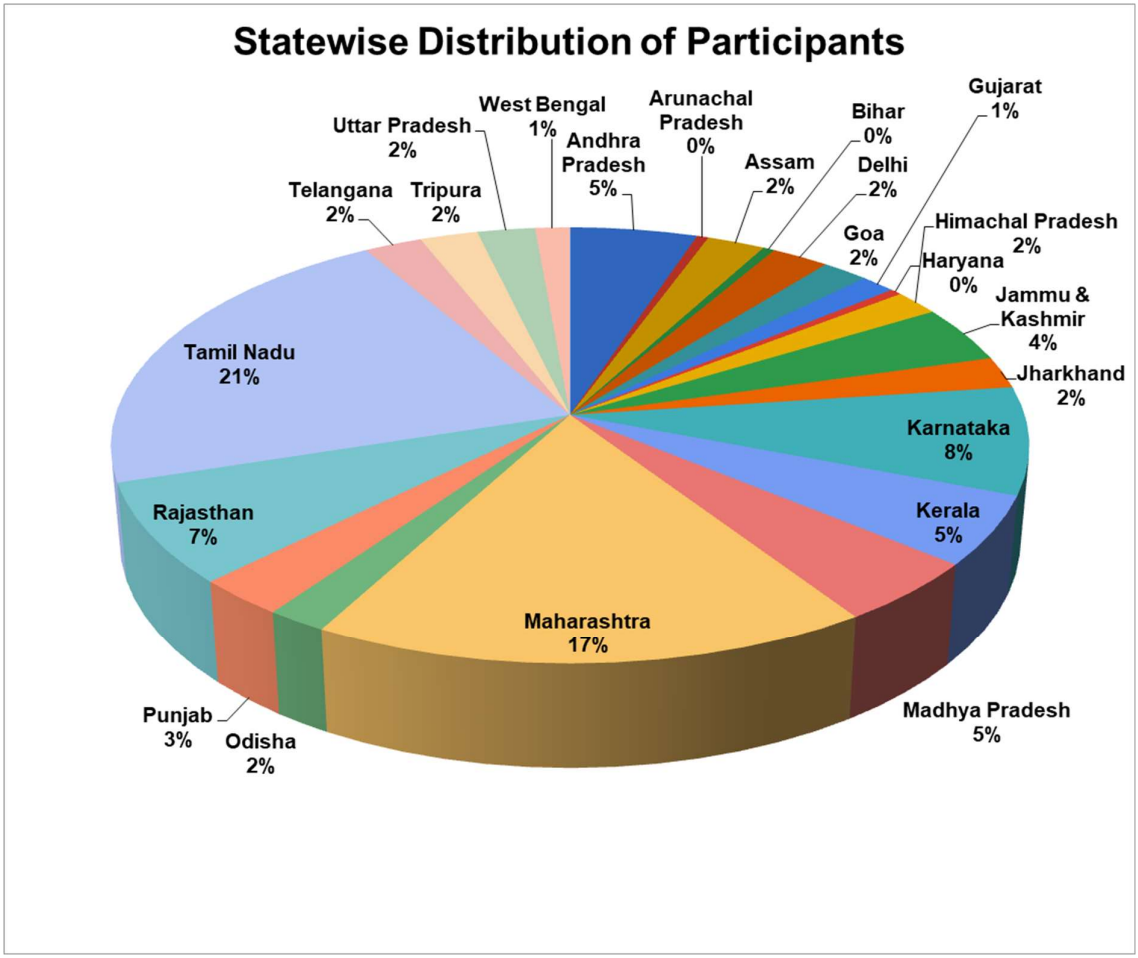


Total no. of Institutions – 122

Total no. of Participants – 217

- ✓ Faculty Members – **54**
- ✓ Ph.D. Students – **103**
- ✓ M.Tech. Students – **10**
- ✓ Others – **50**


Statewise Distribution of Participating Institutes
Arunachal Pradesh 1%
Andhra Pradesh 3%
Uttar Pradesh 4%
West Bengal 2%
Tripura 2%
Telangana 2%
Assam 2%
Bihar 1%
Gujarat 2%
Goa 1%
Haryana 1%
Himachal Pradesh 2%
Delhi 4%
Jammu & Kashmir 3%
Jharkhand 3%
Tamil Nadu 20%
Karnataka 7%
Rajasthan 7%
Kerala 6%
Maharashtra 18%
Punjab 3%
Odisha 1%
Madhya Pradesh 4%


Statewise Distribution of Participants
West Bengal 1%
Arunachal Pradesh 0%
Gujarat 1%
Uttar Pradesh 2%
Andhra Pradesh 5%
Bihar 0%
Assam 2%
Delhi 2%
Telangana 2%
Tripura 2%
Goa 2%
Himachal Pradesh 2%
Haryana 0%
Jammu & Kashmir 4%
Tamil Nadu 21%
Jharkhand 2%
Karnataka 8%
Rajasthan 7%
Kerala 5%
Maharashtra 17%
Punjab 3%
Odisha 2%
Madhya Pradesh 5%