A training session report on

Fluorescence Based Characterization Techniques

Under STUTI program funded by DST

In association with

Indian Institute of Technology, Gandhinagar

(Project Management Unit)

The University for Innovation

Coordinated by

Dr. Tvarit Patel

Department of Biological Sciences and Biotechnology,

Institute of Advanced Research, Gandhinagar, Gujarat, India

4th to 10th July 2022

Acknowledgement

We convey gratitude for the encouragement and support received from multiple sources during the execution of this training since its beginning. First and foremost, we want to express our sincere appreciation to the IIT Gandhinagar (PMU) and Department of Science and Technology (DST) for entrusting us with this project. The workshop was coordinated by **Dr. Tvarit Patel**. The workshop was conducted on the '*Fluorescence-based characterization techniques*' on the instrument funded by the FIST program (Sanction No.: SR/FST/College-135/2012(C) Date:03/06/2014). Organizing team acknowledge the contributions of the committee, in the implementation and the execution of the program to achieve the objectives of the project, particularly, **Dr. Reena Rajput** (Professor, Bio-Technology and Bio-Engineering, IAR), **Dr. Dr. Anand K. Tiwari** (Professor, Bio-Technology and Bio-Engineering), **Dr. Alok Pandya** (Assistant Professor, Bio-Technology and Bio-Engineering) and **Dr. Sushilkumar D Ramdasi** (Chief Guest, Application Scientist at Beckman Coulter Life Sciences). We also acknowledge the contributions of IAR staff and student volunteers without which these sessions could not have been possible.

I also acknowledge all the teaching and non-teaching staff for their contributions, without which these could not have been possible.

Dr. Tvarit Patel
Coordinator

Summary

The goal of this training session was to provide a general overview on the practical aspects of Flow Cytometer, Confocal microscope, Fluorescence microscope and FTIR along with the hands on practical knowledge using sophisticated instrumentation techniques among research scholars, faculty, young scientists and industry professionals through a week-long training workshop. The workshop was conducted at Institute of Advanced Research, Gandhinagar from 4th to 10th July 2022 which comprised of lectures and hands on training sessions. This initiative is funded by Department of Science & Technology under the program STUTI (Synergistic Training Program Utilizing the Scientific and Technological Infrastructure). This workshop is aimed to provide an insight into the basic research in clinical practice and visualizing the dynamics of tissue, cells, individual organelles, and macromolecular assemblies inside the cell. The focus of this workshop was to have a balance between theory and practical training on the equipment and schedule was designed in a way that if a theory session for a topic was organized in morning, the hands-on training session for the same topic was organized in afternoon/evening session. '*Emphasis was given on hands-on use of equipment for demonstration/characterization of sample by each participant for better understanding*'.

Introduction

Institute of Advanced Research, Gandhinagar conducted 7-day long hands-on training program on '*Fluorescence-based characterization techniques* 'organized by IIT Gandhinagar, (PMU). The participants from various backgrounds such as Post Graduate, Professors, Scientists, Post-Doc Fellows, Ph.D. Fellows and Industry persons participated in this workshop **(Annex-1)**. The training program was organized during 4th to 10th July 2022, the activities of which are as mentioned in (**Annex-2** and **3)**. This report provides a quick overview of both the lecture and technical sessions.

- *Lecture Sessions:*

Dr. Tvarit Patel (Assistant Professor, Bio-Technology and Bio-Engineering) gave a brief lecture on DST and its schemes. In another lecture, he gave an introductory lecture on Basic introduction of Microscopy and the methods by which the obtained data can be analyzed. **Dr. Reena Rajput** (Professor, Bio-Technology and Bio-Engineering, IAR) gave a detailed lecture on Application of Flow cytometer in immunology, Neurobiology and cellular programming. **Dr. Dr. Anand K. Tiwari** (Professor, Bio-Technology and Bio-Engineering) gave a talk on FTIR and its application. His lecture basically focused on the collection of data its analysis. **Dr. Alok Pandya** (Assistant Professor, Bio-Technology and Bio-Engineering) gave detailed lecture on Nano-biotechnology, Nanochemistry and Forensic Nanotechnology. **Dr. Sushilkumar D Ramdasi** gave a detailed lecture on instrumentation process of Flow cytometer technique.

- *Technical Session*

Day **One** session started with an Inauguration and Welcome note to the Participants. Next the session preceded with a lab visit. Specifically, a working principle of APD Based Flow Cytometers was explained. Day **Two** session held with a discussion on Fundamentals of Sorting and CytoFLEX SRT. Day **Three** session held with detailing demonstration on the basic introduction of microscopy and data collection using fluorescence microscope. Day **Four** hands-on session, focused on working principle of confocal microscopy. The seesion carried out with sample preparation of participants and imaging generation. Day **Five** session held with a hands-on training on FT-IR, it sample identification, operation and characterization. Day **Six** session held with hands-on over FT-IR technique in biological and diagnostic application. Furthermore, spectrum interpretation of characteristic peaks and participants sample analysis were also carried out. Day **Seven** session held with a interaction with the participants with problems and certification and gathering feedback.

- *Types of samples tested*

During the technical session, all of the participants expressed an interest in learning from the workshop and characterized samples like cells from solid tissue and body fluid. FTIR consists of liquid samples tested in lab session for demonstrating the participants.

Outcomes of the Workshop

The STUTI workshop attracted participants from 25 different institutes (**Figure 1**). About 37 participants enrolled and attended the 'Fluorescence-based characterization techniques'. The goal of this training event was to provide a general overview on the practical aspects of characterization of biological samples along with the hands-on practical knowledge using sophisticated instrumentation techniques. To bring together participants from many disciplines and raise awareness of the institute's advanced facilities. Throughout the workshop, participants actively involved in the session and developed expertise's, asked major questions regarding theoretical and practical aspects of biological sample characterization. This hands-on training program collaborations from many small institutions and national level institutes. Finally, the feedback from the participants was considered in the evaluation of the workshop. The majority of the participants were pleased with the training session and suggested that more workshops should be held in the future. Few participants suggested organizing such a workshop/training session on more regarding full instrumental technique workshop and regulatory needs.

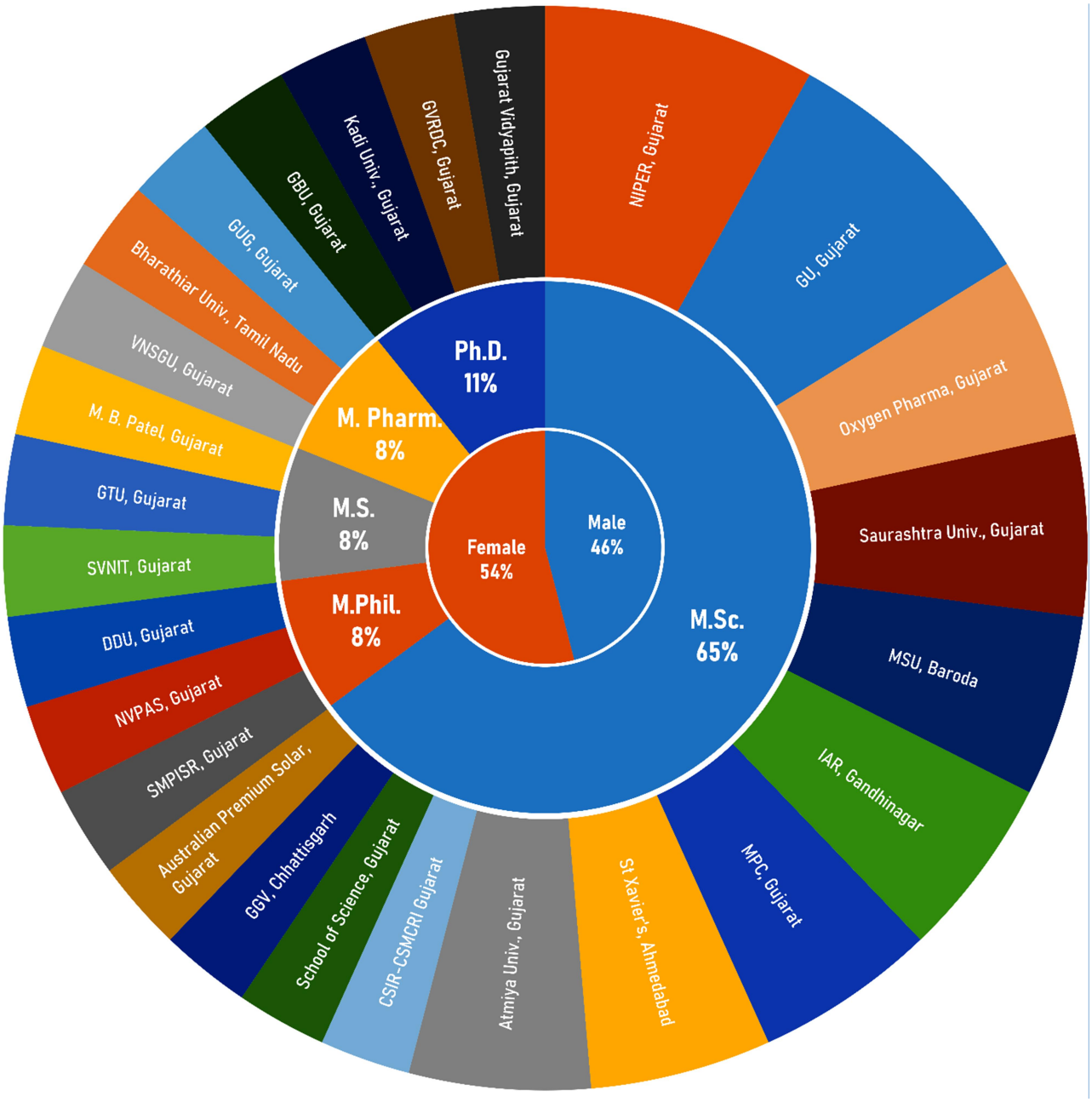


Figure 1. Participants registered workshop from different institutes

Annexure 1: Brochure for the program

Speakers

Dr. Reena Rajput is a Professor in Department of Bio-technology and Bio-engineering at IAR Gandhinagar. Her work focuses on Immunology, Neurobiology and cellular reprogramming.

Dr. Anand K. Tiwari is a Dean (Research and Innovation) and Professor in Department of Biotechnology and Bio-engineering at IAR Gandhinagar. His work focuses on Drosophila Develop-mental Biology and Neurobiology.

Dr. Alok Pandya is an Assistant Professor in Department of Biotechnology and Bioengineering at Institute of Advanced Research. His research are Nano-biotechnology, Nano-chemistry and Forensic Nano-technology

Dr. Sushilkumar D Ramdasi is an Application Scientist at Beckman Coulter Life Sciences. He is an expert in demonstrating the advanced application and hands on tanning on Flow cytometry technique.

Registration & Contact Details

Interested participants must register and only selected candidates would be invited for the workshop.

For selected candidates Registration fees, local travel, Boarding and lodging will be covered by STUTI grant.

Interested participants should register using the following link: https://forms.gle/6eRRCbiPQrVJvAfr6

Registration Deadline: **28th June 2022**
Shortlisted candidates will be intimated by email, latest by 1st July 2022.

Eligibility criteria:

A. Minimum qualification: Post Graduate (Science) or B.Tech. (Technology).

B. Professors / Scientists / Post-Doc Fellows / Ph.D. Fellows / Industry persons who are actively involved in R&D.

C. Not more than 3 participants from one institute.

For more information contact :-

- **Coordinator**: **Dr. Tvarit Patel** (IAR Gandhinagar)
- **Access**: https://events.iitgn.ac.in/stuti/
- **Mail**: stuti@iitgn.ac.in
- **Address**: 317, IAR Gandhinagar, Koba Institutional Area, Gandhinagar, Gujarat – 382426
- **Contact No.** : +91-9426362106 /+91-7698715292

Acknowledgements

The University for Innovation

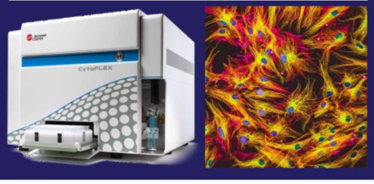
Department of Science & Technology (DST) funded Training workshop under **STUTI** (Synergistic Training Program Utilizing the Scientific and Technological Infrastructure)

7 Days Workshop on

Fluorescence-based characterization techniques

4th July to 10th July 2022

IAR Gandhinagar, Gujarat



Annexure 2: List of registered participants for the workshop.

Sr. No.	Candidate Name	Gender	Educational Qualification	Email address	University/Institute
1	Patel Bimalkumar Rajeshbhai	Male	MSc. (Organic Chemistry)	bimal.patel1998@gmail.com	Gujarat University, Gujarat
2	Manoj Vora	Male	MPhil (Inorganic Chemistry)	manojvora.2410@gmail.com	
3	Falak Panjwani	Female	MPhil (Applied Chemistry)	mj.falakpanjwani@gmail.com	
4	Ms. Suchita Dattatray Shinde	Female	M.S. (Medicinal Chemistry)	suchitashinde9405@gmail.com	NIPER Ahmedabad, Gujarat
5	Nupur	Female	MS Pharm (Pharmaceutics)	nupur.vasdev@niperahm.res.in	
6	Stephin Baby	Male	MS Pharm (Medicinal Chemistry)	stephin.baby@niperahm.res.in	
7	Gunja H. Vasant	Female	MSc. (Microbiology)	gunjavasant84017@gmail.com	Atmiya University Rajkot, Gujarat
8	Makadiya Daksha Bhagwanji	Female	MSc. (Microbiology)	dakshabrijeshchhatrala@gmail.com	
9	Pranavbhai M. Trivedi	Male	Ph.D. (Chemistry)	pranav.trivedi@sxca.edu.in	St Xavier's College , Ahmedabad, Gujarat
10	Francis A Christy	Male	Ph.D. (Physics)	francis.christy@sxca.edu.in	
11	Vrushti Hemantkumar Kansara	Female	M. Pharm (Pharmaceutics)	v.kansara12@gmail.com	Maliba Pharmacy College, Gujarat
12	Desai Aneri Prashantbhai	Female	M. Pharm (Pharmaceutics)	aneri.desai@utu.ac.in	
13	Pooja Savadiya	Female	MSc. (Molecular Medicine)	savadiyapooja212@gmail.com	Institute of Advanced Research, Gandhinagar, Gujarat
14	Maiya Dhruveshkumar B.	Male	Ph.D. (Chemistry)	maiyadhruvx@gmail.com	
15	Somesh Diwate	Male	MSc. (Biochemistry)	someshdiwate1@gmail.com	Maharaja Sayajirao University, Baroda, Gujarat
16	Kanchan Keshav Dharmadhikari	Female	MPhil (Biochemistry)	kanchagold8@gmail.com	
17	Manoj Dineshbhai Godhaniya	Male	MSc. (Bioscience)	mgodhaniya76@gmail.com	Saurashtra University, Gujarat
18	Jagruti V. Chauhan	Female	MSc. (Microbiology)	chauhanjagruti007@gmail.com	
19	Priya C. Vithalani	Female	MSc. (Microbiology)	vithalanipriya@gmail.com	Gujarat Vidyapith, Gujarat
20	Meghavi Raval	Female	MSc. (Biotechnology)	meghaviraval09@gmail.com	Gujarat Veterinary Research and Diagnostic Centre
21	Yadav Parth Govindbhai	Male	MSc. (Organics)	parthrajsinhyadav@gmail.com	Kadi University Gandhinagar
22	Nishant Chauhan	Male	MSc. (Microbiology)	nishant.6620@gmail.com	Gujarat Biotechnology University
23	Dr Dhaval makawana	Male	Ph.D. (Bioscience)	dhavalmak@gmail.com	Central university of Gujarat
24	Hema Thangavel	Female	MSc. (Biochemistry)	hemathangavel102@gmail.com	Bharathiar University
25	Nidhi Nitinbhai Patel	Female	MSc. (Biotechnology)	patelnidhi702@gmail.com	Veer Narmad South Gujarat University
26	Dipeshkumar T. Patel	Male	MSc. (Microbiology)	pdipesh883@gmail.com	M. B. Patel Science College, Anand
27	Siddhapura Pratikkumar J.	Male	M. Pharm. (Pharmaceutics)	siddhapurapratik99@yahoo.com	Graduate School of Pharmacy, GTU
28	Prajapati Virendrabhai M.	Male	MSc. (Chemistry)	Virenprajapati75@yahoo.com	Sardar Vallabhbhai National Institute of technology
29	NareshKumar C Vala	Male	MSc. (Chemistry)	vala50026@gmail.com	Dharmsinh Desai University Nadiad
30	Kirti Anand Yadav	Female	MSc. (Biotechnology)	kirtiy2755@gmail.com	Natubhai V Patel Pure and Applied Sciences College
31	Rajavat Shreyakunwar J.	Female	MSc. (Analytical Chemistry)	shreyakunwar230999@gmail.com	Shri Maneklal M. Patel Institute Of Sciences And Research
32	Patel Meetkumar Arvindbhai	Male	MSc. (Materials Science)	meetpatel19300@gmail.com	Australian Premium solar
33	Ravi Das	Male	MSc. (Zoology)	ravidas744@gmail.com	Guru Ghasidas Vishwavidhalaya, Bilaspur
34	Dhandhukiya Hetvi Umeshbhai	Female	MSc. (Chemistry)	hetviudhandhukiya@gmail.com	Department of Chemistry, School of Science
35	Mrunalini Yuvrajsinh Gohil	Female	MSc. (Biotechnology)	mygohil22@gmail.com	CSIR-CSMCRI Bhavnagar Gujarat
36	Thakur Pooja	Female	MSc. (Organic Chemistry)	thakurpooja4515@gmail.com	Oxygen Pharma
37	Ruchi Nair	Female	MSc. (Organic Chemistry)	nairruchi08@gmail.com	

Annexure 3: Schedule date and activities during the workshop.

Day 1	
08:30	Registration
09:00	Inaugural Session
10:00	Expert Talk (S-I)
11:00	Tea Break
11:20	Expert Talk (S-I)
12:30	Lunch
14:00	Hands on training (S-II)
16:00	Tea Break
16:20	Campus Visit

Day 2	
09:00	Expert Talk (S-I)
10:30	Tea Break
11:00	Expert Talk (S-I)
12:30	Lunch
14:00	Hands on training (S-II)
16:00	Tea Break

Day 3	
09:00	Expert Talk (S-I)
10:30	Tea Break
11:00	Expert Talk (S-I)
12:30	Lunch
14:00	Session II–A
15:30	Tea Break
15:45	Session II-B

Day 4	
09:00	Expert Talk (S-I)
10:30	Tea Break
11:00	Expert Talk (S-I)
12:30	Lunch
14:00	Session II–A
15:30	Tea Break
15:45	Session II-B

Day 5	
09:00	Expert Talk (S-I)
10:30	Tea Break
11:00	Expert Talk (S-I)
12:30	Lunch
14:00	Session II–A
15:30	Tea Break
15:45	Session II-B

Day 6	
09:00	Expert Talk (S-I)
10:30	Tea Break
11:00	Expert Talk (S-I)
12:30	Lunch
14:00	IITGN Lab visit
16:00	Tea Break at IITGN
16:45	IITGN Lab visit

Day 7	
09:00	Interactive session
11:15	Tea Break
11.30	Closing remarks

Sessions IIA & IIB will be Hands on training

Annexure 4: Feedback summary

Sr. No	Content	% Rating
1	Overall grading of the program with reference to relevance of course, module/ content etc.	97% Rated on or above 8 points
2	Overall grading of the facilities provided by the institute, i.e., Hostel, Mess, Classrooms, Transport/infrastructure etc.	98% Rated on or above 8 points
3	Overall grading of the faculty members conducting the training	96% Rated on or above 8 points
4	How do you rate the overall training methodology	95% Rated on or above 8 points
5	How far the field visit is relevant and related to your research study	97% Rated on or above 8 points
6	Usefulness of this training in your current role	97% Rated on or above 8 points
7	Usefulness of this training in future work/job you may handle	98% Rated on or above 8 points
8	How far have you benefitted from interaction with the fellow participants of the training	97% Rated on or above 8 points
9	How far the course material supplied relevant and related to the training curriculum	94% Rated on or above 8 points
10	Overall grading of the process of training	98% Rated on or above 8 points
11	Your recommendation to your peers/ colleagues for the training Program	98% Rated on or above 8 points