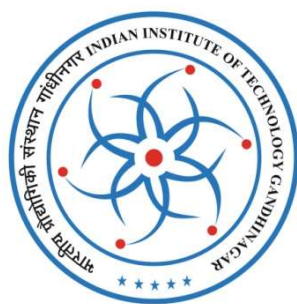


A training session report on
**Karyotyping & FISH, CHNS analysis and
Stereozoom Microscope Operation**

Under

STUTI program funded by DST



In association with

Indian Institute of Technology, Gandhinagar

(Project Management Unit)



Coordinated by

Prof. M. G. Thakkar

Department of Earth and Environmental Science

KSKV Kachchh University, Bhuj-Kachchh-370001

1st to 7th August 2022

Acknowledgement

I am sincerely grateful to the Department of Science and Technology, Govt. of India, FIST division and also the Indian Institute of Technology Gandhinagar; STUTI program for providing us the financial assistance and facilitation of the resources for this training program. We are equally grateful to the Vice Chancellor and Register of KSKV Kachchh University for the encouragement and support all throughout the execution of the training since its beginning. Mr Parth Patel and Ms. Riya are the key persons who, right from the beginning approached me and kept trust on me for this prestigious training program and helped us making this program successful.

The workshop was conducted on the instruments funded by DST-FIST Sanction Letter No. SR/FST/ES-1/2018/29(C) on the title 'Karyotyping & FISH, CHNS analysis and Stereozoom Microscope Operation'. Organizing team includes Dr. Gaurav Chauhan, Dr. Mrugesh Trivedi, Dr. Seema Sharma, Ketan Chaskar, Dr. Chirag Jani, Yash Shah, Hemashree Thacker who were the backbone of this training program. The resource persons and speakers Dr. Ravi Bhushan, Dr. Sandhu Gaurang, Dr. Shilpa Pandey, Prof. M.G. Thakkar, Dr. Mrugesh Trivedi, Dr. Vijay Ram, Dr. Seema Sharma and Dr. Prashant Wagh are gracefully acknowledged for their valuable contributions in the training program.

I also acknowledge all the department staff and IITGN staff's contributions without which the training could not have been possible.

Project Coordinator

Prof. M. G. Thakkar

Summary

The goal of this training session is to popularize Karyotyping and FISH technique among students, faculty, scientists and industry professionals through a week-long training workshop. The workshop was conducted at KSKV Kachchh University from 1st to 7th August, 2022 and 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 introduce the basic concepts of FISH karyotyping CHNS analysis, use of stereo-zoom and petrographic microscopes and preparation of Rock samples. The focus of this workshop was to have “*a balance between theory and practical training on the equipment. Emphasis is on hands-on use of equipment for demonstration/characterization by each participant and analysis of participant’s samples*”.

Introduction

KSKV Kachchh University conducted 7-day long workshop on DST-FIST funded instrument, in the Department of Earth and Environmental Sciences demonstrating FISH, Karyotyping, stereo zoom microscope and CHNS analysis in its campus for the participants from various backgrounds such as Post Graduate, B.Tech., Professors, Scientists, Ph.D. and Post Doc Fellows and Industry persons were invited (Annex-1). The following workshop's activities took place from August 1st to 7th, 2022 (Annex-2 and 3). This report provides a quick overview of both the lecture and technical sessions.

- Lecture Sessions

Prof. J.D. Jadeja (Honorable Vice Chancellor), **Dr. J.M. Butani** (Registrar), **Dr. Ravi Bhushan** and **Mr. Parth Patel** (STUTI associate from IIT Gandhinagar), were invited as a chief guest to grace the inaugural function. **Prof. J.M. Jadeja** explained about the rising graph of research in the department of Earth and Environmental Science of the university and its contribution in the society is highly appreciable. **Dr. Ravi Bhushan** is a well-known *oceanographer* at (PRL, Ahmedabad) gave an overview on the basics of Elemental Analyser and how it can be used in various scientific fields, like paleo-climatics, and climatology, archaeology, etc. **Dr. Seema Sharma** delivered lecture on usefulness of present instruments in soil science. **Dr. Pranav Pandya** showed importance of stereo-zoom microscope in micro-invertebrates and other micro-fossils. **Dr. Bhushan** shared his knowledge of the radiocarbon dates and AMS (Acceleration Mass Spectroscopy) facilities available in PRL for detection of C¹⁴ dates. **Dr Gaurav Sindhu** (Gujarat University) explained importance of Karyo-typing technique in early detection of genetic diseases and can cease pregnancy. The chromosomal defects lead to many incredible diseases and such issues can be eradicated with such diagnosis at the early stage. **Dr. Vijay Kumar Ram** (Department of chemistry, Kachchh University) gave a lecture on understanding of mass spectroscopy and spectrometry and how they are useful in identification of elements and different inorganic chemicals. **Dr. Shilpa Pandey** a palynologist (BSIP, Lucknow) gave

demonstration on prepare the slides for the palynology study before examination under the stereo microscope.

- Technical Session

On the **first** day, **Dr. Ravi Bhushan** along with **Dr. Prashant Bagh** (Ashapura Mind Camp Ltd.) showed demonstration on CHNS analysis and usefulness of geochemical analysis. On the **second** day, **Dr. M.G. Thakkar** (the Convener) showed how solid, black and un-interesting rocks can be seen so beautifully under the microscope. Research scholars **Yash Shah, Hemashree Thakkar, Bhavyata Chavda and Dr Suraj Bhosale** and **Dr. Jani** assisted him during the practical sessions. On the **third** and **fourth** day, **Dr. Gaurav Sindhu** (Gujarat University) and **Dr. Mrugesh Trivedi** (Kachchh University) have taken lecture as well as practical sessions on how to prepare the slides for Karyo-typing studies of the human or any other animals. Blood samples were taken and the chromosomes were extracted on the slides for study under the microscope. By the help of software, deformities in the chromosomes were explained and demonstrated by the experts. Such a slide takes a minimum of 72 hours for preparation. Hence, some of the processes were started before the date of the commencement of the training program. Research scholars **Gautam Priyadarshi, Ms. Khayali Vaidya, Mr. Sagar Prajapati** and **Mr. Manish** helped in entire process of preparation and practical arrangements. On **fifth** day, **Dr. M.G. Thakkar** taught the basics of mineralogy and petrology and provided hands-on session for making sections of the rocks and minerals for the optical means of identification. He also guided with a practical study while using petro-graphical microscopes and the students interacted and identified several minerals and rocks under the microscope. Research scholars of geology department helped in practical explanation and arrangements. **Dr. Vijay Kumar Ram** provided a practical training session on ICPMS and SEM. On the **sixth** and **seventh** day, all the participants were taken to the field at various places of geological, environment and ecological importance and gave hands-on exposure in collecting the soil and rock samples for geochemical, geochronological and paleo-climatic analysis using CHNS analyser, ICPMS, XRF, XRD and SEM.

- *Types of samples tested*

During the technical session, all of the participants expressed an interest in learning from the workshop and characterized more than 20 no. of samples. Moreover, the it was observed that 3 samples were tested on CHNS analyzer (rock and soil); 4 slides samples on stereozoom microscope (biological samples for Karyotyping); and almost 20 slides samples on Petrographical Microscope.

Outcomes of the workshop

The workshop attracted 53.3% male and 46.7% female participants from 15 different institutes (**Figure 1**). 30 participants were allowed for this training session. The goal of this training event was to bring together participant from many disciplines and raise awareness of the institute's advanced facilities. Throughout the session participants asked major questions regarding theoretical and practical expects of CHNS analyser and its procedures; use of typing and preparation of samples for the same semi: And use of FISH Karyo-typing of the samples, stereo-zoom and petro graphical microscopes for the rocks minerals, micro-fossils, pollens and pores and also live micro-organisms. The expert gave suggestions for possible solutions and invited participants to future collaborations. Finally the feedback (**Annex-4**) from the participant was considered in the valuation of the workshop. The major the majority of the participants were pleased with the training session and suggested that more workshops to be held in the future. Few participants suggested organising such a workshop training session on more advanced characterization techniques.



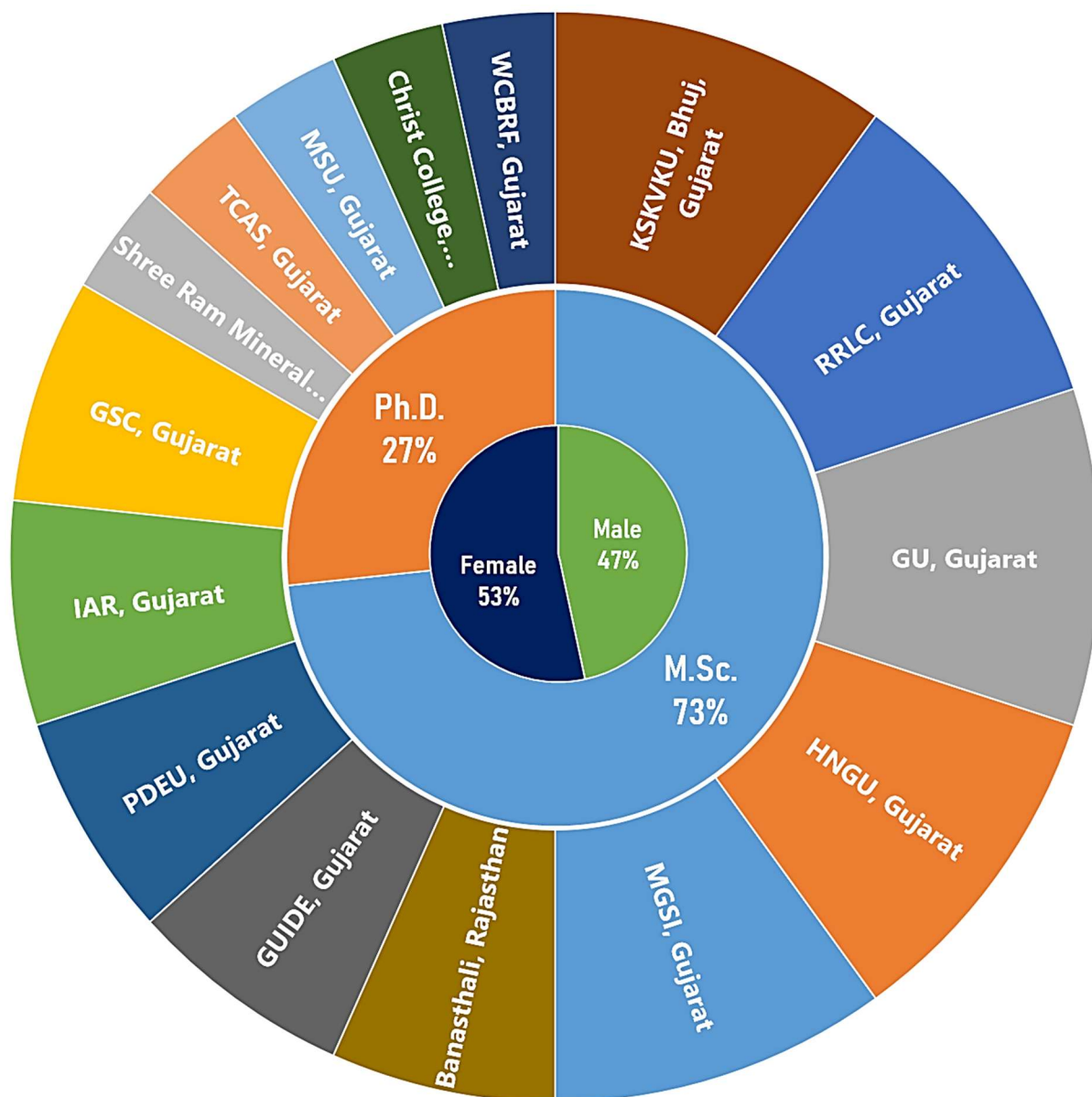



Figure 1: Participants registered for the ‘Karyotyping & FISH, CHNS analysis and Stereozoom Microscope Operation’ workshop from 15 different institutes.

Annex 1: Brochure for the program.

DST funded "Synergistic Training program Utilizing the Scientific and Technological Infrastructure (STUTI)" facilitated by the PMU IIT-Gandhinagar



**Training Programme on:
Karyotyping & FISH, CHNS analysis and Stereozoom microscope operation**

7 Days STUTI workshop from 1st Aug to 7th Aug 2022

**Organized by:
Department of Earth and Environmental Science
KSKV Kachchh University
Bhuj-Kachchh-370001**

Registration and Contact details

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

For the selected candidates, the registration fees, local travel, boarding and lodging will be covered by the KSKV Kachchh University, Bhuj

Interested participants should register using the following link:
<https://forms.gle/8WLQpsBtixaqcEHx7>


Registration Deadline: **26th July 2022**
Shortlisted candidates will be intimated by email, latest by 27th July 2022.

Eligibility criteria:


- Minimum qualification: Postgraduate (Science) or B. Tech. (any subject)
- Professors/scientists/Post-doc fellows/Ph.D. scholars/industry persons who are actively involved in R&D
- Not more than three candidates from one institute


For more information:
Prof. M. G. Thakkar (Head)
Department of Earth and Environmental Science, KSKV Kachchh University, Bhuj-Kachchh-370001 (Gujarat)
Email: mthakkar.geology@gmail.com

Acknowledgments:




Speakers







Prof. M. G. Thakkar is professor in Geology and Head, Department of Earth and Environmental Science, KSKV Kachchh University. He has 32 years of teaching and Research experience in Geology, Quaternary climates and tectonics and paleoseismology.




Dr. Hruges Trivedi is an Assistant Professor in the Department of Earth and Environmental Science, KSKV Kachchh University. He has 15 years of teaching and research experience. He is specialized in environmental toxicology and molecular ecology




Dr. Ravi Bhushan is a Senior Research Scientist at Physical Research Laboratory, Ahmedabad. He is actively working on geochronology, Paleoclimatic & paleoenvironmental studies and Cosmogenic Radionuclide application in Earth & Planetary Sciences



Dr. Sindhav Gaurang is an Assistant Professor in the Department of Zoology, BMT, HG and WBC University school of Sciences, Gujarat University. He is specialized in Cyto and Molecular Biology, Genetic diagnosis and counseling



Dr. Shilpa Pandey is a Scientist (D) in Birbal Sahnii Institute of Paleosciences, Lucknow. She has expertise in Palynology of Quaternary sediments.



Dr. Paras Shrivastav, CHNS expert, Elmantar Pvt. Ltd.

Contents of the workshop

Session 1 A-B
Inauguration and Welcome note
Introduction of the participants and the Host
Overview of various DST sponsored Programs

Session 2 A-B
Principles and application of cytogenetics, Karyotyping and FISH
Overview of the microscope and software used for the Karyotyping and FISH

Session 3 A-B
Basics of Stereo-zoom, Light and Polarizing microscopes
Applications of Stereo microscopes in Geology, Palynology and micropaleontology

Session 4 A-B
Principles of CHNS Analyser, basics of its components
Applications of CHNS in soil, water and coal studies

Session 5 A-B
Practical studies of rocks under the microscopes (Petrography and Optical mineralogy)
Hands on training on petrographical microscopes and CHNS as well as Stereo microscopes

Session 6 A-B
Field work and sample collection techniques for each instruments

Session 7
Valedictory and feedback

Overview of STUTI and Objectives of Workshop

DST welcomes all their participants for the workshop on "Karyotyping & FISH, CHNS analysis and Stereo zoom microscope operation" organized under STUTI. The STUTI program envisions hands-on training and sensitization of the state-of-art equipment as well as towards sharing while ensuring transparent access to S & T facilities. Department of Science and Technology has identified IIT-Gandhinagar to function as a Project Management Unit (PMU). While the Department of Earth and Environmental Science of KSKV Kachchh University as coordinator for this workshop since the department has received the prestigious FIST grants.

This workshop is aimed to provide an insight into the functioning of CHNS analyser, soil, coal, water and hydrocarbon analyses, identification of the foraminifers, ostracods, pollens and petrographical studeis through stereo zoom and petrological/ polarizing microscopes, Karyotyping and FISH – cytogenic studies of human cells and identification of defected chromosomes etc. The participants will be introduced to the basic concepts of above mentioned techniques and operation of CHNS analyser as well as the preparation of the slides for karyotyping and foraminifers. They will have chance to interact with subject experts and also analyse their own samples (with prior approval).

Schedule

Day 1 (01-08-2022)	Day 2 (02-08-2022)	Day 3 (03-08-2022)
09:00 Registration	10:30 Session 2A	10:30 Session 3A
09:30 Inaugural Session	11:30 Break	11:30 Break
10:30 Session 1A	12:00 Session 2B	12:00 Session 3B
11:30 Session 1B	01:30 Lunch	01:30 Lunch
01:30 Lunch	02:30 Lab session-2	02:30 Lab Session-3
02:30 Lab session-1	04:30 Tea break	04:00 Tea break
Day 4 (04-08-2022)	Day 5 (05-08-2022)	Day 6 (06-08-2022)
10:30 Session 4A	10:30 Session 5A	10:30 Session 6A
11:30 Break	11:30 Break	11:30 Break
12:00 Session 4B	12:00 Session 5B	12:00 Session 6B
01:30 Lunch	01:30 Lunch	01:30 Lunch
02:30 Lab Session-4	02:30 Lab Session-5	02:30 Lab Session-6
04:00 Tea break	04:00 Tea break	04:00 Tea break
Day 7 (07-08-2022) 10:30 Valedictory and feed back		

Annex 2: List of participants registered and their attendance for the Karyotyping & FISH, CHNS analysis and Stereo-zoom Microscope Operation workshop.

Sr. No.	Candidate Name	Gender	Educational Qualification	Email address	University/Institute
1	Mr. Darji Darshan Kumar Rajesh Bhai	Male	M.Sc. Geology	darshandaiya234@gmail.com	MGSI, Ahmedabad
2	Mr. Akash Limbachiya	Male	M.Sc. Geology	akashlimbachiya912@gmail.com	
3	Mr. Mihir Chaudhary	Male	M. Sc. Geology	mihirchaudhary1611@gmail.com	
4	Mr. Pratikumar Desai	Male	M.Sc. Zoology	pratikdesai825@gmail.com	HNGU, Patan
5	Ms. Vala Sejal Vinodchandra	Female	M.Sc. Environmental Science	svala07@gmail.com	
6	Mr. Aditya Dharaiya	Male	M.Sc. Geology	adiradhu@gmail.com	GU, Ahmedabad
7	Ms. Aayushi Jashwantbhai Panchal	Female	M.Sc. Environmental Science	aayuship88@gmail.com	
8	Ms. Yadav Jyoti Kumari Harishankar	Female	M.Sc. Life Science	jyotiyadav1031@gmail.com	
9	Ms. Chauhan Sunita	Female	Ph.D. Chemistry	chauhansunni92.sc@gmail.com	GSC, Mandvi
10	Mr. Altafkhani Jalwani	Male	Ph.D. Botany	Jalwani.70@gmail.com	
11	Mr. P K Mehta	Male	Ph.D. Botany	dr.pk.mehta@gmail.com	
12	Ms. Ekta Bhanuprasad Joshi	Female	Ph.D. Botany	dr.ektajoshi21@gmail.com	RRLC, Bhuj
13	Ms. Renu V. Yadav	Female	M. Sc. Botany	renu.yadav020190@gmail.com	
14	Mr. Darshit Padia	Male	Ph.D. Geology	dpadia04@gmail.com	IAR, Gandhinagar
15	Mr. Kush Gupta	Male	M.Sc. Biotech.	kushgupta191@gmail.com	
16	Mr. Nikhil Mehra	Male	M.Sc. Biotech.	nv1111mehra@gmail.com	
17	Ms. Suruchi Patel	Female	Ph.D. Geology	sur25patel@gmail.com	PDEU, Gandhinagar
18	Ms. Archchi Sarkar	Female	M. Sc. Applied Geology	sarkar.archchi@gmail.com	
19	Ms. Dipmala Gajjar	Female	M.Sc. Environmental Science	dipmalagajjarbhuj@gmail.com	KSKVKU, Bhuj
20	Ms. Bhavyata Chavda	Female	M.Sc. Geology	briyu6834@gmail.com	
21	Ms. Khayali Vaidya	Female	M.Sc. Environmental Science	vaidyakhayali20@gmail.com	
22	Ms. Monika Sharma	Female	M.Sc. Environmental Science	ms802366@gmail.com	GUIDE, Bhuj
23	Ms. G. Jayanthi	Female	Ph.D. Botany	jayanthiguide@gmail.com	
24	Ms. Pooja Chauhan	Female	M.Sc. Geology	pc231862@gmail.com	Banasthali Vidhyapith, Jaipur
25	Ms. Kamna Sharma	Female	M. Sc. Geology	kamna1284@gmail.com	
26	Ms. Shalu Mesaria	Female	M.Sc. Zoology	shalumesaria@gmail.com	WCBRF, Patan
27	Mr. Harshal Purohit	Male	M.Sc. Microbiology	harshal2199purohit@gmail.com	Christ College, Rajkot
28	Mr. Chaudhary Nitesh	Male	M. Sc. Medical Biotech.	niteshsirvi23@gmail.com	MSU, Baroda
29	Mr. Riteshkumar Jerambhai Tandel	Male	Ph.D. Microbiology	rtstandel@gmail.com	TCAS, Adipur
30	Mr. Jaymeet Solanki	Male	M.Sc. Geology	jaymeetsolanki@gmail.com	Shree Ram Minerals

Annex 3: Schedule date and activities during the workshop.

<p>Day 1 (01-08-2022) 09:00 Registration 09:30 Inaugural Session 10:30 Session 1A 11:30 Session 1B 01:30 Lunch 02:30 Lab session-1</p>	<p>Day 5 (05-08-2022) 10:30 Session 5A 11:30 Break 12:00 Session 5B 01:30 Lunch 02:30 Lab Session-5 04:00 Tea break</p>
<p>Day 2 (02-08-2022) 10:30 Session 2A 11:30 Break 12:00 Session 2B 01:30 Lunch 02:30 Lab session-2 04:30 Tea break</p>	<p>Day 6 (06-08-2022) 10:30 Session 6A 11:30 Break 12:00 Session 6B 01:30 Lunch 02:30 Lab Session-6 04:00 Tea break</p>
<p>Day 3 (03-08-2022) 10:30 Session 3A 11:30 Break 12:00 Session 3B 01:30 Lunch 02:30 Lab Session-3 04:00 Tea break</p>	<p>Day 7 (07-08-2022) 10:30 Valedictory and feed back</p>
<p>Day 4 (04-08-2022) 10:30 Session 4A 11:30 Break 12:00 Session 4B 01:30 Lunch 02:30 Lab Session-4 04:00 Tea break</p>	

Annex 4: Feedback summary

Sr. No.	Content	% Rating
1	Overall grading of the Programme with reference to relevance of course, module/content etc.	80% rated above 8 points
2	Overall grading of the facilities provided by the institute, i.e., Hostel, Mess, Class Rooms, Transport/infrastructure etc.	87% rated above 8 points
3	Overall grading of the faculty members conducting the training	93% rated above 8 points
4	How do you rate the overall training methodology	100% rated above 8 points
5	How far the field visit is relevant and related to your research study	87% rated above 8 points
6	Usefulness of this training in your current role	100% rated above 8 points
7	Usefulness of this training in future work/job you may handle	90% rated above 8 points
8	How far have you benefitted from interaction with the fellow participants of the training	90% rated above 8 points
9	How far the course material supplied relevant and related to the training curriculum	93% rated above 8 points
10	Overall grading of the process of training	100% rated above 8 points
11	Your recommendation to your peers/ colleagues for the training Programme	100% rated above 8 points