



Technical Workshops Series – 2018

4 Days Hands-on Workshop on Microscopy

- Organized by Venture Center -

Learn	<ul style="list-style-type: none"> • Light Microscopy basics, Resolution and Contrast in Light Microscopy, Advanced Light Microscopy techniques and applications. • Principles, techniques and applications of Fluorescence & Confocal Microscopy. • Introduction to Electron Microscopy, Specimen processing techniques, Advanced imaging methods and applications. • Basic concepts of digital imaging and data analysis. • Hands-on lab sessions on Light, Fluorescence & Confocal Microscopy. • Hands on training on image acquisition and developing skills in settings and configuration for image collection in confocal microscopy. • Hands-on interactive session on image processing using Image J software. 								
Organized by	BioIncubator & Cell Studio at Venture Center								
For whom	<ul style="list-style-type: none"> • Students & Researchers • Entrepreneurs • Industry professionals 								
When	Wednesday-Saturday 6 - 9 June 2018 9 am – 6 pm								
Where	Training Room, Venture Center, 100 NCL Innovation Park, Dr. Homi Bhabha Road, Pune-411008								
Contact	<p>Technical queries: Ms Sujaya Ingale 020-25865877/75/76 lab@venturecenter.co.in</p> <p>Logistical queries: Ms Lipika 020-25865877/75/76 eventsdesk@venturecenter.co.in</p>								
Cost	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Category</th> <th style="text-align: left;">Fees</th> </tr> </thead> <tbody> <tr> <td>Students with valid ID card</td> <td>Rs 5000/-</td> </tr> <tr> <td>Micro and Small Enterprises/ academic institutions/ Individuals</td> <td>Rs 7000/-</td> </tr> <tr> <td>Medium and large companies</td> <td>Rs 10000/-</td> </tr> </tbody> </table> <p>Limited seats: 20 ; First-come-first-serve</p> <p>Register here: https://bit.ly/2Gw5BaN Registration closes once 20 seats are full or 2 June 2018 (whichever comes sooner)</p> <p>NOTE</p> <ul style="list-style-type: none"> • Definitions of Micro Small and Medium Enterprise: http://dcmsme.gov.in/ssiindia/defination_msme.htm • Fees paid is not refundable and non transferable under any circumstances 	Category	Fees	Students with valid ID card	Rs 5000/-	Micro and Small Enterprises/ academic institutions/ Individuals	Rs 7000/-	Medium and large companies	Rs 10000/-
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Introduction

The microscope is an invaluable tool in today's research and education. It is used in a wide range of scientific fields, where major discoveries in biology, medicine and materials research are based on advances in microscopy.

This workshop aims to give an introduction to the principles, techniques and applications of Light Microscopy, Fluorescence and Confocal Microscopy and Electron Microscopy.

From the simple light microscope different techniques have evolved, aimed at making it possible to see certain objects or processes. Optical or light microscopy involves passing visible light transmitted through or reflected from the sample through a single or multiple lenses to allow a magnified view of the sample. In order to improve specimen contrast or highlight certain structures in a sample; special techniques must be used. These techniques to increase contrast will also be discussed in the workshop.

In fluorescence microscopy, the sample you want to study is itself the light source. The technique is used to study specimens, which can be made to fluoresce. The fluorescence microscope is based on the phenomenon that certain material emits energy detectable as visible light when irradiated with the light of a specific wavelength. The sample can either be fluorescing in its natural form like chlorophyll and some minerals, or treated with fluorescing chemicals. This method is of critical importance in the modern life sciences, as it can be extremely sensitive, allowing the detection of single molecules.

Using a scanning point of light instead of full sample illumination confocal microscopy gives slightly higher resolution, and significant improvements in optical sectioning. Confocal microscopy is, therefore, commonly used where 3D structure is important.

The wavelength of the light limited the resolution of traditional microscopy to around 0.2 micrometers. In order to gain higher resolution, the use of an electron beam with a far smaller wavelength is used in electron microscopes.

TEM is quite similar to the compound light microscope, by sending an electron beam through a very thin slice of the specimen.

SEM visualizes details on the surfaces of specimens and gives a very nice 3D view.

The workshop will also cover basic concepts of digital imaging and data analysis

The workshop will be conducted by scientists and Industry experts, having vast experience working in the field of Microscopy. The workshop includes Theory sessions; Hands-on lab sessions, Live demonstrations on latest equipments. The participants will also learn best practices in microscopy, troubleshooting and maintenance of microscopes. The workshop shall also discuss some recent trends and new developments.



Course Outline

Talks:

- **Light Microscopy & Optics:** Light Microscopy, Advanced Light Microscopy: Phase contrast, Dark-field contrast, Polarizing and DIC microscopes- Principles and applications,
- **Fluorescence & Confocal Microscopy:** Fluorescence Microscopy, Principle and Applications of Confocal Microscopy
- **Electron Microscopy:** Introduction to Electron Microscopy, Specimen Processing Techniques for electron microscopy, Cryo EM and Advanced Imaging Techniques, Advanced Scanning Electron Microscopy: imaging, analysis and applications
- **Advanced Microscopy Tools & Techniques, Image Acquisition & Processing:** Insights on advanced light microscopy and applications, Basic concepts of digital imaging and data analysis

Hands-on lab sessions:

- Light Microscopy
- Fluorescence Microscopy, Confocal Microscopy, image acquisition and developing skills in settings and configuration for image collection in confocal microscopy
- Hands-on interactive session on image processing using Image J software
- Educational documentaries on fluorescence microscopy and applications
- Demonstration of Scanning Electron Microscopy and Transmission Electron Microscopy

Course includes

- Access to restricted website with online compilation of resources for microscopic techniques and applications
- Certificate of Participation issued by Venture Center
- Breakfast, tea and lunch at Venture Center cafeteria

*Please note, the participants will have to arrange for their own travel/local transport and accommodation and dinners.

- For accommodation (standard and budgeted hotels) please visit: www.venturecenter.co.in/puneguide/standard.php
- For accommodation (deluxe and luxury hotels) please visit: www.venturecenter.co.in/puneguide/deluxe.php
- For local transport details visit: www.venturecenter.co.in/puneguide/taxi.php



Workshop Schedule

Time	Session title	Lead
6th June 2018	(Light Microscopy & Optics)	
8:30 to 9:00	Registration & breakfast	
9:00 to 9:30	Introduction to the course and faculty	Dr. Manisha Premnath
	Theory session – Light Microscopy	
9:30 to 10:30	Microscopy Primer - I	Dr. Bimalendu Nath
10:30 to 11:30	Microscopy Primer - II	Dr. Bimalendu Nath
11:30 to 12:00	Tea break	
12:00 to 13:30	Advanced Light Microscopy: Phase contrast, Dark-field contrast, Polarizing and DIC microscopes- Principles and applications	Dr. Bimalendu Nath
13:30 to 14:30	Lunch break	
14:30 to 16:00	Lab session on Light Microscopy (Batch – I)	Dr. Bimalendu Nath
14:30 to 16:00	Lab session on Light Microscopy (Batch – II)	Dr. Leena Thorat
16:00 to 16:30	Tea break	
16:30 to 18:00	Lab session on Light Microscopy (Batch – I)	Dr. Leena Thorat
16:30 to 18:00	Lab session on Light Microscopy (Batch – II)	Dr. Bimalendu Nath
7th June 2018	(Fluorescence & Confocal Microscopy)	
9:00 to 9:30	Breakfast	
9:30 to 10:30	Fluorescence Microscopy Primer - I	Dr. Leena Thorat
10:30 to 11:30	Fluorescence Microscopy Primer - II	Dr. Leena Thorat
11:30 to 12:00	Tea break	
12:00 to 13:30	Principle and Applications of Confocal Microscopy	Dr. Nishigandha Naik
13:30 to 14:30	Lunch break	
14:30 to 15:15	Lab session on Fluorescence Microscopy (Batch – I)	Dr. Leena Thorat
14:30 to 15:15	Lab session on Confocal Microscopy (Batch – II)	Dr. Nishigandha Naik
15:15 to 16:00	Lab session on Confocal Microscopy (Batch – I)	Dr. Nishigandha Naik
15:15 to 16:00	Lab session on Fluorescence Microscopy (Batch – II)	Dr. Leena Thorat
16:00 to 16:30	Tea break	
16:30 to 17:15	Hands on training on image acquisition and developing skills in settings and configuration for image collection in confocal microscopy (Batch- I)	Dr. Anupam Banerjee
16:30 to 17:15	Educational documentaries on fluorescence microscopy and applications (Batch – II)	Dr. Leena Thorat



17:15 to 18:00	Educational documentaries on fluorescence microscopy and applications (Batch – I)	Dr. Leena Thorat
17:15 to 18:00	Hands on training on image acquisition and developing skills in settings and configuration for image collection in confocal microscopy (Batch- II)	Dr. Anupam Banerjee
8th June 2018	(Electron Microscopy)	
9:00 to 9:30	Breakfast	
9:30 to 10:30	Introduction to Electron Microscopy	Dr. Anuya Nisal
10:30 to 11:15	Specimen Processing Techniques	Dr. Anuya Nisal
11:15 to 11:45	Tea break	
11:45 to 12:30	Biological Applications of Electron Microscopy	Dr. Bimalendu Nath
12:30 to 13:30	Advanced Scanning Electron Microscopy: imaging, analysis and applications	Dr. Anuya Nisal
13:30 to 14:30	Lunch break	
14:30 to 17:30	Visit to Electron Microscopy facility at NCL	Dr. Anuya Nisal
9th June 2018	(Advanced Microscopy Tools & Techniques, Image Acquisition & Processing)	
9:00 to 9:30	Breakfast	
9:30 to 10:30	Insights on advanced light microscopy and applications	Dr. Santosh Podder
10:30 to 11:30	Basic concepts of digital imaging and data analysis	Dr. Santosh Podder
11:30 to 12:00	Tea break	
12:00 to 13:30	Hands-on interactive session on image processing using Image J software	Dr. Santosh Podder
13:30 to 14:30	Lunch break	
14:30 to 16:00	Concluding session – Feedback, Certificate distribution	Dr. Premnath V.



Course Director



Dr. Bimalendu Nath

Senior Professor, Department of Zoology, SP Pune University

Dr B.B.Nath teaches genetics and allied subjects and is researching in the area of stress biology and chromosomal genetics. He graduated from Guwahati University, Assam. He received his Master's degree in Life Sciences from the Visva-Bharati Central University, Santiniketan, West Bengal. He obtained his Ph.D. from Banaras Hindu University and thereafter he continued as a Post-Doctoral Associate at the Molecular Biology Unit of Institute of Medical Sciences, BHU. Dr Nath started his independent career in teaching and research at the University of Pune in 1992 and over the years, he has established a Stress Biology Research Group using *Drosophila* and *Chironomus* as model organisms. He is a member of the Society of Experimental Biology (U.K.) and Cell Stress Society International (U.S.A.). He is a member of the editorial board of Journal of Radiation and Cancer Research. He is a national mentor for the NIUS programme (Biology) of Homi Bhabha Centre for Science Education, TIFR, Mumbai and has been contributing as a visiting faculty at different life science departments of S.P. Pune University campus in subjects like Microscopy and Genetics. Prof. Nath has been a recipient of 'Joag award' for the best teacher in 2014 from the University of Pune. Prof. Nath has more than 50 publications including book chapters and reviews in national and international peer reviewed journals and he has several journal cover page images on microscopy and imaging techniques to his credit. Prof. Nath has been elected as a Vice President of Indian Society of Cell Biology. He is also working as the Vice President of the Association of Teachers in Biological Sciences. He has a number of ongoing national and international collaborations and has worked as a visiting scientist at the I.M.T., Philipps University, Marburg and Freie University, Berlin, Germany.

Other Faculty



Dr. Anupam Banerjee

Manager- Application Support at Leica Microsystem

Dr. Banerjee obtained his Ph.D. in Chemistry from Saha Institute of Nuclear Physics. He has total 8 years of experience in microscopy. He is currently working as Application Product Manager at Life Science Research Division, Leica Microsystems.



Dr. Nishigandha Naik

Director, Haffkine Institute for Training, Research and Testing, Mumbai

Head of Dept. of Biochemistry and Dept of Toxicology

Dr. Naik has more than twenty eight years of research work experience that includes academia as well as industry. Her work is in the field of cancer cell biology, imaging and pre-clinical drug discovery. Her basic research is focused on cell motility related signal transduction events and development of therapeutic approaches for cancer, especially chronic myeloid leukemia, breast cancer, glioblastoma and neural stem cells. Studies of her group have identified rhoGTPases as therapeutic targets.

Dr. Naik did her Ph.D. at the Cancer Research Institute (CRI) of the **Tata Memorial Centre** which is a pioneering and leading comprehensive cancer centre of India. She did her post-doctoral research at the Centre d'Etudes Nucleaires de Grenoble, France. She worked as an independent scientist at the CRI (now known as Advanced Centre for Training, Research and Education in Cancer – ACTREC). Focus of her group was to understand pathogenesis of chronic



myeloid leukemia and breast cancer. In her tenure of almost two decades at the CRI, she developed expertise in the field of imaging. She was instrumental in establishing Laser Confocal Facility for the institute which was second in the Country. She also contributed to Flow Cytometry and Live Cell Imaging Facilities of the Institute and served as a member of the Academic Committee, Institutional Scientific Committee, etc.

As a Head of Imaging and Cancer Biology at **Piramal Enterprises Limited**, she had set up complete preclinical imaging facility required for the drug discovery industry.

Dr. Naik is inventor in international patents and is a recipient of several national and international awards including Indian National Science Academy's Medal for Young Scientist, award for Young Scientist from International Federation for Cell Biology (IFCB) and European Cell Biology Organization (ECBO), Marie Curie Fellowship from the Commission of European Communities and DST, Long Term Overseas Associateship award from DBT, STA Fellowship from Government of Japan and DST, etc. She is associated with MGM Institute of Health Sciences, Navi Mumbai as a Senior Biotechnologist (honorary). Dr. Naik has several times served as elected office-bearer of the Indian Association for Cancer Research and Indian Society of Cell Biology. She is the founder president of the ACTREC Alumni Association and is also associated with the Moving Academy of Medicine and Biomedicine.

Dr. Anuya Nisal

Senior Scientist, Polymer Science and Engineering Division, CSIR-NCL, Pune



Dr. Nisal obtained her Ph.D. in Chemical Engineering from Indian Institute of Technology, Powai where she had been involved in studying Structure-processing-property-performance relationships in Regenerated Silk Fibroin.

Research in her lab is focused on development of novel polymeric materials, blends and composites, their structure-property-processing relationships primarily for biomedical sector. For the last few years, she has been exploring the development of value added and niche applications of silk fibroin, which is an ancient textile material. She has published several research papers and filed multiple patents on microstructure of silk fibroin, novel and unique processing protocols and modification of silk fibroin surfaces to tune bioactivity. This work has resulted in a technology start-up BioIMed Innovations Pvt. Ltd., which is commercializing bone graft substitutes based on silk fibroin. She is also actively involved in information research and technology assessment projects.

Dr. Santosh Podder

Senior Technical Officer, Microscopy Facility, IISER Pune



Dr. Podder obtained his PhD in Zoology in 2011 from Visva Bharati University, India where he had been involved in studying fluoride induced genotoxicity. After a short stint as an Assistant Professor at Guru Ghasidas University, India he received a Dr. DS Kothari Postdoctoral Fellowship from University Grants Commission, India to work on the interaction of DNA lesions induced by fluoride and radiation in cancer cells in the North-Eastern Hill University, India. In 2013 he joined IISc Bangalore as Research Scientist to help manage the newly established Centre for Infectious Disease Research (CIDR) and manage the Bio-Imaging Facility at IISc. In July, 2017 he joined as Senior Technical Officer in the microscopy facility at IISER Pune. Santosh is responsible for overseeing the microscopy facility management, maintenance and training of users.



Dr. Manisha Premnath
General Manager, Venture Center, Pune

Dr. Manisha is General Manager at Venture Center. Manisha holds a Ph.D in Biotechnology from University of Pune and Post-doctoral training from University of Cambridge, UK. She has been a Chevening Rolls Royce Science, Innovation, Policy and Leadership Programme (CRISP) Fellow at the Said Business School, University of Oxford, UK during 2015 where she had the opportunity to study technology innovation ecosystems. She has research experience in biotechnology, microbiology, fungal biotechnology, molecular biology and molecular virology. She has experience in planning and setting up of advanced scientific facilities and program management.



Dr. V. Premnath
Director, Venture Center | Head, NCL Innovations | Head, IP group, NCL

Dr. Premnath is Founding Director of Venture Center and Head, NCL Innovations. He holds a B.Tech from the Indian Institute of Technology - Bombay and a Ph.D. from the Massachusetts Institute of Technology, USA. He has also been a Chevening Technology Enterprise Fellow with the Centre for Scientific Enterprises, London Business School and Cambridge University, UK. He brings with him considerable experience in technology development and commercialization, working with start-up companies (in Cambridge-UK and India) and engaging with large corporations on research and consulting projects as project leader.



Dr. Leena Thorat
DBT BioCARE Scientist, Department of Zoology, SP Pune University

Dr. Thorat received her Bachelor's and Master's in Zoology and her Ph.D. degree from SPPU. Thereafter she continued as a PostDoctoral Fellow at the Cell and Molecular Biology Laboratory, Department of Biotechnology, SPPU. She was a recipient of CSIR-NET JRF in 2008 and in 2013, she received the DAAD fellowship to pursue part of her doctoral research at the Institute of Tumor Biology and Molecular Biology in Germany. She also spent 3 months as EMBO Visiting Scientist at the Freie Universität Berlin, Germany where she gained extensive exposure and acquired hands-on training in different types of new generation imaging techniques including confocal and STED microscopy and image analysis tools. In India, she got research training in confocal microscopy at BHU, EM techniques at NCL, Bioimaging at AU-KBC, Chennai, Advanced Microscopy at IISER, Pune and in many other premier institutes. She has published many research papers in reputed journals like Nature Scientific Reports, BBRC, Glycobiology, Cell Stress and Chaperones, Acta Zoologica, Physiological Entomology, International Journal of Biological Macromolecules, Journal of Biosciences, European Journal of Environmental Sciences and so on. She has visited several countries and delivered lectures in Italy, France, Germany and Czech Republic. She loves both teaching and research and she is deeply fond of delivering popular lectures in science education and on career guidance for young students.



Venture Venter team (in alphabetical order of last names)



Sujaya Ingale

Lab Manager, Venture Center, Pune

Sujaya manages scientific facilities and services at Venture Center which includes flow cytometry and confocal imaging facility. She has done M.Sc. in Microbiology from University of Pune. She has several years of research experience in biotechnology projects, experience in setting up and oversight of Venture Center's lab facilities, running and assisting in proof-of-concept projects and in creating, planning and organizing technical and scientific workshops for life sciences students and scientists.



Akansha Mishra

Lab Associate, Venture Center, Pune

Akansha manages shared lab facilities at Venture Center. She did her M.Sc. in Biotechnology from Gurunanak Dev University and have total 5 years of research experience in the field of nanobiotechnology. She worked as a Project associate in Department of Chemical Engineering, IIT Kanpur where she set up mammalian cell culture lab.

About the organizers



Entrepreneurship Development Center (Venture Center) – a CSIR initiative – is a Section 25 company hosted by the National Chemical Laboratory, Pune. Venture Center strives to nucleate and nurture technology and knowledge-based enterprises by leveraging the scientific and engineering competencies of the institutions in the Pune region in India. The Venture Center is a technology business incubator supported by the Department of Science & Technology's National Science & Technology Entrepreneurship Development Board (DST-NSTEDB). Venture Center focuses on technology enterprises offering products and services exploiting scientific expertise in the areas of materials, chemicals and biological sciences & engineering.

For more information, visit <http://www.venturecenter.co.in/>



The BioIncubator at Venture Center aims to nucleate and nurture technology and knowledge-based enterprises leveraging knowledge in the areas of biotechnology (biopharma, agrobiotech, industrial biotech, clean technology), biomedical engineering/devices/ diagnostics, biomass value addition/ renewable fuels/chemicals/materials, bioinformatics, bio/medical services and related disciplines. Created with support from DBT-BIRAC under the Bioincubator Support Scheme. For more information, visit

<http://www.bioincubator.venturecenter.co.in/>



Cell Studio is a facility of the BIRAC supported BioIncubator at Venture Center, NCL Innovation Park, Pune, India. The Cell Studio is home to advanced scientific facilities for microscopy and imaging, flow cytometry, cell growth studies and tissue engineering. The Cell Studio aims to support selected areas of technology development and science entrepreneurship while also nurturing collaborations between researchers and industry/startup companies.

For more information, visit <http://www.venturecenter.co.in/cellstudio/>