



Venture Center  
 100, NCL Innovation Park  
 Dr. Homi Bhabha Road, Pune –411008  
 Email: [eventsdesk@venturecenter.co.in](mailto:eventsdesk@venturecenter.co.in)  
 Phone: +91-20-2586-5877

Technical Workshops Series – 2013

**Three-Day Intensive Workshop on**  
**Microscopy.....*Seeing the Unseen***  
 - Organized by Venture Center -

<b>Learn</b>	Principles and applications of <b>Light Microscopy</b> - Resolution and different contrasting techniques; <b>Fluorescence and Confocal Microscopy</b> ; <b>Electron Microscopy – SEM and TEM</b> ; Live demonstrations on latest instruments; Best practices in Microscopy; Troubleshooting and maintenance of microscopes. Quick update on latest techniques/developments; Workshop is intended to be basic.
<b>Organized by</b>	Venture Center – a Technology Business Incubator
<b>For whom</b>	<ul style="list-style-type: none"> <li>Industry professionals wishing to expand their skill sets</li> <li>Students, researchers</li> <li>Maximum 30 seats; First-come-first-serve.</li> </ul>
<b>When</b>	4 <sup>th</sup> , 5 <sup>th</sup> , & 6 <sup>th</sup> September 2013 0900-1800 hrs
<b>Where</b>	Training Room and Lab Block, Venture Center, 100 NCL Innovation Park, Dr. Homi Bhabha Road, Pune-411008
<b>Contact</b>	Ms. Lipika Biswas Venture Center, 100, NCL Innovation Park, Dr. Homi Bhabha Road, Pune – 411008; Phone: +91-20-25865877 Email: <a href="mailto:eventsdesk@venturecenter.co.in">eventsdesk@venturecenter.co.in</a>
<b>Cost</b>	<ul style="list-style-type: none"> <li>Students with valid ID card: Rs 3000</li> <li>Micro and small enterprises/ individuals: Rs 4000</li> <li>Medium and large companies/ others: Rs 6000</li> </ul>



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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 and practices of Light Microscopy, Fluorescence and Confocal Microscopy, Electron Microscopy – Transmission Electron Microscopy and Scanning 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 be conducted by scientists and Industry experts, having vast experience working in the field of Microscopy. The workshop includes theory 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.



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### Course Outline

The workshop will include theory as well as practical sessions. Workshop format will include:

- **Talks** - Light microscopy; Optimizing contrast techniques – Differential Interference Contrast, Handling, Adjustment and Trouble shooting skills in Light Microscopy; Fluorescence & Confocal Microscopy; Electron Microscopy – TEM and SEM
- **Demonstration** - Handling, Adjustment and Trouble shooting skills in Light Microscopy
- **Practical** - Light Microscopy -Optimizing contrast techniques – Darkfield, Phase contrast, Use of polarizer device
- **Practical** - Handling light, inverted and fluorescence microscope
- **Demonstration cum tour** of Confocal and Electron Microscopy ( TEM and SEM) facility at NCL



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Schedule			
<b>4-Sep-2013</b>			
Time	Session title	Lead	Venue
0830 – 0845	Registration		Foyer, Learning Center, VC
0845 – 0900	Introduction to the course and faculty	Dr. Manisha Premnath	Training Room, VC
0900 – 1030	Light Microscopy- Nature of light and lenses - Brightfield	Dr. B. B. Nath	Training Room, VC
1030 – 1100	Tea break		Foyer, Learning Center, VC
1100 – 1230	Light Microscopy - Optimizing contrast techniques – Darkfield, Phase contrast, DIC & Polarizing microscopy	Dr. B. B. Nath	Training Room, VC
1230 – 1300	Handling, Adjustment and Trouble shooting skills in Light Microscopy	Dr. B. B. Nath	Training Room, VC
1300 – 1400	Lunch break		Cafeteria, VC
1400 – 1500	Demonstration - Handling, Adjustment and Trouble shooting skills in Light Microscopy	Dr. B. B. Nath	Lab-block, VC
1500 – 1530	Tea break		Cafeteria, VC
1530 – 1700	Practical - Light Microscopy - Optimizing contrast techniques – Darkfield, Phase contrast, Use of polarizer device	Dr. B. B. Nath	Lab-block, VC
<b>5-Sep-2013</b>			
0900 – 1030	Electron Microscopy - SEM	Mrs. Anuya Nisal	Training Room, VC
1030 – 1100	Tea break		Foyer, Learning Center, VC
1100 – 1230	Electron Microscopy - TEM	Mrs. Anuya Nisal	Training Room, VC
1230 – 1330	Lunch break		Cafeteria, VC



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1330 – 1600	Demonstration - Electron Microscopy – SEM & TEM	Mrs. Anuya Nisal	NCL
1600 – 1630	Tea break		Cafeteria, VC
<b>6-Sep-2013</b>			
0900 – 1000	Fluorescence Microscopy & Laser Confocal Microscopy	Dr. Nishigandha Naik	Training Room, VC
1000 – 1030	Tea break		Foyer, Learning Center, VC
1030 – 1130	Basic Applications of Fluorescence & Laser Confocal Microscopy	Dr. Nishigandha Naik	Training Room, VC
1130 – 1230	Special techniques in Fluorescence Microscopy	Dr. Nishigandha Naik	Training Room, VC
1230 – 1330	Lunch break		Cafeteria, VC
1330 – 1500	Demonstration: Fluorescence Microscopy	Dr. Nishigandha Naik	Lab-block, VC
1500 – 1630	Demonstration: Laser Confocal Microscopy	Dr. Suresh Bhat	NCL
1630 – 1700	Tea break		Cafeteria, VC
1700 – 1800	Concluding session – Feedback, Certificate distribution	Dr. V. Premnath	Training Room, VC

#### Course includes

- Course notes (hard copy) including slides, case studies, application notes
- Access to restricted website with online compilation of resources for microscopic techniques
- Certificate of Participation issued by Venture Center
- Course includes tea and lunch at Venture Center cafeteria

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



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#### Course Director

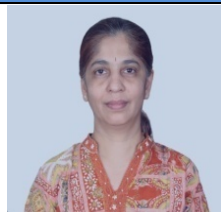


**Dr. B. B. Nath**

**Professor & Head, Dept of Zoology, University of Pune.**

Dr. Nath has more than 25 years of research experience in the areas of cell biology and cytogenetics involving different microscopic techniques.

#### Other Faculty



**Dr. Nishigandha Naik**

**Assistant Director, Haffkine Institute for Training, Research and Testing**

Dr. Naik's fields of interest are Cytoskeletal proteins – actin and tubulin, formyl peptide receptors, antisense therapy, cellular, zebrafish and small animal imaging, chronic myeloid leukemia, breast cancer, glioblastoma.



**Dr. Suresh Bhat**

**Scientist E2, Polymer Science and Engineering Department, National Chemical Laboratory, Pune.**

Dr. Bhat has extensive expertise in the field of Light scattering from complex fluids, Protein-Polysaccharide interactions, Aggregation, Gelation and phase separation in soft materials. His areas of interest are Investigation of Structure, Dynamics & Rheology of Soft Materials using Scattering Techniques, Structure Property Relationships, Application of Nanoscience concepts to food technology, Developments of novel scattering tools for soft matter research.



**Mrs. Anuya Nisal**

**Scientist, Polymer Science and Engineering department at National Chemical Laboratory, Pune.**

Ms. Nisal has over six years of experience in handling and characterizing polymeric systems using both transmission Electron Microscopy and Scanning Electron microscopy. These skills have been leveraged to solve a variety of scientifically relevant problems.



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#### 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's 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>