**Course Schedule**

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| **Sunday, Sept. 16: Opening Lecture, Poster Session**  |
| **12:30-01:30pm** | **Lunch** |
| **Location: Glass roof top Canteen** |
| **01:30-02:00pm** | **Participants Registration** |
| **Location: Reception, Southern Laboratories Complex (SLC)**  |
| **02:00-03:30pm** | **Opening Remarks**: Satyajit Mayor, NCBS, India |
| **Research Lecture 1**:Satyajit Mayor, NCBS, India |
| **Location: Dasheri (**SLC) |
| **03:30-04:00pm** | **Coffee Break** |
| **04:00-05:00pm** | **Didactic Lecture 1:** Basics of Microscopy**,** Köhler illumination and Resolution, Diffraction. - Ronald D Vale, UCSF, USA |
| **Location: Dasheri (**SLC) |
| **05:00-05:15pm** | **Group Photo** |
| **05:15-08:00pm** | **Poster session** by the students attending the course & Social |
| **Location: SLC Atrium** |
| **08:00-09:00pm** | **Dinner** |
| **Location: Glass roof top Canteen** |
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| **Monday, Sept 17:**  | **Basics of microscopy: Microscope Light Path, Diffraction/Resolution, Phase and Polarization** |
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| **08:30-01:15pm** | **Laboratory 1:** Microscopy and Köhler illumination on rails |
| **Lab leader:** Manoj Mathew |
| **Lab Instructors: :** Abhishek Kumar, Aliaksandr A Halavatyi, Anjana Badrinarayanan, Erik Manders, Ian Ross, Joshua Rappoport, Minhaj Sirajuddin, Rahul Roy, Ronald D. Vale, Satyajit Mayor |
| **Lab Support:** Rimple and Jahnavi/Rashmi |
| **Location: Raspuri** (New Teaching Lab) |
| **11:00-11:15am** | **Coffee Break** |
| **01:15-02:15pm** | **Lunch** |
| **Location: Glass roof top Canteen** |
| **02:15-03:15pm** | **Didactic Lecture 2:** Contrast enhancement -Phase Contrast, Dark Field, Polarized Light, DIC – Joshua Rappoport, Northwestern University, USA |
| **Location: Raspuri** (New Teaching Lab) |
| **03:15-04:15pm** | **Didactic Lecture 3:** Principles of Fluorescence and Fluorescence microscopy, (and Fluorescent dyes, Fluorescent Proteins and Selection of Fluorescent Probes) – Ronald D Vale, UCSF, USA |
| **Location: Raspuri** (New Teaching Lab) |
| **04:15-04:30pm** | **Coffee Break** |
| **04:30-06:30pm** | **Laboratory 2:** Phase Contrast, DIC and Dark Field Microscopy |
| **Lab leader:** Joshua Rappoport |
| **Lab instructors:** Abhishek Kumar, Aliaksandr A Halavatyi, Anjana Badrinarayanan, Erik Manders, Ian Ross, Manoj Mathew, Minhaj Sirajuddin, Rahul Roy, Ronald D Vale, Satyajit Mayor |
| **Lab Support:** Rimple and Jahnavi/Rashmi |
| **Location: Raspuri** (New Teaching Lab) |
| **06:30-07:30pm** | **Didactic Lecture** **4:** Practical Aspects of Objective Lens Design, covering lenses and aberrations - Ian Ross, Nikon Inc., USA |
| **Location: Raspuri** (New Teaching Lab) |
| **07:30-08:30pm** | **Dinner** |
| **Location: Glass roof top Canteen**  |
| **08:30-11:00pm** | **Free time on Microscopes** |
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| **Tuesday, Sept. 18: Fluorescence Microscopy** |
| **08:30-10:30am** | **Laboratory 3:** Fluorescence Lab A: Examine the fluorescence light path and dichroic mirrors/filters.  |
| **Lab leader:** Rahul Roy |
| **Lab instructors:** Abhishek Kumar, Aliaksandr A Halavatyi, Anjana Badrinarayanan, Erik Manders, Ian Ross, Joshua Rappoport, Manoj Mathew, Minhaj Sirajuddin, Ronald D Vale, Satyajit Mayor |
| **Lab Support:** Rimple and Jahnavi/Rashmi |
| **Location: Raspuri** (New Teaching Lab) |
| **10:30- 10:45am** | **Coffee Break** |
| **10:45-11:45am** | **Didactic Lecture 5:** Detectors- Manoj Mathew, Carl Zeiss, Singapore |
| **Location**: **Raspuri** (New Teaching Lab) |
| **11:45-12:45pm** | **Didactic Lecture 6:** Image Analysis- Aliaksandr A Halavatyi,European Molecular Biology Laboratory, Germany |
|  | **Location**: **Raspuri** (New Teaching Lab) |
| **12:45-01:45pm** | **Lunch** |
| **Location:** Glass roof top Canteen |
| **01:45-03:45pm** | **Laboratory 4:** Fluorescence Lab B: Fluorescence, Time Lapse, Cameras and Z projections of PSF |
| **Lab leader:** Erik Manders |
| **Lab Instructors:** Abhishek Kumar, Aliaksandr A Halavatyi, Anjana Badrinarayanan, Ian Ross, Joshua Rappoport, Manoj Mathew, Minhaj Sirajuddin, Rahul Roy, Ronald D Vale, Satyajit Mayor |
| **Lab Support:** Rimple and Jahnavi/Rashmi |
| **Location: Raspuri** (New Teaching Lab) |
| **03:45-04:45pm** | **Research Lecture 2:** Ronald D Vale, UCSF, USA |
| **Location: Dasheri (**SLC) |
| **04:45-05:00pm** | **Coffee Break** |
| **05:00-07:00pm** | **Laboratory 5:** Image Processing/Analysis Workshop |
| **Lab leader:** Aliaksandr A Halavatyi |
| **Lab Support:** Lakshmi B and Mugdha |
| **Location: Raspuri** (New Teaching Lab) |
| **07:00-08:00pm** | **Free Time on Microscopes** |
| **06:30-09:00pm**  | **Dinner** (For Faculty- Down Town Bangalore) |
| **08:00-09:00pm**  | **Dinner** (For Participants- Glass roof top Canteen) |
| **09:00-11:00pm** | **Free time on microscopes** |
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| **Wednesday, Sept. 19: Optical Sectioning and Enhancing Resolution** |
| **08:30-09:30am** | **Didactic Lecture 7:** FRET Microscopy- Satyajit Mayor, NCBS, India  |
| **Location: Raspuri** (New Teaching Lab) |
| **09:30-10:30am** | **Didactic Lecture 8:** Optical Sectioning Techniques- Confocal Microscopy - Erik Manders |
| **Location: Raspuri** (New Teaching Lab) |
| **10:30-10:45am** | **Coffee Break** |
| **10:45-03:45pm** | **Laboratory 6:** Optical Sectioning Techniques (point scanning, line scanning, spinning disk). 2 x 2hr modules |
| **Lab Leader**: H. Krishnamurthy**Lab Support:** Ashish, Chandrima, Chaitra, Divya, Manisha, Reena, Rukmini, Saheli, Suchitha, Nishan, Drisya |
|  | **1. Equipment:** Olympus FV3000 point scanning microscope |
| **Lab Instructor:** Olympus Application Specialist |
| **Location: CIFF, SLC** |
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|  | **2. Equipment:** Leica SP5 point scanning microscope |
| **Lab Instructor:** Leica Application Specialist |
| **Location: CIFF, SLC** |
|  | **3. Equipment:** Andor spinning disk microscope  |
| **Lab Instructor:** Chandrima Patra |
| **Location:** Satyajit Mayor Lab, SLC, First Floor |
|  | **4. Equipment:** Zeiss LSM 780 NLO point scanning microscope  |
| **Lab Instructor:** Chaitra Prabhakara, Nishan Shettigar |
| **Location: CIFF, SLC** |
| **5. Equipment:** Olympus Upright point scanning microscope |
| **Lab Instructor:** Olympus Application Specialist |
| **Location: CIFF, SLC** |
| **6. Equipment:** Nikon A1R HD point scanning confocal microscope  |
| **Lab Instructor:** Nikon Application Specialist |
| **Location: CIFF, SLC** |
| **12:45- 01:45pm** | **Lunch, Glass roof top Canteen** |
| **03:45-04:00pm** | **Coffee Break** |
| **04:00-05:00pm** | **Research Lecture 3:** Anjana Badrinarayanan, NCBS, India |
| **Location: Dasheri (**SLC) |
| **05:00-06:00pm** | **Research Lecture 4:** Minhaj Sirajuddin, inStem, India |
| **Location: Dasheri (**SLC) |
| **06:00-6:30pm** | **Zeeshan Khan Memorial Award Presentation** |
| **06:30-7:30pm** | **Dinner, Glass roof top Canteen** |
| **07:00-10:00pm** | **Cultural and Social Event** |
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| **Thursday, Sept. 20: Special Topics** |
| **08:30-09:30am** | **Didactic Lecture 9:** Super-Resolution Microscopy - STED, - Tony Pakorn Kanchanawong, NUS, Singapore |
| **Location:** **Raspuri** (New Teaching Lab) |
| **09:30-10:30am** | **Didactic Lecture 10:** TIRF Microscopy, Light sheet, Structured illumination - Abhishek Kumar  |
| **Location: Raspuri** (New Teaching Lab) |
| **10:30-10:45am** | **Coffee Break** |
| **10:45-02:45pm** | **Laboratory 7:** Specialized techniques 2 x 1.5hr modules, distributed by student signup and selection. There will be 2 rotations of 1.5 hour each. Students can choose in advance and a rotation plan will be prepared. |
| **Technique 1:** Integrating microscope systems and Configuring Automation Software for Microscope |
| **Equipment:** Nikon Ti2-E Microscope |
| **Lab Instructor:** Ian Ross , Joshua Rappoport |
| **Lab Support:** Rukmini, Reena  |
| **Location: Raspuri** (New Teaching Lab) |
| **Technique 2:** Homo-Försters Resonance Energy Transfer (Homo-FRET) |
| **Equipment:** Nikon TIRF microscope with dual camera |
| **Lab Leader:** Satyajit Mayor |
| **Lab Instructor:** Joseph Mathew K. |
| **Lab Support:** Chandrima, Rashmi |
| **Location: Mayor Lab, SLC** |
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| **Technique 3:** Fluorescence Correlation Spectroscopy (FCS) |
| **Equipment:** Zeiss LSM 780 NLO |
| **Lab Instructor:** Chaitra Prabhakara /Thomas Van Zanten |
| **Lab Support:** Manisha, Chandrima  |
| **Location: CIFF, SLC** |
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| **Technique 4:** Laser Micro Dissection and Catapulting  |
| **Equipment:** PALM Microbeam Laser microdissection and catapulting- Carl ZEISS  |
| **Lab Instructor:** Ritusree Biswas |
| **Lab Support:** Lakshmi K, Manisha  |
| **Location:** **CIFF, SLC** |
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| **Technique 5:** TIRF Microscopy  |
| **Equipment:** Olympus Multi line CellTIRF Microscope |
| **Lab Instructor:** Ananya Mukherjee, Nishan Shettigar**Lab Support:** Ashish, Saheli |
| **Location: 2nd Floor, SLC** |
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| **Technique 6:** SIM Super Resolution Microscopy  |
| **Equipment:** Nikon N-SIM/N-STORM Microscope |
| **Lab Instructor:** Nikon Application Specialist |
| **Lab Support:** Saheli, Ashish |
| **Location: CIFF, SLC** |
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| **Technique 7:** Multi-Photon Microscopy |
| **Equipment:** Leica SP8 Dive |
| **Lab Instructor:** Leica Application Specialist |
| **Lab Support:** Drisya, Prakash |
| **Location: CIFF, SLC** |
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| **Technique 8:** Re-Scan Super Resolution Confocal Microscopy |
| **Equipment:** Re-Scan Confocal Microscope, Confocal.nl |
| **Lab Instructor:** Erik Manders |
| **Lab Support:** Chittaspandini, Divya |
| **Location: CIFF, SLC** |
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| **Technique 9:** Fluorescence Recovery After Photobleaching (FRAP) |
| **Equipment:** Olympus FV3000 6 Laser Microscope |
| **Lab Instructor:** Olympus Application Specialist |
| **Lab Support:** Reena, Rukmini  |
| **Location: CIFF, SLC** |
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| **Technique 10:** Laser Free Confocal Microscopy |
| **Equipment:** AUROX Laser Free Confocal Microscope  |
| **Lab Instructor:** Phillipa Timmins |
| **Lab Support:** Divya, Satyaghosh |
| **Location: CIFF, SLC** |
| **12:15- 01:15pm** | **Lunch**  |
| **02:45-03:00pm** | **Coffee Break** |
| **03:00-05:00pm** | **Technical Presentations** |
|  | **Location: LH1** |
| **05:00-05:15pm** | **Coffee Break** |
| **05:15-06:15pm** | **Didactic Lecture 11:** Single Molecule Imaging - Rahul Roy, IISc, India  |
| **Location: Raspuri** (New Teaching Lab) |
| **06:15-07:30pm** | **Free Time on Microscopes** |
| **07:30-08:30pm** | **Dinner, Glass roof top Canteen**  |
| **08:30-10:00pm** | **Free Time on Microscopes/Camera Lab** |
| **Friday, Sept. 21: Research Lectures, Specialized Techniques** |
| **08:30-09:30am** | **Didactic Lecture 12:** Fluorescence Microscopy based methods to study protein dynamics in live cells: from FRAP to FCS - Sudipta Maiti, TIFR, India |
| **Location: Raspuri** (New Teaching Lab) |
| **09:30- 10:30am** | **Didactic Lecture 13:** PALM/STORM - Tony Pakorn Kanchanawong, NUS, Singapore |
| **Location: Raspuri** (New Teaching Lab) |
| **10:30-10:45am** | **Coffee Break** |
| **10:45-03:45pm** | **Laboratory 8:** Specialized techniques, 2 x 1.5hr modules, distributed by student signup and selection. There will be 2 rotations of 1.5 hours each. Students can choose in advance and a rotation plan will be prepared.  |
|  | **Technique 1:** Integrating microscope systems and Configuring Automation Software for Microscope |
| **Equipment:** Nikon Ti Microscope |
| **Lab Instructor:** Ian Ross , Joshua Rappoport |
| **Lab Support:** Priyanka, Ramya |
| **Location: Raspuri** (New Teaching Lab) |
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| **Technique 2:** Homo-Försters Resonance Energy Transfer (Homo-FRET)  |
| **Equipment: Nikon TIRF microscope with dual camera** |
| **Lab Leader:** Satyajit Mayor |
| **Lab Instructor:** Joseph Mathew K. |
| **Lab Support:** Ramya, Priyanka |
|  | **Location: Mayor Lab, SLC** |
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| **Technique 3:** Fluorescence Correlation Spectroscopy (FCS) |
| **Equipment:** Zeiss LSM 780 NLO |
| **Lab Instructor:** Chaitra Prabhakara, Thomas Van Zanten |
|  | **Lab Support:** Saheli, Ashish |
| **Location: CIFF, SLC** |
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| **Technique 4:** Laser Micro Dissection and Catapulting  |
| **Equipment:** PALM Microbeam Laser microdissection and catapulting- Carl ZEISS  |
| **Lab Instructor:** Ritusree Biswas |
|  | **Lab Support:** Reena , Rukmini  |
| **Location:** **CIFF, SLC** |
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| **Technique 5:** TIRF Microscopy  |
| **Equipment:** Olympus Multi line CellTIRF Microscope |
| **Lab Instructor:** Ananya Mukherjee, Nishan Shettigar**Lab Support:** Rashmi, Reena  |
|  | **Location: 2nd Floor, SLC** |
|  |
| **Technique 6:** SIM Super Resolution Microscopy  |
| **Equipment:** Nikon N-SIM/N-STORM Microscope |
| **Lab Instructor:** Nikon Application Specialist |
| **Lab Support:** Manisha, Rashmi |
|  | **Location: CIFF, SLC** |
|  |
| **Technique 7:** Multi-Photon Microscopy |
| **Equipment:** Leica SP8 Dive |
| **Lab Instructor:** Leica Application Specialist |
|  | **Lab Support:** Lakshmi K, Jahnavi |
| **Location: CIFF, SLC** |
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| **Technique 8:** Re-Scan Super Resolution Confocal Microscopy |
| **Equipment:** Re-Scan Confocal Microscope, Cofocal.nl |
| **Lab Instructor:** Erik Manders |
|  | **Lab Support:** Satyaghosh, Rimple |
| **Location: CIFF, SLC** |
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| **Technique 9:** Fluorescence Recovery After Photobleaching (FRAP) |
| **Equipment:** Olympus FV3000 6 Laser Microscope |
| **Lab Instructor:** Olympus Application Specialist |
|  | **Lab Support:** Divya, Lakshmi K |
| **Location: CIFF, SLC** |
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| **Technique 10:** Laser Free Confocal Microscopy |
| **Equipment:** AUROX Laser Free Confocal Microscope  |
| **Lab Instructor:** Phillipa Timmins |
| **Lab Support:** Ashish, Saheli |
|  | **Location: CIFF, SLC** |
| **12:15-12:30pm** | **Group Photo** |
| **12:30-2:15pm** | **Discussion over Lunch:** Small group discussions of students with faculty over lunch about their Research/Microscopy interests |
| **03:45-04:00pm** | **Coffee Break** |
| **04:00-05:00pm** | **Research Lecture 5:** Sudipta Maiti, TIFR, Mumbai |
| **Location: Dasheri (**SLC) |
| **05:00-06:00pm** | **Research Lecture 6:** Rahul Roy, IISc, India |
| **Location: Dasheri (SLC**) |
| **6:00-06:30pm** | **Technical Lecture** |
|  | **Location: Dasheri (SLC**) |
| **6:30-07:30pm** | **Graduation** |
| **07:30-09:00pm** | **Glass roof top Canteen** |
| **09:00-11:00pm** | **Project briefing /Free Time on Microscopes** |
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| **Saturday, Sept. 22: Projects** |
| **09:00-10:00am** | **Research Lecture 7:** Tony Pakorn Kanchanawong, NUS, Singapore  |
| **Location**: **Dasheri**  |
| **10:00-11:00am** | **Research Lecture 8:** Vinothkumar Kutti Ragunath, NCBS, India |
| **Location**: **Dasheri**  |
| **11:00-11:15am** | **Coffee Break** |
| **11:15-01:00pm** | **Projects** |
| **01:00-02:00pm** | **Lunch** |
| **02:00-04:00pm** | **Projects**  |
| **04:00-04:15pm** | **Coffee Break** |
| **04-15-06:15pm** | **Projects** |
| **06:15-10:00pm** | **Workshop Dinner and Social (Downtown Bangalore)** |
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| **Sunday, Sept. 23: Projects** |
| **09:00-11:00am** | **Projects** |
| **11:00-11:15am** | **Coffee Break** |
| **11:15-01:00pm** | **Projects** |
| **01:00-02:00pm** | **Lunch** |
| **02:00-04:00pm** | **Projects**  |
| **04:00-04:15pm** | **Coffee Break** |
| **04:15-06:15pm** | **Project Presentation by Participants**  |