

# National Workshop on Fluorescence and Raman Spectroscopy

December 16-21, 2019

## Venue

TIFRH-Auditorium

Tata Institute of Fundamental Research

Hyderabad

## Organizers

Dr. Kanchan Garai (kanchan@tifrh.res.in)

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# Program



**Day-1: Monday, 16<sup>th</sup> December, 2019**

8:00 - 9:45 AM	<b>Breakfast &amp; Registration</b>
9:45 - 10:00 AM	Inauguration /Welcome address
<b>Session - 1 (10:00 AM - 12:45 PM) - Teaching Talks</b> <b>Chair: Trevor Smith</b>	
10:00 - 11:00 AM	Introduction to FCS: <b>Jochen Mueller</b> , University of Minnesota
11:00 - 11:45 AM	Advanced topics in FCS: <b>Sudipta Maiti</b> , TIFR, Mumbai
11:45 - 12:45 PM	Single-molecule FRET: <b>Melissa Birol</b> , University of Pennsylvania
12:45 - 1:45 PM	<b>Lunch</b>
<b>Session - 2 (1:45 PM - 4:15 PM) - Teaching Talks</b> <b>Chair: Jyotishman Dasgupta</b>	
1:45- 2:45 PM	Introduction to fluorescence microscopy: <b>Jan Bieschke</b> , University College London
2:45 - 3:30 PM	Advanced imaging techniques: <b>Trevor Smith</b> , University of Melbourne
3:30 - 4:15 PM	Super-resolution imaging: <b>Winston Zhao</b> , National University of Singapore
4:15 - 6:00 PM	<b>Break from workshop Talks/ Tea &amp; Snacks</b>
4:30 - 6:00 PM	Parallel session: <b>1. Colloquium</b> by Prof. Girish S Agarwal: Magnons: New platform for quantum optics and quantum information science  <b>2. Hands-on:</b> Build your single molecule setup
<b>Session - 3 (6:00 PM - 7:50 PM) - Teaching Talks</b> <b>Chair: Winston Zhao</b>	
6:00-6:45 PM	Introduction to Raman spectroscopy: <b>Chandrabhas Narayana</b> , JNCASR, Bangalore
6:45 - 7:30 PM	Resonance Raman: <b>Jyotishman Dasgupta</b> , TIFR, Mumbai
7:30 - 7:50 PM	I&AC1: Scanning FCS and super-resolution microscopy on 2D lipid membranes: <b>Uwe Ortmann</b> , PicoQuant
7:50 - 8:50 PM	<b>Dinner</b>
8:50 - 10:00 PM	<b>Hands-on:</b> Build your single molecule setup

I&AC: Industry & Academia Collaboration; IL: Invited Lecture; OP: Oral Presentation

**Day-2: Tuesday, 17<sup>th</sup> Dceember, 2019**

8:00 - 8:45 AM	<b>Breakfast</b>
<b>Session - 4 (9:00 AM - 11:15 AM) - Teaching Talks</b> <b>Chair: Jan Bieschke</b>	
9:00 - 9:45 AM	Introduction of time resolved fluorecence, TCSPC and anisotropy: <b>Anindya Datta</b> , IIT, Mumbai
9:45 - 10:30 AM	FLIM: Technique and applications, etc.: <b>Trevor Smith</b> , University of Melbourne
10:30 - 11:15 AM	Fluorescence upconversion: <b>Sobhan Sen</b> , JNU, New Delhi
11:15 - 11:30 AM	<b>Tea</b>
<b>Session - 5 (11:30 AM - 1:20 PM) - Teaching Talks</b> <b>Chair: Bidyut Sarkar</b>	
11:30 - 12:00 PM	Surface enhanced Raman and imaging: <b>Chandrabhas Narayana</b> , JNCASR, Bangalore
12:30 - 1:00 PM	Ultrafast Raman: <b>Jyotishman Dasgupta</b> , TIFR, Mumbai
1:00 - 1:20 PM	I&AC2: <b>Uwe Ortmann</b> , PicoQuant
1:20 - 2:15 PM	<b>Lunch</b>
2:15 - 6:30 PM	<b>Hands-on Training</b>
4:30 - 4:50 PM	<b>Tea &amp; snacks</b>
6:30 - 7:30 PM	<b>Tutorial: data analysis Raman, FCS and imaging separate sessions</b>
7:30 - 8:30 PM	<b>Dinner</b>
8:30 - 10:00 PM	<b>Parallel Sessions:</b> 1. Panel discussions on protein aggregation 2. Hands-on: Build your single molecule setup

**Day-3: Wednesday, 18<sup>th</sup> December, 2019**

8:00 - 8:45 AM	<b>Breakfast</b>
<b>Session - 6 (9:00 AM - 10:30 AM) - Teaching Talks</b> <b>Chair: Pavan Kumar</b>	
9:00 - 9:45 AM	Integrate spectroscopic measurements with molecular simulations: <b>Abhinav Nath</b> , University of Washington
9:45 - 10:30 AM	2D-FLCS: <b>Bidyut Sarkar</b> , RIKEN, Wako
10:30 - 1:00 PM	<b>Hands-on training</b>
1:00 - 2:00 PM	<b>Lunch</b>
2:00 - 5:30 PM	<b>BREAK</b> <b>Sight Seeing at Golconda Fort</b>
<b>Session - 7 (5:30 PM - 7:45 PM) - Teaching Talks</b> <b>Chair: Rajaram Swaminathan</b>	
5:30 - 6:15 PM	Plasmons and Raman scattering: <b>Pavan Kumar</b> , IISER, Pune
6:15 - 7:00 PM	Single molecule spectroscopy and imaging: <b>Rahul Roy</b> , IISc, Bangalore
7:00 - 7:45 PM	Towards quantum enhanced microscopy: <b>Ron Tenne</b> , Weizmann Institute of Science
7:45 - 8:30 PM	<b>Dinner</b>
8:30 - 10:00 PM	<b>Tutorial and Hands-on training</b>

Day-4: Thursday, 19<sup>th</sup> December, 2019

8:00 - 8:45 AM	<b>Breakfast</b>
9:00 - 11:00 AM	<b>Hands-on Training</b>
11:00 - 11:10 AM	<b>Tea</b>
<b>Session - 8 (11:10 AM - 1:10 PM) Research Presentations - Raman/Plasmonics</b> <b>Chair: Abani Bhuyan</b>	
11:10 - 11:30 AM	IL1: Directional light emission from self-assembled mesophotonic structures: <b>Pavan Kumar</b> , IISER, Pune
11:30 - 11:50 AM	IL2: Tryptophan radical cation mediates charge transfer chemistry at the Cu-active site in azurin: <b>Jyotisman Dasgupta</b> , TIFR, Mumbai
11:50 - 12:10 PM	IL3: Ultrafast excited state dynamics of twisted aromatics: <b>Mahesh Hariharan</b> , IISER, Thiruvananthapuram
12:10 - 12:30 PM	IL4: Fluorescence correlation spectroscopy in exploring binding interactions of metal ions with (bio-)ligands: <b>Manoj Kumbhakar</b> , BARC, Mumbai
12:30 - 12:50 PM	IL5: Protein charge transfer luminescence can modify fluorescence parameters of other intrinsic and extrinsic fluorophores in a protein: <b>Rajaram Swaminathan</b> , IIT, Guwahati
12:50 - 1:10 PM	I&AC3: Commercialization and of a new HORIBA imaging camera featuring TCSPC in-pixel architecture for dynamic FLIM studies at video rates: <b>Cary Davies</b> , HORIBA Scientific
1:10 - 2:00 PM	<b>Lunch</b>
2:00 - 4:00 PM <b>Poster session</b> (Odd number posters)	
<b>Session - 9 (4:00 PM - 5:40 PM) Biological Imaging</b> <b>Chair: Aprotim Mazumder</b>	
4:00 - 4:20 PM	IL6: Pore assembly of bacterial alpha pore-forming toxin ( $\alpha$ PFT), cytolysin A on lipid membranes: <b>Rahul Roy</b> , IISc, Bangalore
4:20 - 4:40 PM	IL7: Super-resolution imaging reveals spatio-temporal propagation of human replication foci mediated by CTCF-organized chromatin structures: <b>Winston Zhao</b> , National University of Singapore
4:40 - 5:00 PM	IL38: Imaging life with programmable supramolecular interaction: <b>Sarit Agasti</b> , JNCASR, Bangalore
5:00 - 5:20 PM	IL9: Title of the talk TBA: <b>Adish Dani</b> , TIFR, Hyderabad
5:20 - 5:40 PM	IL10 : Analysis of bio fluids towards the management of cancer using fluorescence and Raman spectroscopy: <b>S.Ganesan</b> , Anna University, Chennai

5:40 – 6:00 PM	Tea & snacks
Session – 10 (6:00 PM – 7:30 PM) Single molecule spectroscopy Chair: Sudipta Maiti	
6:00 – 6:20 PM	IL11: Determining the axial location of nuclear envelope proteins with nanometer resolution in live cells. A progress report: <b>Jochen Mueller</b> , University of Minnesota
6:20 – 6:40 PM	IL12: Dynamic conformations in disease pathology and transmission: <b>Melissa Birol</b> , University of Pennsylvania
6:40 – 7:00 PM	IL13: Formation of peptide/lipid co-aggregates by the amyloidogenic seminal peptide PAP <sub>248-286</sub> : <b>Abhinav Nath</b> , University of Washington
7:00 – 7:10 PM	OP1: Environment-dependent photo-physical properties of an asymmetrical cyanine for biophysical applications: <b>Nikita Kumari</b> , Arizona State University
7:10 – 7:30 PM	I&AC4: Nanoscale Raman and SPM characterization of heterogeneities in 2D materials, Florian Nehme, HORIBA Scientific
7:30 – 8:30 PM	Dinner

**Day-5: Friday, 20<sup>th</sup> December, 2019**

8:00 – 8:45 AM	Breakfast
Session – 11 (9:00 AM – 10:50 AM) Protein aggregation Chair: Kalyanasis Sahu	
9:00 – 9:20 AM	IL14: Determining oligomer size by single molecule photobleaching: Correct before you interpret!: <b>Sudipta Maiti</b> , TIFR, Mumbai
9:20 – 9:40 AM	IL15: Single molecule investigation of amyloid and prion dynamics: <b>Jan Bieschke</b> , University College London
9:40 – 10:00 AM	IL16: Soft interactions and protein dynamics in crowded scenario: <b>Pramit Chowdhury</b> , IIT, Delhi
10:00 – 10:10 AM	OP2: Paper swab based SERS detection of unauthorized colourants using a portable spectrometer: <b>Nikita Tyagi</b> , IISc, Bangalore
10:10 – 10:30 AM	IL17: TDP-43 aggregation and toxicity mechanisms from the yeast model system: <b>Basant Patel</b> , IIT, Hyderabad
10:30 – 10:50 AM	IL18: Microsecond conformational dynamics and ligand binding mechanism of preQ <sub>1</sub> riboswitch studied by two-dimensional fluorescence lifetime correlation spectroscopy (2D FLCS): <b>Bidyut Sarkar</b> , RIKEN, Wako
10:50 – 11:10 AM	Tea
Session – 12 (11:10 AM – 1:10 PM) Ultrafast spectroscopy Chair: Jaydeep Bhattacharya	
11:10 – 11:30 AM	IL19: Origin of slow solvation dynamics in DNA: What is the biological significance?: <b>Sobhan Sen</b> , JNU, New Delhi
11:30 – 11:50 AM	IL20: Key factors for design of organic fluorogens: <b>Anindya Datta</b> , IIT, Mumbai
11:50 – 12:10 PM	IL21: Ultrafast photo induced electron transfer: Porphyrin to CdTe QD in CdTe QD-porphyrin composite: <b>Prakriti Bangal</b> , ICT, Hyderabad
12:10 – 12:30 PM	IL22: Ultrafast pump-probe and single-particle photoluminescence studies of caesium lead halide perovskite nanocrystals: <b>Anunay Samanta</b> , University of Hyderabad
12:30 – 12:50 PM	IL23: Light-controlled <i>in situ</i> bidirectional tuning and monitoring of gold nanorod plasmon: <b>Soumyakanti Khatua</b> , IIT, Gandhinagar
12:50 – 1:10 PM	I&AC5: Atos Presentation
1:10 – 2:00 PM	Lunch

<b>2:00 - 4:00 PM</b> <b>Poster session</b> (Even number posters)	
<b>Session - 13 (4:00 PM - 5:40 PM) Single molecule force spectroscopy and Mechanobiology</b> <b>Chair: Bidisha Sinha</b>	
4:00 - 4:20 PM	IL24: Title of the talk TBA: <b>Shivaprasad Patil</b> , IISER, Pune
4:20 - 4:40 PM	IL25: Mechanobiology of collective cell dynamics: Cells in the epithelium: <b>Tamal Das</b> , TIFR, Hyderabad
4:40 - 5:00 PM	IL26: DsbA is a switchable mechanical chaperone: <b>Shubhasis Haldar</b> , Ashoka University, Sonipat
5:00 - 5:20 PM	IL27: Ubiquitin-family proteins: Diversity in protein stability and mechanical resistance: <b>Sri Rama Koti</b> , TIFR, Mumbai
5:20 - 5:30 PM	OP3: Cross-talk between intrinsically disordered proteins (IDPs) of different origin and its implication in neurodegenerative diseases: <b>Neha Jain</b> , IIT, Jodhpur
5:30 - 5:40 PM	OP4: Exploring the formation of neuronal inclusions in Parkinson's disease using single-molecule fluorescence spectroscopy: <b>Andre Leitao</b> , University of New South Wales
<b>5:40 - 6:00 PM</b>	<b>Tea &amp; snacks</b>
<b>Session - 14 (6:00 PM - 7:40 PM) Biophysics: Theory, computation and experiments</b> <b>Chair: Melissa Birol</b>	
6:00 - 6:20 PM	IL28: Understanding spatiotemporal regulation of membrane mechanics in cells: <b>Bidisha Sinha</b> , IISER, Kolkata
6:20 - 6:40 PM	IL29: Photoinduced electron transfer processes in proteins: <b>Ravi Venkataramani</b> , TIFR, Mumbai
6:40 - 7:00 PM	IL30: Interacting multivalent molecules: Affinity and valence impact the extent and symmetry of phase separation: <b>Saroj Nandi</b> , TIFR, Hyderabad
7:00 - 7:20 PM	IL31: Structural organization of protein oligomer: A critical insight of disulfide linkages based on Raman spectroscopic analysis: <b>Nakul Maiti</b> , IICB, Kolkata
7:20 - 7:30 PM	OP5: Biophysical characterization of interactions between ApoE and A $\beta$ : <b>Shamasree Ghosh</b> , TIFR, Hyderabad
7:30 - 7:40 AM	OP6: Self-healing fluorophores for single-molecule research: <b>Avik Pati</b> , St. Jude Children's Research Hospital
<b>7:40 PM onwards</b>	<b>Dinner</b>

**Day-6: Saturday, 21<sup>st</sup> December, 2019**

<b>8:00 - 8:45 AM</b>	<b>Breakfast</b>
<b>Session - 15 (9:00 - 11:30 AM) Biophysics</b> <b>Chair: Sobhan Sen</b>	
9:00 - 9:20 AM	IL32: Polypurine hairpins(PPRH) for gene silencing and triplex-affinity capture: An smFRET approach: <b>Padmaja Mishra</b> , SINP, Kolkata
9:20 - 9:40 AM	IL33: ROS mediated cytoplasmic stiffening impairs the phagocytic ability of the macrophage: <b>Deepak Sinha</b> , IACS, Kolkata
9:40 - 10:00 AM	IL34: Reversible fluorescent chemical tools for imaging biologically essential ions: <b>Ankona Datta</b> , TIFR, Mumbai
10:00 - 10:20 AM	IL35: Role of membrane cholesterol in GPCR endocytosis and intracellular trafficking: <b>Amitabha Chattopadhyay</b> , CCMB, Hyderabad
10:20 - 10:30 AM	OP7: Unraveling the differences in the microscopic structural organization of monocationic and dicationic room temperature ionic liquids through resonance energy transfer (RET) studies: <b>Manjari Chakraborty</b> , NISER, Bhubaneswar
10:30 - 10:50 AM	IL36: Real time monitoring of amyloid aggregation using single-molecule fluorescence techniques to determine the rate constants of the microscopic processes: <b>Kanchan Garai</b> , TIFR, Hyderabad
10:50 - 11:00 AM	OP8: Planarization of anthracene fused cyclooctatetraene: <b>Sunandita Paul</b> , TIFR, Mumbai
11:00 - 11:30 AM	General body meeting of Fluorescence Society
<b>11:30 - 11:50 PM</b>	<b>Tea</b>
<b>Session - 16 (11:50 AM - 1:40 PM) Biophysics</b> <b>Chair: Ron Tenne and Timir Sil</b>	
11:50 - 12:10 AM	IL37: Visualising phase segregation in mixed-halide perovskite single crystals: <b>Trevor Smith</b> , University of Melbourne
12:10 - 12:30 PM	IL8: Quantum image scanning microscopy: Concept and outlook: <b>Ron Tenne</b> , Weizmann Institute of Science
12:30 - 12:50 PM	IL39: Title of the talk TBA: <b>Jayaprakash Balaji</b> , IISc, Bangalore
12:50 - 1:10 PM	IL40: Role of label-free Raman and SERS - from decoding nano-bio interfaces to precision medicine: <b>Soumik Siddhanta</b> , IIT, Delhi
1:10 - 1:30 PM	IL41: Investigating DNA damage responses and associated chromatin remodeling and gene expression with tools of microscopy: <b>Aprotim Mazumder</b> , TIFR, Hyderabad
1:30 - 1:40 PM	OP9: Graphene gold nanocomposites as highly efficient SERS substrates for chemical and bio sensing: <b>Annasamy Gowri</b> , Vel Tech, Chennai
<b>1:40 - 2:30 PM</b>	<b>Lunch</b>
2:30 - 3:30 PM Poster prizes, concluding remarks, decision for next meeting etc.	