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List of Publications:


187. Effect of Microheterogeneity of Different Aqueous Binary Mixtures on the Proton Transfer Dynamics of [2,2′-Bipyridyl]-3,3′-diol: A Femtosecond Fluorescence Upconversion Study

186. Effect of sugars on the dynamics of hydrophilic fluorophores confined inside the water pool of anionic reverse micelle: A spectroscopic approach.

185. Influence of water inside the HY zeolite on the photophysical properties of 2, 2′-Bipyridine-3,3′-diol (BP(OH)₂).

184. Effect of Vitamin E and a Long-Chain Alcohol n-Octanol on the Carbohydrate-Based Nonionic Amphiphile Sucrose Monolaurate—Formulation of Newly Developed Niosomes and Application in Cell Imaging.
*ACS Omega*, 2017, 2, 7637–7646.


182. Concentration-Driven Fascinating Vesicle-Fibril Transition Employing Merocyanine 540 and 1-Octyl-3-methylimidazolium Chloride.

181. Effects of a common worldwide drink (Beer) on L-Phenylalanine and L-Tyrosine fibrillar assemblies.

180. Small Molecule Induced Fusion of a Model Protocell Membrane Composed of Fatty Acids: A New Insight into the Membrane Fusion Monitored through Fluorescence Lifetime Imaging Microscopy.
N. Kundu, N. Sarkar.

179. Influence of bile salt on vitamin E derived vesicles involving a surface active ionic liquid and conventional cationic micelle.

178. Membrane perturbation though novel cell-penetrating peptides influences intracellular accumulation of imatinib mesylate in CML cells.
**Cell Biol Toxicol.**, 2017, doi: 10.1007/s10565-017-9414-9

177. Unveiling the Interaction between Fatty-Acid-Modified Membrane and Hydrophilic Imidazolium-Based Ionic Liquid: Understanding the Mechanism of Ionic Liquid Cytotoxicity.


**176.** Inhibiting the Fibrillation of Serum Albumin Proteins in the Presence of Surface Active Ionic Liquids (SAILs) at Low pH: Spectroscopic and Microscopic Study.

S. Kundu, C. Banerjee, N. Sarkar.


**175.** Protein-Guided Formation of Silver Nanoclusters and Their Assembly with Graphene Oxide as an Improved Bioimaging Agent with Reduced Toxicity.

N. Kundu, D. Mukherjee, T. K. Maiti, N. Sarkar.


**174.** Cholesterol Based Surface Active Ionic Liquid That Can Form Microemulsions and Spontaneous Vesicles.


**173.** A new rhodamine derived fluorescent sensor: Detection of Hg2+ at cellular level


**172.** Investigation of Fibril Forming Mechanisms of L-Phenylalanine and L-Tyrosine: Microscopic Insight toward Phenylketonuria and Tyrosinemia Type II.


**171.** Sodium Chloride Triggered the Fusion of Vesicle Composed of Fatty Acid Modified Protic Ionic Liquid: A New Insight into the Membrane Fusion Monitored through Fluorescence Lifetime Imaging Microscopy.


170. Micelle-vesicle-micelle transition in aqueous solution of anionic surfactant and cationic imidazolium surfactants: Alteration of the location of different fluorophores.

169. Proton Transfer Pathways of 2,2′-Bipyridine-3,3′-diol in pH Responsive Fatty Acid Self-Assemblies: Multiwavelength Fluorescence Lifetime Imaging in a Single Vesicle.

168. Influence of trehalose on the interaction of curcumin with surface active ionic liquid micelle and its vesicular aggregate composed of a non-ionic surfactant sorbitan stearate.


166. Probing the Interaction between a DNA Nucleotide (Adenosine-5′-Monophosphate Disodium) and Surface Active Ionic Liquids by Rotational Relaxation Measurement and Fluorescence Correlation Spectroscopy.

165. Effect of viscosity on photoinduced electron transfer reaction: An observation of the Marcus inverted region in homogeneous solvents.


A new strategy to prepare giant vesicles from surface active ionic liquids (SAILs): a study of protein dynamics in a crowded environment using a fluorescence correlation spectroscopic technique.

Comparative Fluorescence Resonance Energy-Transfer Study in Pluronic Triblock Copolymer Micelle and Niosome Composed of Biological Component Cholesterol: An Investigation of Effect of Cholesterol and Sucrose on the FRET Parameters.

Unveiling the Mode of Interaction of Berberine Alkaloid in Different Supramolecular Confined Environments: Interplay of Surface Charge between Nano-Confined Charged Layer and DNA.
N. Kundu, A. Roy, D. Banik, N. Sarkar

Preparation of Carbon Nanotube Doped Ceramic Powders for Plasma Spraying Using Heterocoagulation Method.

Picosecond Solvation Dynamics—A Potential Viewer of DMSO—Water Binary Mixtures.

**152.** How Does the Surface Charge of Ionic Surfactant and Cholesterol Forming Vesicles Control Rotational and Translational Motion of Rhodamine 6G Perchlorate (R6G ClO4)?

**151.** Vesicles Formation by Zwitterionic Micelle and Poly-L-lysine: Solvation and Rotational Relaxation Study.

**150.** Picosecond Solvation and Rotational Dynamics: An Attempt to Reinvestigate the Mystery of Alcohol–Water Binary Mixtures.

**149.** How does Bile Salt Penetration Affect the Self-Assembled Architecture of PluronicP123 Micelles?– Light Scattering and Spectroscopic Investigations.

**148.** Modulation of the Aggregation Properties of Sodium Deoxycholate in Presence of Hydrophilic Imidazoliumbased Ionic Liquid: Water Dynamics Study to probe the structural alteration of the aggregates.

**147.** Graphene Oxide and Pluronic Copolymer Aggregates–PossibleRoute to Modulate the Adsorption of Fluorophores and Imaging of Live Cells.
146. Designing a New Strategy for the Formation of IL-In-Oil Microemulsions Containing Double Chain Surface Active Ionic Liquid.

145. Spectroscopy and Fluorescence Lifetime Imaging Microscopy To Probe the Interaction of Bovine Serum Albumin With Graphene Oxide.


142. Excited-State Proton Transfer Dynamics of Firefly’s Chromophore D-Luciferin in DMSO-Water Binary Mixture.

141. Spectroscopic investigation of the binding interactions of a membrane potential molecule in various supramolecular confined environments: contrasting behavior of surfactant molecules in relocation or release of the probe between nanocarriers and DNA surface.

139. Interaction of fluorescence dyes with 5-fluorouracil: A photoinduced electron transfer study in bulk and biologically relevant water.

138. Effect of Encapsulation of Curcumin in Polymeric Nanoparticles: How Efficient to Control ESIPT Process?


136. Interaction of gold nanoclusters with IR light emitting cyanine dyes: a systematic fluorescence quenching study.


134. Effect of Room Temperature Surface Active Ionic Liquids on Aggregated Nanostructures of $\gamma$-Cyclodextrins: A Picosecond Fluorescence Spectroscopic Study.
133. Exploring the Photophysics of Curcumin in Zwitterionic Micellar System: An Approach to Control ESIPT Process in Presence of Room Temperature Ionic Liquids (RTILs) and Anionic Surfactant.


131. Solvent and rotational relaxation of coumarin-153 and coumarin-480 in ionic liquid (1-butyl-3-methylimidazolium tetrafluoroborate) modified sodium 1,4-bis(2-ethylhexyl) sulfosuccinate (NaAOT) micelle.

130. A joint experimental/theoretical study of the ultrafast excited state deactivation of deoxyadenosine and 9-methyladenine in water and acetonitrile.

129. Is it possible to apply dynamics of solvent to locate metal nanoparticles inside an ionic liquids-containing microheterogeneous system? A comparative study.

128. Zwitterionic micelles as a soft template for the extremely rapid synthesis of small hollow gold nanocontainers.

127. Curcumin in Reverse Micelle: An Example to Control Excited-State Intramolecular Proton Transfer (ESIPT) in Confined Media.

126. An Investigation into the Effect of the Structure of Bile Salt Aggregates on the Binding Interactions and ESIHT Dynamics of Curcumin: A Photophysical Approach to Probe Bile Salt Aggregates as a Potential Drug Carrier.

**125.** Unique Photophysical Behavior of 2,2'-Bipyridine-3,3'-diol in DMSO-Water Binary Mixtures: Potential Application for Fluorescence Sensing of Zn$^{2+}$ Based on the Inhibition of Excited-State Intramolecular Double Proton Transfer.


**124.** Fluorescence Resonance Energy Transfer in Microemulsions Composed of Tripled-Chain Surface Active Ionic Liquids, RTILs, and Biological Solvent: An Excitation Wavelength Dependence Study.


**123.** Spontaneous Transition of Micelle–Vesicle–Micelle in a Mixture of Cationic Surfactant and Anionic Surfactant-like Ionic Liquid: A Pure Nonlipid Small Unilamellar Vesicular Template Used for Solvent and Rotational Relaxation Study.


**122.** A Step toward the Development of High-Temperature Stable Ionic Liquid-in-Oil Microemulsions Containing Double-Chain Anionic Surface Active Ionic Liquid.


**121.** Modulation of the Photophysical Properties of Curcumin in Nonionic Surfactant (Tween-20) Forming Micelles and Niosomes: A Comparative Study of Different Microenvironments.


**120.** Roles of Viscosity, Polarity, and Hydrogen-Bonding Ability of a Pyrrolidinium Ionic Liquid and Its Binary Mixtures in the Photophysics and Rotational Dynamics of the Potent Excited-State Intramolecular Proton-Transfer Probe 2,2'-Bipyridine-3,3'-diol.

119. Effect of Alkyl Chain of Room Temperature Ionic Liquid (RTILs) on the Phase Behavior of \([C_{2}\text{mim}][C_{n}\text{SO}_{4}]\)/TX-100/Cyclohexane Microemulsions: Solvent and Rotational Relaxation Study.

118. Unique Characteristics of Ionic Liquids Comprised of Long-Chain Cations and Anions: A New Physical Insight.


114. Designing a New Strategy for the Formation of IL-In-Oil Microemulsions Containing Double Chain Surface-Active Ionic Liquid.

113. Protic ionic liquid-induced changes in the properties of aqueous triton TX-100–CTAB surfactant solution: Solvent and rotational relaxation studies.
112. Aggregation Behavior of Triton X-100 with a Mixture of Two RoomTemperature Ionic Liquids: Can We Identify the Mutual Penetration of Ionic Liquids in Ionic Liquid Containing Micellar Aggregates?

111. Study of Fluorescence Resonance Energy Transfer in Zwitterionic Micelle: Ionic-Liquid-Induced Changes in FRET Parameters.

110. Tuning the Probe Location on Zwitterionic Micellar System with Variation of pH and Addition of Surfactants with Different Alkyl Chains: Solvent and Rotational Relaxation Studies.


108. Ionic Liquid-in-Oil Microemulsions Composed of Double Chain Surface Active Ionic Liquid as a Surfactant: Temperature Dependent Solvent and Rotational Relaxation Dynamics of Coumarin-153 in [Py][TF$_2$N]/[C$_4$mim][AOT]/Benzene Microemulsions.


106. Photoinduced electron transfer between various coumarin analogues and N,N-dimethylaniline inside niosome, a nonionic innocuous polyethylene glycol-based surfactant assembly.

**105.** Ionic Liquid-Induced Changes in the Properties of Aqueous Zwitterionic Surfactant Solution: Solvent and Rotational Relaxation Studies.


**104.** Dynamics of Solvation and Rotational Relaxation of Coumarin 480 in Pure Aqueous-AOT Reverse Micelle and Reverse Micelles Containing Different Size Silver Nanoparticles Inside its Core: A Comparative Study.


**102.** Förster resonance energy transfer among a structural isomer of adenine and various Coumarins inside a nanosized reverse micelle.


**101.** An Understanding of the Modulation of Photophysical Properties of Curcumin inside a Micelle Formed by an Ionic Liquid: A New Possibility of Tunable Drug Delivery System.


**100.** Pluronic Micellar Aggregates Loaded with Gold Nanoparticles (Au NPs) and Fluorescent Dyes: A Study of Controlled Nanometal Surface Energy Transfer.


**99.** Photoinduced Electron Transfer in an Imidazolium Ionic Liquid and in Its Binary Mixtures with Water, Methanol, and 2-Propanol: Appearance of Marcus-Type of Inversion.


**98.** Solvation Dynamics and Rotational Relaxation Study Inside Niosome, A Nonionic Innocuous Poly(ethylene Glycol)-Based Surfactant Assembly: An Excitation Wavelength Dependent Experiment.


96. Solvation and Rotational Dynamics of Coumarin-153 in Ethylammonium Nitrate Containing γ-Cyclodextrin.

95. Solvent and rotational relaxation study in ionic liquid containing reverse micellar system: A picosecond fluorescence spectroscopy study.


93. Effects of 1-butyl-3-methyl Imidazolium Tetrafluoroborate Ionic Liquid on TX-100 Aqueous Micelles: Solvent and Rotational Relaxation Studies.


91. Photoinduced Electron Transfer in a Room Temperature Ionic Liquid 1-Butyl-3-Methylimidazolium OctylSulfate Micelle: A Temperature Dependent Study.


89. Room Temperature Ionic Liquid in Confined Media: A Temperature Dependence Solvation Study in [bmim][BF4]/BHDC/Benzene Reverse Micelles.

88. Photoinduced intermolecular electron transfer in a room temperature imidazolium ionic liquid: An excitation wavelength dependence study.

87. Ionic Liquid Containing Microemulsions: Probe by Conductance, Dynamic Light Scattering, Diffusion-Ordered Spectroscopy NMR Measurements, and Study of Solvent Relaxation Dynamics.

86. Characterization of 1-Ethyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide ([Emim][Tf2N])/TX-100/Cyclohexane ternary microemulsion: Investigation of Photoinduced Electron Transfer in this RTIL containing microemulsion.

85. The effect of membrane fluidity on FRET parameters: an energy transfer study inside small unilamellar vesicle.

84. Chemical dynamics in room-temperature ionic liquids: the role of hydrogen bonding.

83. Effect of water on the solvent relaxation dynamics in an ionic liquid containing microemulsion of 1-butyl-3-methyl imidazolium tetrafluoroborate/TritonX-100/cyclohexane.

82. Solvent and rotational relaxation of Coumarin-153 in a micellar solution of a room-temperature ionic liquid, 1-butyl-3-methylimidazolium octylsulfate, in ethylammonium nitrate.

81. Synthesis of Silver Nanoparticle Inside the Nonaqueous Ethylene Glycol Reverse Micelle and a Comparative Study to Show the Effect of the Nanoparticle on the Reverse Micellar Aggregates through Solvation Dynamics and Rotational Relaxation Measurements.


80. Microemulsions with Surfactant TX100, Cyclohexane, and an Ionic Liquid Investigated by Conductance, DLS, FTIR Measurements, and Study of Solvent and Rotational Relaxation within this Microemulsion.


79. Effect of polymer, poly (ethylene glycol)(PEG-400), on solvent and rotational relaxation of coumarin-480 in an ionic liquid containing microemulsions.


78. Probing the Interaction of 1-Ethyl-3-methylimidazolium Ethyl Sulfate ([Emim][EtSO₄]) with Alcohols and Water by Solvent and Rotational Relaxation. [56]*


77. Temperature dependent solvation dynamics in an ionic liquid containing microemulsions of 1-butyl-3-methylimidazolium tetrafluoroborate/Triton X-100/cyclohexane.


76. Dynamics of solvent and rotational relaxation in RTIL containing confined media.


75. To probe the structure of methanol and Aerosol OT (AOT) in AOT reverse micelles by FTIR measurements.

74. Photoinduced electron transfer (PET) from N, N-dimethylaniline to 7-amino Coumarin dyes in a room temperature ionic liquid (RTIL): Slowing down of electron transfer rate compared to conventional solvent.

73. To Probe the Interaction of Methanol and Acetonitrile with the Ionic Liquid N,N,N-Trimethyl-N-propyl Ammonium Bis(trifluoromethanesulfonyl) Imide at Different Temperatures by Solvation Dynamics Study.

72. Direct Observation of Solvation Dynamics in Aqueous Reverse Micellar System Containing Silver Nanoparticle in the Reverse Micellar Core.

71. Photophysical Studies of a Hemicyanine Dye (LDS-698) in Dioxane-Water Mixture and in Different Alcohols and in a Room Temperature Ionic Liquid.

70. Dynamics of Solvent and rotational relaxation of room temperature ionic liquid (RTIL) in RTIL containing microemulsions.

69. Solvent and rotational relaxation of Coumarin 153 in a protic ionic liquid dimethyl ethanol ammonium formate.

68. Assessing solvent effects on the singlet excited state lifetime of uracil derivatives: A femtosecond fluorescence upconversion study in alcohols and D$_2$O.

67. Dynamics of solvent and rotational relaxation of Coumarin 153 in a room temperature ionic liquid Butyl-3-methylimidazolium octylsulfate forming micellar structure.


58. Singlet excited state dynamics of uracil and thymine derivatives: A femtosecond fluorescence upconversion study in acetonitrile.

57. Solvent Effect on the Singlet Excited-state Dynamics of 5-Fluorouracil in Acetonitrile as Compared with Water.


55. Photoinduced Electron Transfer in a Protein-Surfactant Complex: Probing the interaction of SDS with BSA.

54. Photoinduced intermolecular electron transfer from dimethylaniline to 7- amino-Coumarin dyes on surface of β-cyclodextrin.

53. Photoinduced electron transfer from N,N-dimethylaniline to 7-amino Coumarins in protein-surfactant complex: Slowing down of electron transfer dynamics compared to micelles.

52. Dynamics of Solvent and Rotational Relaxation of Glycerol in the Nanocavity of Reverse Micelles.

51. Photoinduced intermolecular electron-transfer from electron donating solvents to Coumarin dyes in bile salt aggregates: Role of diffusion in electron transfer reaction.
50. Dynamics of Solvent and Rotational Relaxation of Coumarin 153 in Room Temperature Ionic Liquid 1-Butyl-3-methylimidazolium Hexafluorophosphate Confined in Brij-35 Micelles: A Picosecond Time-Resolved Fluorescence Spectroscopic Study.


48. Intramolecular charge transfer and solvation dynamics of coumarins in reverse micelles and mixed micelles.

47. Study of energy transfer from 7-amino Coumarin donors to rhodamine 6G acceptor in lecithin vesicles and Sodium Taurocholate-lecithin mixed aggregates.

46. Photoinduced electron transfer from dimethyl aniline to coumarin dyes in reverse micelles.

45. Study of energy transfer from 7-amino Coumarin donors to rhodamine 6G acceptor in non-aqueous reverse micelles.

44. Effect of alkyl chain length and size of the headgroups of the surfactant on solvent and rotational relaxation in micelles and mixed micelles.

43. Dynamics of solvation and rotational relaxation of Coumarin 153 in an ionic liquid confined in a nanometer size microemulsions.
Effect of water, methanol and acetonitrile on solvation relaxation and rotational relaxation of Coumarin 153 in neat 1-hexyl-3-methyl-imidazolium hexafluorophosphate.

Intramolecular charge transfer and solvation dynamics of Nile Red in the nanocavity of cyclodextrins.

Dynamics of solvation and rotational relaxation in neutral Brij 35 and Brij 58 micelles.

Dynamics of Photoisomerisation and rotational relaxation of 3,3-diethyloxadecarbocyanine iodide in room temperature ionic liquid and binary mixture of ionic liquid and water.

Dynamics of solvation and rotational relaxation of Coumarin 153 in 1-butyl 3-methylimidazolium hexafluorophosphate [bmim][PF₆]-water mixtures.

Effect of hydrogen bonding on intramolecular charge transfer in aqueous and non-aqueous reverse micelles.

Probing protein-surfactant interaction by steady state and time-resolved fluorescence spectroscopy.

Corrigendum to Photoinduced intermolecular electron transfer between Coumarin dyes and electron donating solvents in cetyltrimethylammonium bromide (CTAB) micelles: evidence for Marcus inverted region.

Solvation Dynamics of Coumarin 480 in TritonX-100 (TX-100) and Bile Salt Mixed Micelles.
33. Solvation dynamics of Coumarin 480 in Bile salt-Cetyltrimethyl ammonium bromide (CTAB) and Bile salt-Tween 80 mixed micelles.

32. Solvation dynamics of Coumarin 153 in aqueous and non-aqueous reverse micelles.

31. Solvation dynamics of coumarin 480 in Neutral (TX-100), anionic (SDS), and cationic (CTAB) water–in-oil microemulsions.

30. Dynamics of solvent relaxation in room temperature ionic liquids.

29. Photoinduced intermolecular electron transfer between Coumarin dyes and electrondonating solvents in cetyltrimethylammonium bromide (CTAB) micelles: evidence for Marcus inverted region.

28. Solvation dynamics of Coumarin 152A in methanol and acetonitrile reverse micelles.

27. Intramolecular Charge Transfer and Solvation Dynamics of Coumarin 152 in Aerosol-OT, Water-Solubilizing Reverse Micelles, and Polar Organic Solvent Solubilizing Reverse Micelles.


25. Influence of large magnetic fields on nonradiative transitions from the A state of thiophosgene.

24. Effect of large magnetic fields on the fluorescence from the a state of gaseous thiophosgene.
23. Intramolecular charge transfer processes and solvation dynamics of coumarin-490 in reverse micelles. 


22. Effects of large magnetic fields on radiationless transitions of gaseous excited molecules. 


21. Influence of large magnetic fields on fluorescence of gaseous CS\textsubscript{2} excited through several V bands. 


20. Vibronic relaxation of polyatomic molecules in non-polar solvent: Femtosecond anisotropy/intensity measurements of the S\textsubscript{n} and S\textsubscript{1} fluorescence of tetracene. 


19. Dual emission of 2-(2\textsuperscript{′}-hydroxy phenyl) benzimidazole (HPBI) in reverse micelle. 


18. Effect of large magnetic fields on the fluorescence from the A (\textsuperscript{1}A\textsubscript{2}) state of gaseous thiophosgene. 


17. Fluorescence quenching of 13V and 15V bands of CS\textsubscript{2} via large magnetic fields 


15. Solvation dynamics of Coumarin-480 in micelles. 


14. Effect of salt and solvent on the ionic solvation of p-toluidino naphthalene sulphonate 

12. Solvation dynamics in solid host : Coumarin-480 in zeolite 13X.
10. Excited State Intramolecular Proton Transfer (ESIPT) of 2-(2′-hydroxyphenyl) benzimidazole (HPBI) in micelles.
7. Salt Effect on the Hydrophobic binding of p-toluidino naphthalene sulphonate with cyclodextrins.
6. Twisted Charge Transfer Processes of Nile Red in homogeneous solution and in Faujasite zeolite.
5. Interaction of urea with fluorophores bound to protein surfaces.
4. Excited-state intramolecular proton transfer and rotamerism of 2-(2′-hydroxy phenyl) benzimidazole.


2. Interaction of urea with fluorophores bound to cycloextrins. Fluorescence of p-toluidino naphthalene sulphonate.


1. Effect of urea on micelles: Fluorescence of p-toluidino naphthalene sulphonate.


**According to Scopus (20.02.2018)**

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<td>Study of ultrafast processes in ionic liquid containing holdings</td>
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Characterization of Micelles, Reverse Micelles in Room temperature ionic liquids (RTILs) using Dynamic Light Scattering, Fluorescence Spectroscopy and use of these novel systems for photophysical, dynamical studies and nanoparticle synthesis

Ultrafast Spectroscopic Study of Solvation and Photochemical reactions in solution and organized assemblies

### 14. Thesis Provided by Professor Nilmoni Sarkar:

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<tr>
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<td>Investigation of photophysical properties of organic molecules with the help of both steady state &amp; time resolved fluorescence spectroscopic techniques.</td>
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<td>Study of Excited State Intramolecular Proton Transfer, Solvation dynamics in different organized</td>
<td>2005</td>
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<td>Dr. Anjan Chakraborty</td>
<td>Assembly using steady state &amp; time resolved fluorescence spectroscopic techniques</td>
<td>2006</td>
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<td>Dr. Debabrata Seth</td>
<td>Photophysics of drug molecules and Study of different biological systems by fluorescence spectroscopy</td>
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<td>Dynamics of solvent and rotational relaxation in room temperature ionic liquid containing mixed solvents and microheterogeneous systems.</td>
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<td>Nonaqueous reverse micelles as templating media and investigation of solvent relaxation in organized assembly containing nanoparticle</td>
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<td>Dr. Souravi Sarkar</td>
<td>Photophysical and dynamical studies in solvent mixture, room temperature ionic liquids (RTILs) and RTIL containing confined media.</td>
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<td>Dr. Chiranjib Ghatak</td>
<td>Fluorescence Spectroscopic Investigation of Various Photophysical and Dynamical Phenomena inside Biologically Relevant</td>
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<td>Dr. Sarthak Mandal</td>
<td>Excited State Intramolecular Proton Transfer, Energy Transfer and Solvation Dynamics in Biologically Relevant Self-Assemblies, Room Temperature Ionic Liquid and Binary Solutions</td>
<td>2014</td>
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<td>Dr. Chiranjib Banerjee</td>
<td>Photophysics and Dynamics of Different Fluorophores in Confined Media</td>
<td>2015</td>
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<td>Dynamics of Solvation, Photoisomerisation and Proton transfer in microheterogenous systems consisting of Surfactants,Polymers and RTILs</td>
<td>2015</td>
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<td>Dr. Jagannath Kuchlyan</td>
<td>Investigation of Various Photophysical and Dynamical Phenomena Using Different</td>
<td>2017</td>
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15. Work in Progress:

1. Single Molecule Spectroscopy. (a) Amyloid fibrils, highly organized protein or peptide aggregates, are associated with several pathological disorders such as Alzheimer’s disease, transmissible spongiform encephalopathy, type II diabetes, and prion disorders. Polyphenols are well known for the disruption of such amyloid fibrils. Using fluorescence correlation spectroscopy (FCS) and fluorescence lifetime imaging microscopy (FLIM) we have examined
the growth of fibre like network of different metabolites such as l-phenylalanine, tyrosine and glycine etc and their disruption using crown ether and lanthanides.

(b) Early cell membranes are thought to comprise of fatty acid or other single chain amphiphiles. The most important feature of the fatty acid vesicle is the self replication. Therefore, it has a great relevance to understand the emergence of cellular life in real biological system. We are studying different dynamics and interaction of different fatty acid based vesicles using FCS and FLIM measurements. We have conducted time scan FLIM measurements of the vesicular aggregates to understand the kinetics of vesicle fusion in presence of different external additives such as electrolytes, ionic liquids etc.

(c) Self-assembly of amphiphilic molecules is the main driving force for the formation of a wide variety of nanostructures using different building units. FCS is one of the unique way to understand the self assembly of different surfactants including surface active ionic liquid (SAIL). The transition of micelle to vesicle is studied by measuring the diffusion coefficient of differently charged fluorophores.

(d) Graphene is now expanding its territory beyond electronic and chemical applications toward biomedical areas such as precise biosensing through graphene-quenched fluorescence, graphene-enhanced cell differentiation and growth etc. Using FCS as a tool we have showed the adsorption of different biomolecules such as protein or protein based fluorescent nano cluster on the grapheme oxide (GO) surface. Further, we have studied the controlled adsorption of different molecules on GO surfaces in presence of non-ionic triblock copolymer and using FLIM we have showed that this assembly can be used for the live cell imaging. The drug loading capacity into the cancerous cell can also be enhanced in presence of GO.

(e) Multi-wavelength FLIM measurements. The Multi-wavelength FLIM system can detect the fluorescence simultaneously in 16 wavelength channel. Therefore, the wavelength region can be tuned depending on the situation. The light from one DCS-120 output is focused into the slit plane of the polychromator. The polychromator project a spectrum of the fluorescence light on a 16-channel PMT tube inside a bh PML-16C multichannel detector. PML-16 delivers a timing pulse for every photon. Thus, TCSPC modules ‘routes’ photon of different wavelengths into separate lifetime images and the process does not involve noticeable loss of photons. Different
Photophysical phenomena such as solvation dynamics and excited state proton transfer of fluorophores are monitored in a single vesicle using MW FLIM.

(2) Femtosecond Fluorescence Upconversion. Usually, small amphiphilic molecules such as dimethyl sulfoxide (DMSO), dioxane, ethanol, 1-propanol, tert-butyl alcohol (TBA), which contain both hydrophilic and lipophilic moieties, have a tendency to form microheterogeneous aggregates upon mixing with water. We have performed picosecond solvation dynamics of different alcohol-water mixtures as well as DMSO-water mixture using femtosecond fluorescence upconversion techniques and we have obtained different anomalous regions in the mixture which is due to the aggregation induced structural transition of alcohol molecules.

3. Time Correlated Single Photon Counting (TCSPC). Different photophysical phenomena such as excited state proton transfer, fluorescence resonance energy transfer (FRET), electron transfer and solvation dynamics have been studied extensively in different confined systems using TCSPC.