

Name: Dr. Subrata Mahanta



Present Position: Assistant Professor

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❖ **Research Interests**

Molecular Spectroscopy

Photochemistry

Quantum Mechanics

Ultrafast Laser Spectroscopy

Dye Sensitized Solar Cells

Hydrogen Bond

❖ **Awards & Recognitions**

- 1) **Alexander von Humboldt Postdoctoral Fellowship**, Germany (April 2009-March 2011).
- 2) **Postdoctoral Fellowship** funded by DFG-Cluster of Excellence: Munich-Centre for Advanced Photonics, Germany (Nov 2008 – March 2009).
- 3) Qualified **NET-Junior Research Fellowship (JRF)** conducted by Council of Scientific and Industrial Research (CSIR), India in December 2002 and June 2003.
- 4) Qualified **Graduate Aptitude Test for Engineering (GATE)**, India (2003).

❖ Educational Qualifications:

Degree	Board/University	Year	Class/ Division	Subjects/ Specialization
Ph.D.	University of Calcutta	2009	NA	Molecular Spectroscopy and Theoretical Calculations
M.Sc.	University of Calcutta	2003	1 st	Chemistry, Physical Chemistry Specialization
B.Sc.	University of Calcutta	2001	1 st	Chemistry (Honors), Physics (Gen) and Mathematics (Gen).
XII Class	West Bengal Council of Higher Secondary Education	1998	1 st	Science
X Class	West Bengal Board of Secondary Education.	1996	1 st	All

❖ Ph.D. Details:

Thesis Title: Photo-induced Processes of Some Organic Molecules: Fluorescence Spectroscopy and Quantum Chemical Calculation

Field: Spectroscopy with specialization in basic and applied photochemistry and Theoretical Calculations

Subject: Chemistry

Date Obtained: 19/01/2009

Institute: University of Calcutta, Kolkata, India

Name of the Supervisor: Prof. Nikhil Guhhait (Supervisor), University of Calcutta and Prof. Deb Narayan Nath (Co-Supervisor), IACS, Kolkata

❖ Postdoctoral Experiences:

Name of the Organization	Date of joining	Date of leaving	Designation	Area of Work
National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba-shi, Japan	02/06/2011	31/12/2014	Postdoctoral Fellow	Ultrafast Laser Spectroscopy, Dye Sensitized Solar Cells
Chair for BioMolecular Optics, Ludwig Maximilians University (LMU), Munich, Germany	01/04/2009	31/03/2011	Alexander von Humboldt postdoctoral fellow	Ultrafast Laser Spectroscopy, Proton Coupled charge transfer
Chair for BioMolecular Optics, Ludwig Maximilians University (LMU), Munich, Germany	03/11/2008	31/03/2009	Postdoctoral Fellow	Ultrafast Laser Spectroscopy,

❖ Membership:

Lifetime member of **Alexander von Humboldt foundation**, Bonn, Germany

❖ Courses Taught:

PG Levels (at NIT Jamshedpur): Quantum Mechanics and Molecular Spectroscopy (M.Sc.), Electrochemistry (M.Sc), Physical Chemistry Lab (M.Sc.) Surface Science and Engineering (M.Tech.), Mechanistic Models of Corrosion (M.Tech.) and Electrified Interfaces (M.Tech.)

UG Levels (at City College, Kolkata): Thermodynamics and Chemical Kinetics

❖ Administrative Experience

Assistant Warden of Hostel G from August 2017 to May 2018

❖ M.Sc. Projects supervision

S.No	Name of the Student	Year	Status
1	Miss. Tannistha Bhattacharya	2017	Completed
2	Mr. Prashant Kumar Sharma	2018	Completed
3	Mr. Vinod Patidar	2018	Completed

❖ Main Skills

Instruments/Spectroscopic techniques familiar with

- 1) Absorption Spectrophotometer and Spectrofluorometer for steady state measurements.
- 2) Time-correlated single photon counting (TCSPC) technique for the estimation of excited state lifetimes of the molecules.
- 3) Ultrafast (Femtosecond-Nanosecond) pump-probe spectroscopy for the investigation of the excited state dynamics in molecular systems (down to femtosecond regime)
 - a) Transmittance technique.
 - b) Diffuse reflectance technique.
- 4) Time resolved fluorescence measurements using Streak camera.
- 5) Fabrication of dye sensitized solar cells

Computational knowledge

Use of **Gaussian 03/09** software for the theoretical calculations of ground and excited state optimized geometry, evaluation of potential energy surfaces and determination of barrier heights for the transformation processes of the investigated molecules

experimentally by using cost effective ab initio studies such as Restricted Hartree-Fock (HF), second order Møller-Plesset (MP2) and Density Functional Theory (DFT) methods.

❖ National and International Conferences attended

1. The 225th electrochemical society (ECS) meeting (International) Month: **May**, Year: **2014**; in Orlando, USA. (Poster)
2. Annual meeting on photochemistry (International), Month: **September**, Year: **2013**, in Ehime, Japan. (Oral)
3. 60th The Japan Society of Applied physics spring meeting (International), Month: **March**, Year: **2013**, in Kanagawa, Japan. (Poster).
4. 7th Asian photochemistry conference (International), Month: **November**, Year: **2012**, in Osaka, Japan. (Poster).
5. Annual meeting on photochemistry (International), Month: **November**, Year: **2012**, in Tokyo, Japan. (Poster).
6. Japan Electrochemical Society 79th Annual Meeting (International), Month: **March**, Year: **2012**, in Hamamatsu, Japan. (Oral).
7. Annual meeting on photochemistry (International) Month: **September**, Year: **2011**, in Miyazaki, Japan. (Oral)
8. Proceeding of XXIV International Conference on Photochemistry (International) Month: **July**, Year: **2009**, in Toledo, Spain, 2009. (Poster).
9. Proceeding of Trombay Symposium on Radiation and Photochemistry (International), Month: **January**, Year: **2008**, in Pune, India, 2008. (Poster)
10. Proceeding of National Symposium on Radiation and Photochemistry (National), Month: **January**, Year: **2007**, in Chennai, India, 2007. (Poster).
11. International Conference on Structure and Dynamics: From Micro to Macro (International), Month: **February**, Year: **2006**, at University of Calcutta, Kolkata, India, (Poster).
12. Proceeding of National Symposium on Radiation and Photochemistry (National), Month: **January**, Year: **2005**, in Dharwad, India, 2005. (Poster).

❖ Publications in Peer-reviewed International Journals

1. “Electron injection efficiency of Ru-based Dye/TiO₂ system in presence of three different organic solvents: a femtosecond transient absorption study.”
Subrata Mahanta, Hiroyuki Matsuzaki, Takuro N. Murakami, Ryuzi Katoh, Hajime Matsumoto and Akihiro Furube; *ChemPhysChem*. (International), Year: **2015**, Vol: **16**, Pages: 1657-1662, (SCI).
2. “Electron Injection Efficiency in Ru-Dye Sensitized TiO₂ in the Presence of Room Temperature Ionic Liquid Solvents Probed by Femtosecond Transient Absorption Spectroscopy: Effect of Varying Anions”;
Subrata Mahanta, Akihiro Furube, Hiroyuki Matsuzaki, Takuro N. Murakami, and Hajime Matsumoto; *Journal of Physical Chemistry C* (International), Year: **2012**, Vol: **116**, Pages: 20213-20219, (SCI).
3. “A new window towards multidimensional sensing of transition metal cations through dual mode sensing ability of N-benzyl-(3-hydroxy-2-naphthalene): Emission enhancement coupled remarkable spectral shift”;
Bijan Kumar Paul, Subrata Mahanta, Rupashree Balia Singh and Nikhil Guchhait; *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, (International), Year: **2011**, Vol: **79**, Pages: 197-205, (SCI).
4. “Inequivalence of Substitution Pairs in Hydroxynaphthaldehyde: A Theoretical Measurement by Intramolecular Hydrogen Bond Strength, Aromaticity, and Excited-State Intramolecular Proton Transfer Reaction”;
Subrata Mahanta, Bijan Kumar Paul, Rupashree Balia Singh and Nikhil Guchhait; *Journal of Computational Chemistry*, (International), Year: **2011**, Vol: **32**, Pages: 1-14, (SCI).
5. “Study of probe-protein complexation equilibria and protein-surfactant interaction using charge transfer fluorescence probe methyl ester of N,N-dimethylamino naphthyl acrylic acid”;
Subrata Mahanta, Rupashree Balia Singh, Arnab Bagchi, Debnarayan Nath and Nikhil Guchhait; *Journal of Luminescence*, (International), Year: **2010**, Vol: **130**, Pages: 917-926, (SCI).

6. "Evidence of acid mediated enhancement of photoinduced charge transfer reaction in 2-methoxy-4-(N,N-Dimethylamino)benzaldehyde: Spectroscopic and quantum chemical study";
Anuva Samanta, Bijan Kumar Paul, Subrata Mahanta, Rupashree Balia Singh, Samiran Kar and Nikhil Guchhait; *Journal Photochemistry Photobiology. A: Chemistry*, (International), Year: **2010**, Vol: **212**, Pages: 161-169, (SCI).
7. "A DFT-based theoretical study on the photophysics of 4-Hydroxyacridine: single water- mediated excited state proton transfer"
Bijan Kumar Paul, Subrata Mahanta, Rupashree Balia Singh and Nikhil Guchhait; *Journal of Physical Chemistry A*, (International), Year: **2010**, Vol: **114**, Pages: 2618-2627, (SCI).
8. "Spectral modulation of charge transfer fluorescence probe encapsulated inside aqueous and non-aqueous β -cyclodextrin nanocavities";
Rupashree Balia Singh, Subrata Mahanta and Nikhil Guchhait; *Journal of Molecular Structure*, (International), Year: **2010**, Vol: **963**, Pages: 92-97, (SCI).
9. "Reply to comments "critical micellar concentration and protein-surfactant interaction (Comment to Destructive and protective action of sodium dodecyl sulphate micelles on the native conformation of Bovine Serum albumin: A study by extrinsic fluorescence probe 1-hydroxy-2-naphthaldehyde)":
Rupashree Balia Singh, Subrata Mahanta and Nikhil Guchhait;
Chemical Physics Letters, (International), Year: **2009**, Vol: **483**, Pages: 184-185, (SCI).
10. "Study of proteinous and micellar microenvironment using donor acceptor charge transfer fluorosensor N,N-dimethylaminonaphthyl-(acrylo) nitrile";
Rupashree Balia Singh, Subrata Mahanta and Nikhil Guchhait;
Spectrochimica Acta A: Molecular and Biomolecular Spectroscopy, (International), Year: **2009**, Vol: **72**, Pages: 1103-1111 (SCI).
11. "Study of HSA-probe interaction and protective action of SDS in urea denatured HSA using charge transfer probe-Methyl ester of N,N-dimethylaminonaphthyl-(acrylic) acid";
Subrata Mahanta, Rupashree Balia Singh and Nikhil Guchhait; *Journal of Fluorescence*, (International), , Year: **2009**, Vol: **19**, Pages: 291-302, (SCI).
12. "Interaction of human serum albumin with charge transfer probe ethyl ester of N,N-dimethylamino naphthyl acrylic acid: An extrinsic fluorescence probe for studying protein micro-environment";
Rupashree Balia Singh, Subrata Mahanta, Arnab Bagchi and Nikhil Guchhait;

- Photochemical and Photobiological Sciences*, (International), Year: **2009**, Vol: **8**, Pages: 101-110, (SCI).
13. "Solvent dependent excited state spectral properties of 4-hydroxyacridine: Evidence for only water mediated excited state proton transfer process";
Rupashree Balia Singh, Subrata Mahanta and Nikhil Guchhait. *Journal Photochemistry Photobiology. A: Chemistry*, (International), Year: **2008**, Vol: **200**, 325-333, (SCI).
14. "Evidence of coupled photoinduced proton transfer and intra molecular charge transfer reaction in para-N,N'-dimethylamino orthohydroxybenzaldehyde: Spectroscopic and theoretical studies";
Subrata Mahanta, Rupashree Balia Singh, Samiran Kar and Nikhil Guchhait. *Chemical Physics*, (International), Year: **2008**, Vol: **354**, Pages: 118-129, (SCI).
15. "Destructive and protective action of sodium dodecyl sulphate micelles on the native conformation of Bovine Serum Albumin: A study by extrinsic fluorescence probe 1-hydroxy-2-naphthaldehyde."
Rupashree Balia Singh, Subrata Mahanta and Nikhil Guchhait;
Chemical Physics Letters, (International), Year: **2008**, Vol: **463**, Pages: 183-188, (SCI).
16. "Spectroscopic and Theoretical Evidence for the Photoinduced Twisted Intramolecular Charge Transfer State Formation in N,N-Dimethylaminonaphthyl-(acrylo) nitrile";
Rupashree Balia Singh, Subrata Mahanta, Samiran Kar and Nikhil Guchhait;
Journal of Luminescence, (International), Year: **2008**, Vol: **128**, Pages: 1421-1430, (SCI).
17. "Photophysical properties of 2, 3, 6, 7-Tetrahydro-8-hydroxy-1H,5H-benz[i,j]quinolizine-9-carboxaldehyde: Evidence of excited state intramolecular proton transfer but not of intramolecular charge transfer process";
Subrata Mahanta, Rupashree Balia Singh, Debnarayan Nath and Nikhil Guchhait;
Journal of Photochemistry and Photobiology A: Chemistry, (International), Year: **2008**, Vol: **197**, Pages: 62-73, (SCI).
18. "Study of interaction of proton transfer probe 1-Hydroxy 2-Naphthaldehyde with Serum Albumins: A spectroscopic study";
Rupashree Balia Singh, Subrata Mahanta and Nikhil Guchhait; *Journal of Photochemistry and Photobiology B: Biology*, (International), Year: **2008**, Vol: **91**, Pages: 1-8, (SCI).

19. "Photoinduced intramolecular charge transfer in methyl ester of N,N-dimethylaminonaphthyl-(acrylic) acid: Spectroscopic measurement and quantum chemical calculations";
Subrata Mahanta, Rupashree Balia Singh, Samiran Kar and Nikhil Guchhait;
Journal of Photochemistry and Photobiology A: Chemistry, (International), Year: **2008**, Vol: **194**, Pages: 318- 326, (SCI).
20. "Spectroscopic study of excited state intramolecular charge transfer in ethyl ester of N,N'-Dimethylaminonaphthyl-(acrylic) acid";
Rupashree Balia Singh, Subrata Mahanta, Samiran Kar and Nikhil Guchhait;
Chemical Physics, (International), Year: **2007**, Vol: **342**, Pages: 33-42, (SCI).
21. "Photophysical properties of 1-Acetoxy-8-hydroxy-1,4,4a,9a-tetrahydroanthraquinone: Evidence for excited state proton transfer reaction";
Rupashree Balia Singh, Subrata Mahanta and Nikhil Guchhait;
Chemical Physics, (International), Year: **2007**, Vol: **331**, Pages: 189-199, (SCI).
22. "Photo-physical properties of 1-hydroxy-2-naphthaldehyde: A combined fluorescence spectroscopy and quantum chemical calculations";
Rupashree Balia Singh, Subrata Mahanta, Samiran Kar and Nikhil Guchhait;
Chemical Physics, (International), Year: **2007**, Vol: **331**, Pages: 373-384, (SCI).
23. "Excited state intramolecular proton transfer in 3-hydroxy-2-naphthaldehyde: A combined study by absorption and emission spectroscopy and quantum chemical calculation";
Subrata Mahanta, Rupashree Balia Singh, Samiran Kar and Nikhil Guchhait;
Chemical Physics, (International), Year: **2006**, Vol: **324**, Pages: 742-752, (SCI).

❖ Abstracts published in Conference Proceedings

1. “Study of Electron Injection Efficiency of N719/TiO₂ System in Different Room Temperature Ionic Liquid (IL) Environments By Using Femtosecond Transient Absorption Spectroscopy: Effect of Varying Viscosity”;
Subrata Mahanta, Akihiro Furube, Hiroyuki Matsuzaki, Hajime Matsumoto and Ryuzi Katoh; *The 225th electrochemical society (ECS) meeting* (International) Month: **May**, Year: **2014**; in Orlando, USA. (Poster).
2. “Electron Injection Efficiency of Ru-Dye/TiO₂ System in Presence of Three Different Organic Solvents: a Femtosecond Transient Absorption Study”;
Subrata Mahanta, Akihiro Furube, Hiroyuki Matsuzaki, Hajime Matsumoto and Ryuzi Katoh.; *Annual meeting on photochemistry* (International), Month: **September**, Year: **2013**, in Ehime, Japan. (Oral).
3. “Effects of electrolyte on electron injection dynamics in dye-sensitized solar cells: Examination of solvents and additives”;
Subrata Mahanta, Akihiro Furube, Hiroyuki Matsuzaki, Hajime Matsumoto and Ryuzi Katoh; *60th The Japan Society of Applied physics spring meeting* (International), Month: **March**, Year: **2013**, in Kanagawa, Japan. (Poster).
4. “Electron injection dynamics and efficiency of dye-sensitized TiO₂ film in ionic liquid revealed by femtosecond transient absorption spectroscopy”;
Subrata Mahanta, Akihiro Furube, Hiroyuki Matsuzaki, Hajime Matsumoto and Ryuzi Katoh; *7th Asian photochemistry conference* (International), Month: **November**, Year: **2012**, in Osaka, Japan. (Poster).
5. “Studied electron injection efficiency of N719/TiO₂ systems in room temperature ionic liquid environments using femtosecond transient absorption”;
Subrata Mahanta, Akihiro Furube, Hiroyuki Matsuzaki, Hajime Matsumoto and Ryuzi Katoh; *Annual meeting on photochemistry* (International), Month: **November**, Year: **2012**, in Tokyo, Japan. (Poster).
6. “Electron injection efficiency in N719/TiO₂ in presence of room temperature ionic liquid solvents probed by femtosecond transient absorption spectroscopy: Effect of varying anions”;
Subrata Mahanta, Akihiro Furube, Hiroyuki Matsuzaki, Hajime Matsumoto and Ryuzi Katoh; *Japan Electrochemical Society 79th Annual Meeting* (International), Month: **March**, Year: **2012**, in Hamamatsu, Japan. (Oral).
7. “An insight into the charge transfer and proton transfer processes in organic and inorganic systems- Extension from steady state to time resolved studies”;
Subrata Mahanta, Rupashree Balia Singh, Nikhil Guchhait and Eberhard Riedle; *Annual meeting on photochemistry* (International) Month: **September**, Year: **2011**, in Miyazaki, Japan. (Oral)

8. "Coupled proton-and intramolecular charge transfer in para-N,N-dimethylamino orthohydroxy benzaldehyde";
Subrata Mahanta, Rupashree Balia Singh, Samiran Kar and Nikhil Guchhait; *Proceeding of XXIV International Conference on Photochemistry* (International)
Month: **July**, Year: **2009**, in Toledo, Spain, 2009. (Poster).
9. "Excited state proton transfer favors over intramolecular Charge Transfer in para-N,N'-dimethylamino orthohydroxybenzaldehyde: Spectroscopic and theoretical studies";
Subrata Mahanta and Nikhil Guchhait; *Proceeding of Trombay Symposium on Radiation and Photochemistry (International)*, Month: **Pune**, Year: **2008**, in Pune, India, 2008. (Poster)
10. "Photophysical behavior of Methyl ester of N,N'-Dimethylamino naphthyl acrylic acid in AOT reverse micellar Environment";
Subrata Mahanta, Arnab Bagchi and Nikhil Guchhait.; *Proceeding of National Symposium on Radiation and Photochemistry* (National), Month: **January**, Year: **2007**, in Chennai, India, 2007. (Poster).
11. "Interaction of charge transfer probe Ethyl ester of N,N-dimethylamino naphthyl acrylic acid with Human Serum Albumin";
Rupashree Balia Singh, Subrata Mahanta, Arnab Bagchi and Nikhil Guchhait; *International Conference on Structure and Dynamics: From Micro to Macro* (International), Month: **February**, Year: **2006**, at University of Calcutta, Kolkata, India, (Poster).
12. "Excited State Properties of 2-hydroxy-3-naphthaldehyde";
Subrata Mahanta and Nikhil Guchhait; *Proceeding of National Symposium on Radiation and Photochemistry* (National), Month: **January**, Year: **2005**, in Dharwad, India, 2005. (Poster).