Curriculum Vitae of Dr. Arghyadeep Bhattacharyya

Personal Information

Nationality: Indian
Date of birth: 01/11/1990
Languages: Bengali, Hindi, English, Spanish
Address: 27/1, West Ghoshpara Road, Bhatpara, 743123, India
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Employment

11/2023-present ***Assistant Professor***
Permanent faculty
Department of Chemistry (Physical Chemistry Section),
Tripura University (A central University)

07/2023-10/2023 ***Research Associate***
University of Calcutta
Project: Development of AIE active probes for bioimaging and OLED applications (under the supervision of Prof. N. Guchhait)

07/2021 – 07/2023 ***Marie Curie International Fellow***
Universidad de Castilla La Mancha, Toledo, Spain
Value (€160,932)
Project: Mixed Metal MOFs for Photocatalytic applications (MMOF4PPS) (under supervision of Prof. Abderrazzak Douhal)
Project to bridge photophysical events to the photocatalytic activity of MOFs.

11/2020 - 06/2021 ***CNRS Post-Doctoral Fellow***
Ecole Polytechnique, Palaiseau, France
Project: Synthesis and application of fluorescent molecules and polymers for optical and electrochemical sensing (under supervision of Dr Gael Zucchi)

Education

10/2014 - 10/2019 ***CSIR Doctoral Fellow (Ph.D)***
University of Calcutta, India
All India fellowship, ranked 72 (top 10% rank)
Thesis: Selective Optical Detection of Biologically Relevant Cations and Anions by Synthesized Novel Aromatic Receptors. (under supervision of Prof. Nikhil Guchhait)

8/2012–7/2014 ***M.Sc., Physical Chemistry***
University of Calcutta, India
Thesis: Application of Fourier Grid Hamiltonian technique to probe tunnelling phenomenon. (under supervision of Prof. Pinaki Chaudhury)

4/2009–3/2012 ***B.Sc., Chemistry***
Presidency College, University Of Calcutta, India

Research skills and experience

Synthesis: majority of classic name reactions, MOFs.
Spectroscopy: Steady State and Time resolved Optical spectroscopic techniques
Characterization: NMR, Mass, FTIR, PXRD, Single Crystal diffraction, photocatalysis
Software Handling: Data analysis, solving crystal structures ,optimization packages.

Publications 33 papers, h-index = 10, citations = 269 (Google Scholar, 10/2023)
https://scholar.google.co.in/citations?user=Ib76MuUAAAAJ&hl=en
ORCID ID:0000-0002-5838-2895
Published 25 as 1st author + another 8 as co-author (vide List of complete publications)

Research Interests

(i) Design and synthesis of molecules and materials for multipurpose optical applications.

(ii) Development of selective molecule and material based chemodosimeters for chromogenic/fluorogenic sensing of neutral analytes, ions.
(iii) Purposefully designed molecules and materials capable of showing AIE and ESIPT coupling, TICT and ESIPT coupling.
(iv) Observing excited state photo physical properties of ESIPT/AIE/ TICT active probes in confined as well as in bulk medium.

Research Experience Description

- Recording of IR spectra of synthesized organic compounds (KBr pellet, 4000–400 cm^{-1}) on a Perkin Elmer model 883 infrared spectrophotometer.
- Collection of absorption spectra of compounds in solution phase (Perkin Elmer Lambda 25 and Hitachi U-3501 spectrophotometer) and emission/ excitation spectra in solution/solid phase (Perkin Elmer LS-55, Horiba Flurolog)in solution, suspension, and solid state.
- Quantum yield determination using the Quanta integrating-sphere setup from Horiba.
- TCSPC experiments using time resolved fluorimeter (Horiba Jobin Yvon Fluorocube-01-NL, Picoquant)in solution, suspension, and solid state.
- Fluorescence up-conversion (home-made setup), FLASH photolysis technique (Spectra physics).
- Deciphering of ^{1}H NMR and ^{13}C NMR spectra as well as sample preparation for NMR spectra.
- Mounting of single crystals and solving of Crystal Structure using XSHELL.
- Optimization of structures using Gaussian 09W package and construction of Potential Energy Surfaces of Excited state photophysical processes.
- Handling of Origin Pro, ChemDraw, Igor Pro among many others.
- Synthesis: Schiff bases and reduced Schiff bases, azo dyes, asymmetric hydrazones, acid hydrazones, formylation (by Vilsmeir-Haack reaction, Duff reaction, Reimer-Tiemann reaction), Nitration of aromatic compounds, reduction of nitro compound to amine, amide synthesis, derivatives of coumarin at 3 and 4 position, carbon-carbon bond formation reactions (Knoevenagel, Claisen-Schmidt, Aldol Condensation), heterocycles(pyrazolones, thiodiazoles, benzothiazole, benzimidazoles, benzoxazoles) UiO-66/67 type mono or mixed metal MOFs comprised of Zr, Ce and Ti.

Conferences Attended 8 conferences with below examples as winner of poster prizes.
DAE - BRNS 13th National Symposium on Radiation and Photochemistry (NSRP-2019), "*Photophysical properties of azine linked pyrene-cinnamaldehyde hybrid: Evidence of solvent dependent charge transfer coupled excimer emission*"; 2019, organized by Visva-Bharati, Santiniketan, India (awarded best poster).

National Conference on Functional Molecules (NCOFM-2019), "*Comparative Photophysical Study of Differently Substituted Cinnamaldehyde-Based Chalcones: From Intramolecular Charge Transfer to Fluorogenic Solvent Selectivity*", 2019, organized by University Of Calcutta, Kolkata, India (awarded third prize in poster competition).

Experience in knowledge transfer
I have successfully mentored 6 graduate summer interns in their projects which included synthesis and photophysical studies of organic fluorophores. Apart from that, I have mentored 12 M.Sc students accomplish their dissertation. Currently, I mentor three PhD students in my doctoral lab on their research on Aggregation Induced Emission active fluorophores as also aid them in writing manuscripts.

Soft skills
I enjoy working out, watching movies and interacting with people from various cultures. I have been actively involved in organizing reunion events in my Institute. My extracurricular activities are sure to put me in accord with international students. I have been fascinated by the wonderful lifestyle, culture and diversity of the European countries I have been till now, and I would also like to amalgamate within other cultures which also stands out to be one of the reasons for my choice.

Complete list of publications of Dr. Arghyadeep Bhattacharyya

A) Publications with peer review process

1. **A. Bhattacharyya**, S. Ghosh, N. Guchhait, Highly sensitive and selective “naked eye” sensing of Cu (II) by a novel amido–imine based receptor: a spectrophotometric and DFT study with practical application. *RSC Adv.*, 6 (2016) 28194-28199
2. **A. Bhattacharyya**, S. Ghosh, S. C. Makhal, N. Guchhait, Hydrazine bridged coumarin-pyrimidine conjugate as a highly selective and sensitive Zn^{2+} sensor: Spectroscopic unravelling of sensing mechanism with practical application. *Spectrochim. Acta Part A*, 183(2017) 306-311
3. **A. Bhattacharyya**, S. Ghosh, S. C. Makhal, N. Guchhait, Harnessing a pyrimidine based molecular switch to construct reversible test strips for F^-/AcO^- with respect to Al^{3+}: A colorimetric approach. *Spectrochim. Acta Part A*, 179 (2017) 242-249
4. **A. Bhattacharyya**, S. Ghosh, S. C. Makhal, N. Guchhait, Employing a hydrazine linked asymmetric double naphthalene hybrid for efficient naked eye detection of F^-: Crystal structure with real application for F.*Spectrochim. Acta Part A*, 198 (2018) 107-114
5. **A. Bhattacharyya**, S. C. Makhal, S. Ghosh, A. A. Masum, N. Guchhait, Competition-free fluorogenic detection of Al^{3+} by a chromone-naphthalene conjugate: a spectroscopic exploration supported by DFT calculations with cell imaging. *ChemistrySelect*, 2 (2017) 9924-29
6. **A. Bhattacharyya**, S. Ghosh, S. C. Makhal, N. Guchhait, Hydrazine appended self-assembled benzoin-naphthalene conjugate as an efficient dual channel probe for Cu^{2+} and F^-: a spectroscopic investigation with live cell imaging for Cu^{2+} and practical performance for fluoride *J. Photochem. Photobiol. A,* 353 (2018) 488-98
7. **A. Bhattacharyya**, S. C. Makhal, S. Ghosh, N. Guchhait, Enhanced charge transfer aptitude resulting in remarkable chromogenic F^- sensing in a Naphthalene-Benzocaine Platform by simple atomic substitution: Azo Dye vs. Schiff base. *ChemistrySelect*, 3(2018) 3258-3264
8. **A. Bhattacharyya**, S.C. Makhal, A. Ganguly, N. Guchhait, Instilling exploitable INHIBIT logic gate response for F^-/H^+ in ‘end-off’ anthracene-diamine hybrid by simple functional group manipulation: experimental study aided by DFT calculations. *Chem. Phys. Lett.,* 696(2018) 106-111
9. **A. Bhattacharyya**, S.C. Makhal, N. Guchhait, Reinvestigating photophysics of 7-diethylamino 3-cyanocoumarin as a polarity sensitive fluorescent probe: a spectroscopic approach. *ISRAPS bulletin* (invited article), 30(1-2) (2018) 29-35
10. **A. Bhattacharyya**, S.C. Makhal, N. Guchhait, CHEF-Affected Fluorogenic Nanomolar Detection of Al^{3+} by an Anthranilic Acid–Naphthalene Hybrid: Cell Imaging and Crystal Structure. *ACS Omega,* 3(2018) 11838-11846
11. **A. Bhattacharyya,** S.C. Makhal, N. Guchhait, Photophysical properties of azine linked pyrene-cinnamaldehyde hybrid: Evidence of solvent dependent charge transfer coupled excimer emission. *ACS Omega,* 4(2019) 2178-2187
12. **A. Bhattacharyya**, S.C. Makhal, N. Guchhait, Fate of protected HBT based chemodosimeters after undergoing deprotection: Restoration of ESIPT or generation of emissive phenoxide? *Chem. Phys.,* 520 (2019) 61-69
13. **A. Bhattacharyya**, S. C. Makhal, N. Guchhait, *ISRAPS bulletin* (invited article), Developing a dual channel receptor for Cu^{2+} and F^- by structural modification: a comparative review.30(4) (2018) 27-33
14. **A. Bhattacharyya**, S. C. Makhal, N. Guchhait, Comparative Photophysical Study of Differently Substituted Cinnamaldehyde-Based Chalcones: From Intramolecular Charge Transfer to Fluorogenic Solvent Selectivity. *J. Phys. Chem. A*, 123 (2019) 6411-6419
15. **A. Bhattacharyya**, S. C. Makhal, N. Guchhait, Mimicking cyclohexane chair form via H-bonding in crystal structure of a dihydroxy coumarin derivative: Efficient ratiometric response of F^- over AcO^-. *J. Mol. Structure,* 1196 (2019) 222-230
16. **A. Bhattacharyya**, S. C. Makhal, N. Guchhait, Evaluating the merit of a diethylamino coumarin-derived thiosemicarbazone as an intramolecular charge transfer probe: efficient Zn (II) mediated green to yellow emission swing. *Photochem. Photobiol. Sci,* 18 (2019) 2031-2041
17. **A. Bhattacharyya**, S. C. Makhal, S.K. Mandal, N. Guchhait, Exploring the hidden potential of methoxy substituted HBT derivative as an efficient example of coupling of

AIE and ESIPT process and as an energy harvesting platform. *New J. Chem.*, 43 (2019) 15087-15096

18. **A. Bhattacharyya**, S.K. Mandal, N. Guchhait, Imine–Amine Tautomerism vs Keto–Enol Tautomerism: Acceptor Basicity Dominates Over Acceptor Electronegativity in the ESIPT Process through a Six-Membered Intramolecular H-Bonded Network. *J. Phys. Chem. A*, 123 (2019) 10246-10253
19. **A. Bhattacharyya**, S. C. Makhal, N. Guchhait, Simple Chloro Substituted HBT derivative Portraying Coupling of AIE and ESIPT Phenomenon: Ratiometric Detection of S^{2-} and CN^{-} in 100% Aqueous Medium, *J. Photochem. Photobiol. A,* 388(2020) 112177
20. **A. Bhattacharyya**, N. Guchhait, Exciplex Formation between a Pair of Synthesized AIEgens Leads to White Light Generation: A Spectroscopic Exploration, *New J. Chem.*, 44 (2020) 10671
21. **A. Bhattacharyya,** N. Guchhait, Proton transfer inhibited charge transfer in a coumarinyl chalcone: Hassle free detection of chloroform vapor in alcohol medium and in neat solution, 253 (2021) 119578, *Spectrochim. Acta Part A*, 253 (2021) 119578-84.
22. **A. Bhattacharyya,** M. Gutierrez, B. Cohen, A. Valverde-Gonzalez, M. Iglesias, A. Douhal, How does the metal doping in mixed metal MOFs influence their photodynamics? A direct evidence for Improved photocatalysts, Mater. Today Energy 29 (2022) 101125-36.
23. S. Ghosh, A. Ganguly**, A. Bhattacharyya**, M. A. Alam, N. Guchhait, Selective chromo-fluorogenic molecular sensor for dual channel recognition of Cu^{2+} and F^{-}: effect of functional group on selectivity. *RSC Adv.*, 6 (2016) 67693-67700
24. S. C. Makhal, **A. Bhattacharyya**, S. Ghosh, N. Guchhait, A spectroscopic exploration of the influence of charge donor group on ESIPT process and its consequences in a salicylimine. *J. Photochem. Photobiol. A,* 358(2018) 138-146
25. D. Ray, **A. Bhattacharyya**, S. C. Bhattacharya, N. Guchhait, Modulation of Excited-State Proton Transfer Dynamics in a Model Lactim–Lactam Tautomeric System by Anisotropic Gold Nanoparticles.*J. Phys. Chem. C*, 122 (2018) 17544-17551
26. S. C. Makhal, **A. Bhattacharyya**, S. Ghosh, N. Guchhait, Influence of acceptor strength on photoinduced charge transfer process in a newly designed molecule in bulk solvent and in β-CD microenvironment. *J. Photochem. Photobiol. A,* 365(2018) 67-76
27. G. H. Debnath, S. Rudra, **A. Bhattacharyya**, N. Guchhait, P. Mukherjee, Host sensitized lanthanide photoluminescence from post-synthetically modified semiconductor nanoparticles depends on reactant identity.*J. Colloid Interface Sci*., 540 (2019) 448-465
28. S. C. Makhal, **A. Bhattacharyya**, N. Guchhait, Thiolactim-Thiolactam photoisomerisation: Sulfur as proton donor for excited state proton transfer process. *Chem. Phys. Lett.,* 717 (2019) 112-118
29. S. Ghosh, M.A. Khan, **A. Bhattacharyya**, M. A. Alam, E. Zangrando, N. Guchhait, Cu(II)-induced twisting of the biphenyl core: exploring the effect of structure and coordination environment of biphenyl-based chiral copper(II) complexes on interaction with calf-thymus DNA, *New J. Chem.*, 44 (2020) 20275-20284.
30. **A. Bhattacharyya**, V. Bhakta, N. Guchhait, Structural Isomerism Induces pH Dependent AIE Coupled ESIPT: An In-Depth Spectroscopic Exploration With Application In Amine Vapor Sensing, Phys. Chem. Chem. Phys. 25 (2023) 17482-17495.
31. **A. Bhattacharyya,** M. Gutierrez, B. Cohen, H. Szladad, J. Albero, H. Garcia, A. Douhal, Unravelling the Optimal Cerium Content for Boosting the Photoresponse Activity of Mixed Metal Zr/Ce Based MOFs through a Photodynamic and Photocurrent Correlation: Implications on Water Splitting Efficiency, ACS Appl. Mater. & Interfaces. 15 (2023) 36434–36446.
32. C. M. Cotrina, **A. Bhattacharyya**, S. Wang; B. Amouroux, N. Casaretto, S. Bourcier; I. Leray, G. Zucchi, Selective Ion Sensing in Aqueous Media with ESIPT Active Fluorescent Probes – A Particular Case for Hypochlorite Detection, Dyes Pigm. 218 (2023) 111524-111532.
33. **A. Bhattacharyya,** A. Das, N. Guchhait, Interrogating the nature of aggregates formed in a model azine based ESIPT coupled AIE active probe: stark differences in photodynamics in the solid state and aggregates in water, Phys. Chem. Chem. Phys. (Just accepted)