Dr. Dipankar Mondal

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Indian Institute of Engineering Science and Technology Shibpur,
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I am a physical chemist who uses optical tools to elucidate the mystery behind the biophysical and biochemical processes.

PROFESSIONAL EXPERIENCE

Aug, 2025 – Current	Assistant Professor in Chemistry, IIEST Shibpur
Nov, 2020 – July, 2025	Assistant Professor in Chemistry, Brahmananda Keshab Chandra College
Aug, 2018 – Nov, 2020	Post doc Fellow, New York University School of Medicine
Nov, 2016 – 2018, Aug	Post doc fellow, IIT Kharagpur

EDUCATION

2010 - 2016	Ph.D in Physical Chemistry from IIT Kanpur **Thesis Title:** *Applications of contactless micromanipulation using one- and two-color femtosecond optical tweezers* Thesis supervisor: Prof. Debabrata Goswami
2008 - 2010	M.Sc in Chemistry, IIT Kanpur, India
2005 - 2008	B.Sc in Chemistry, Jadavpur University, India

COURSES TAUGHT

Kinetic Theory and Gaseous State	CEMDSC101T NEP Curriculum
Chemical and ionic equilibrium	CEMDSC406T NEP Curriculum
Molecular Spectroscopy	CEMDSC407T NEP Curriculum
Chemical Kinetics	CEMACOR02T CBCS Curriculum
Thermodynamics	CEMGCOR03T (CBCS) CEMDSC303T (NEP)
Transport Processes	CEMACOR05T CBCS Curriculum
Electrochemistry	CEMACOR08T CBCS Curriculum
Photochemistry	CEMACOR14T CBCS Curriculum
Statistical Thermodynamics	CEMADSE01T CBCS Curriculum

PUBLICATIONS

Singh A*, **Mondal D***, Singh KK, Goswami D, Unveiling the Role of Molecular Structure in Microscopic Thermodynamics: Insights from Probing Trapped Nanoparticles with Femtosecond Optical Tweezers. *ChemNanoMat*, 11 (7), e202500033 (2025) ***Equal Contribution**

Mondal D, Malik S, Banerjee P, Kundu N, Debnath A, Sarkar N, Modulation of Membrane Fluidity to Control Interfacial Water Structure and Dynamics in Saturated and Unsaturated Phospholipid Vesicles. *Langmuir* 36, 12423-12434 (2020).

Kundu N, **Mondal D**, Sarkar N, Dynamics of the vesicles composed of fatty acids and other amphiphile mixtures: unveiling the role of fatty acids as a model protocell membrane. *Biophysical Reviews*, 1-15 (2020).

Banerjee P, **Mondal D**, Ghosh M, Mukherjee D, Nandi P, Maiti T, Sarkar N, Selective Self-assembly of 5-Fluorouracil through Non-linear Solvent Response Modulates Membrane Dynamics. *Langmuir* 36, 2707-2719 (2020).

Mondal D, Dutta R, Banerjee P, Mukherjee D, Maiti T K, Sarkar N, Modulation of membrane fluidity performed on model phospholipid membrane and live cell membrane: Revealing through spatiotemporal approaches of FLIM, FAIM and TRFS. *Analytical Chemistry* 91, 4337-4345 (2019).

Mondal D*, Bandyopadhyay S N*, Goswami D, Elucidating Optical Field Directed Hierarchical Self-assembly of Homogenous versus Heterogenous Nano Clusters with femtosecond optical tweezers. *PLoS ONE* 14, e0223688 (2019) ***Equal contribution**.

Mondal D, Dinda S, Bandyopadhyay S N, Goswami D, Polarization induced control of optical trap potentials in binary liquids. *Scientific Reports* 9, 700, (2019).

Dutta R, Jana G, **Mondal D**, Pyne A, Sil S, Chattaraj P K, Sarkar N, The Role of Viscosity on Various Dynamical Processes of Different Fluorophores in Ionic Liquid-Cosolvent Mixtures: A Femtosecond Fluorescence Upconversion Study. *Photochemistry & Photobiological Sciences* 18, 1359-1372 (2019).

Mondal D, Bandyopadhyay SN, Mathur P, Goswami D, *On the fly* calibrated measure and control of temperature and viscosity at nanoscale remotely. *ACS Omega* 3, 12304-12311 (2018).

Pal S, Banerjee P, **Mondal D**, Sarkar N, Light-induced morphological transition between unconjugated bilirubin photoisomers. *Soft Matter* 14, 8325-8332, (2018).

Banerjee P, Pal S, Kundu N, **Mondal D**, Sarkar N, Cell penetrating peptide induces self-reproduction of phospholipid vesicles: understanding the role of bilayer rigidity. *Chemical Communication* 54, 11451-11454 (2018).

Dutta R, Pyne A, **Mondal D**, Sarkar N, Effect of Micro-heterogeneity of Different Aqueous Binary Mixtures on the Proton-Transfer Dynamics of [2,2ˈ-Bipyridyl]-3,3ˈ-diol: A Femtosecond Fluorescence Up-Conversion Study. *ACS Omega* 3, 314-328 (2018).

Mondal D, Mathur P, Goswami G, Precise control and measurement of solid-liquid interfacial temperature and viscosity with dual-beam femtosecond optical tweezers in condensed phase. Physical Chemistry Chemical Physics 18, 25823-25830 (2016). (Back Cover)

Mondal D, Goswami D, Controlling and Tracking of Colloidal Nanostructures through Two Photon Fluorescence. Methods and Applications in Fluorescence 4(044004), 1-7 (2016).

Mondal D, Goswami D, A sensitive in situ nano-thermometer using femtosecond optical tweezers. Journal of Nanophotonics 10, 026013 (2016). (Featured)

Roy D, **Mondal D**, Goswami D, Structure and dynamics of optically directed self-assembly of nanoparticles. Scientific Reports 6, 23318 (2016).

Roy D, **Mondal D**, Goswami D, Two-Photon Fluorescence Tracking of Colloidal Clusters. Journal of Fluorescence 26, 1271-1276 (2016).

Mondal D, Goswami D, Controlling local temperature in water using femtosecond optical tweezer. Biomedical optics Express 6, 3190-3196 (2015).

Roy D, **Mondal D**, Goswami D, Elucidating microscopic structure and dynamics in optically tweezed environments. Chemical Physics Letters 621, 203-208 (2015). (Frontier)

OTHER PROFESSIONAL ACTIVITIES

International Conferences on Research Methodology: Issues and Challenges organized by Central Library of BKC College, 10th January, 2025. **Talk Title**: Discovery of Optical tweezers and its applications

International Conference on Ultrafast Nonlinear Optics and Optical Spectroscopy (UNOOS) at the Indian Institute of Science Education and Research Mohali (IISER Mohali) from 10-12 December 2024. **Invited Talk title:** Modulation of Membrane Rigidity to Control Interfacial Water Structure and Dynamics.

Organized Two day Hands-on-Training on “E-governance” as Website Maintenance Committee convener with IQAC and Department Of Computer Science, on 16-19th March, 2024.

Refresher course in ICT in teaching and research, Malviya Mission Teacher Training Centre, The University of Burdwan, 20th February-4th March, 2024

Workshop on Syllabus Modification for UG Chemistry program under NEP-2020, UGBOS & Department of Chemistry, West Bengal State University , on 3rd November, 2023

International Conference on “Contemporary Ideas, Innovations & Initiatives in Chemical Sciences-2023 (CI3CS-2023)” on the occasion of 150 years of the Department of Chemistry, during August 23-24, 2023. **Talk Title:** May Alcohol consumption Effect Our Progenies?

Workshop on UG Chemistry Practical Course organized by UGBOS & Department of Chemistry, West Bengal State University, on 2nd September, 2022.

Faculty Induction Programme (FIP), HRDC, The University of Burdwan during 12th July-10th August, 2022

One day webinar to celebrate "National Science Day-2022" at BKC College on 28th February, 2022. **Invited Talk title:** The effect of drinking Alcohol

One Day International Webinar at Shyampur Siddheswari Mahavidyalaya, West Bengal on 20th September, 2020. **Invited Talk title:** What happens after Alcohol Consumption at Molecular Level?".

AWARDS

Institute Post-doctoral fellowship 2017-19, IIT Kharagpur

SPIE (USA) International student travel grant 2016

SERB (India) International Travel Award 2016

OSA (USA) International student travel Grant recipient 2015

SRF Fellowship From UGC for 2012-2015

JRF Fellowship From UGC for 2010-2012

National Merit Scholarship (West Bengal) for 2003-2005

BOOKS & PROCEDDINGS

Banerjee P, Pal S, Kundu N, **Mondal D**, Sarkar N, Spectroscopic and Microscopic Approach to Monitor the Changes in Bilayer Rigidity during Cell Penetrating Peptide Induced Self-Reproduction of Phospholipid Vesicles. Biophysical Journal, suppl. (63th Biophys. Society Meeting) Vol. 116, Issue 3, 216a (2019).

Mondal D, Goswami D, In situ temperature control and measurement with femtosecond optical tweezers: offering biomedical application. Proc. SPIE (SPIE Photonics BIOS) 100681T-100681T-5 (2017).

Mondal D, Jha A, Joshi Y, Goswami D, Microrheology Study of Aqueous Suspensions of Laponite using Femtosecond Optical Tweezers. Proc. OSA (Optics in the Life Sciences, 2017) OtW2E.1 (2017).

Mondal D, Goswami, D Femtosecond optical tweezers as sensitive nano-thermometer. Proc. OSA (FIO 2016) JTh2A.117, (2016).

Mondal D, Singh A, Dinda S, Goswami D, Elucidating Two Photon FRET and its application through femtosecond optical tweezers. Proc. OSA (Advanced Photonics 2016) NoTu2D.4, (2016).

Mondal D, Goswami D, Temperature control and measurement with tunable femtosecond optical tweezers. Proc. SPIE (SPIE Optics + Photonics 2016) 9922, 992210-1-4 (2016).

Mondal D, Goswami D, Precise control and measurement of Temperature with Femtosecond Optical Tweezers. Biophysical Journal, suppl. (60th Biophys. Society Meeting) Vol. 110, Issue 3, p500a (2016).

Mondal D, Roy D, Goswami D, Spatiotemporal control of energy transfer in optically trapped systems. IEEE Xplore (YSF 2015) YSF, 1-4 (2015).

Mondal D, Goswami D, Controlling the effect on solvent by resonant excitation in femtosecond optical tweezer. Proc. OSA (Optical Trapping Applications 2015) OtT4E. 3, (2015).

Mondal D, Goswami D, Calibration of femtosecond optical tweezers as a sensitive thermometer. Proc. SPIE, (SPIE Optics + Photonics 2015) 95481N, 1-4 (2015).

Book Chapter:

Mondal D, Singhal S, Goswami D, Femtosecond Laser-Induced Photothermal Effect for Nanoscale Viscometer and Thermometer, Selected Topics in Photonics, Springer, 2017