

Faculty Profile

| | |
|---|---|
| <p>Name : Dr. Sayantan Halder Designation : Assistant Professor Department : Chemistry Contact Details: Department of Chemistry, The National Institute of Mysuru, No 50, Koorgalli Village, Hootagalli Industrial Area, next to BEML, Mysuru, Karnataka 571130 E-mail : sayantanhalder@nie.ac.in; vividsayantancolors@gmail.com Phone : +91-9433243332</p> |  |
|---|---|

About me: I am currently serving as an Assistant Professor of Chemistry at The National Institute of Engineering (NIE), Mysuru. My initial schooling and graduation/post graduation are all within West Bengal. I obtained my Ph.D. in Biophysical/Photophysical Chemistry from BITS Pilani, Hyderabad, and completed my postdoctoral research (2 years) at Aarhus University, Denmark. My research expertise lies in photo-physical/bio-physical chemistry, focusing on protein–surfactant interactions, micellar systems, DNA compaction, nanoparticle–protein bioconjugates, and advanced fluorescence spectroscopy techniques including FRET, TCSPC, and fluorescence anisotropy, complemented by SAXS, SANS, and calorimetric methods.

I have published around 17 peer-reviewed articles in reputed international journals and am a co-inventor of an ongoing Indian patent on gene delivery system. My work bridges soft matter chemistry and nano-biotechnology with applications in drug and gene delivery. I have received multiple Best Poster/Oral Presentation Awards at national and international conferences, actively engaging in teaching, laboratory development, and interdisciplinary research collaborations.

Qualifications:

B.Sc. (University of Calcutta), M.Sc. (West Bengal State University), Ph.D. (Birla Institute of Technology and Science, Pilani), Postdoc (Aarhus University, Denmark)

Courses Taught:

- Applied Chemistry for Computer Science & Engineering Stream, NIE Mysuru, 2025 till date (UG classes)
- Applied Chemistry Lab for Computer Science & Engineering Stream, NIE Mysuru, 2025 till date (UG classes)
- Biology for Engineers, NIE Mysuru, 2026 (UG class)

Publications:

Journal Publications:

1. **Sayantana Halder**, Milan Paul, Shalini Dyagala, Rishika Aggrawal, Vinod Kumar Aswal, Swati Biswas, and Subit Kumar Saha (2023): “Role of Gemini Surfactants with Variable Spacers and SiO₂ Nanoparticles in ct-DNA Compaction and Applications toward *In Vitro/In Vivo* Gene Delivery”, *ACS Applied Bio Materials*, 6, 2795-2815.
2. **Sayantana Halder**[†], Rishika Aggrawal[†], Srabanti Jana, and Subit Kumar Saha (2021): “Binding interactions of cationic gemini surfactants with gold nanoparticles-conjugated bovine serum albumin: A FRET/NSET, spectroscopic, and docking study”, *Journal of Photochemistry and Photobiology B: Biology*, 225, 112351.
3. **Sayantana Halder**, Rishika Aggrawal, Vinod Kumar. Aswal, Debes Ray, and Subit Kumar Saha (2021): “Study of Refolding of a Denatured Protein and Microenvironment Probed through FRET to a Twisted Intramolecular Charge Transfer Fluorescent Biosensor Molecule”, *Journal of Molecular Liquids*, 322, 114532.
4. **Sayantana Halder**, Rishika Aggrawal, and Subit Kumar Saha (2022): “Concentration-dependent β -cyclodextrin-promoted refolding of gold nanoparticles-conjugated bovine serum albumin complexed with gemini surfactants of different spacer group”, *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 644, 128862.
5. **Sayantana Halder**, Sunita Kumari, Sugam Kumar, Vinod Kumar Aswal, and Subit Kumar Saha (2018): “Fluorescence Resonance Energy Transfer, Small-Angle Neutron Scattering, and Dynamic Light Scattering Study on Interactions of Gemini Surfactants Having Different Spacer Groups with Protein at Various Regions of Binding Isotherms”, *ACS Omega*, 3, 11192-11204.
6. Rishika Aggrawal[†], **Sayantana Halder**[†], Shalini Dyagala, and Subit Kumar Saha (2022): “Refolding of Denatured Gold Nanoparticles-Conjugated Bovine Serum Albumin through Formation of Catanions between Gemini Surfactant and Sodium Dodecyl Sulphate”, *RSC Advances*, 12, 16014-16028.
7. Shouvik Bhui[†], **Sayantana Halder**[†], Subit Kumar Saha, and Manab Chakravarty (2021): “Binding interactions and FRET between bovine serum albumin and various phenothiazine-/anthracene-based dyes: a structure-property relationship”, *RSC Advances*, 11, 1679-1693.
8. Shalini Dyagala, **Sayantana Halder**[†], Rishika Aggrawal[†], Milan Paul[†], Vinod Kumar Aswal, Swati Biswas, and Subit Kumar Saha (2024): “ct-DNA Compaction by Nanoparticles formed by Silica and Gemini Surfactants having Hydroxyl Group Substituted Spacers: *In Vitro*, *In Vivo* and *Ex Vivo* Gene Uptake to Cancer Cells”, *Journal of Photochemistry and Photobiology B: Biology*, 261, 113066.

9. Sunita Kumari, **Sayantana Halder**, Rishika Aggrawal, Ganapathisubramanian Sundar, and Subit Kumar Saha (2019): "Effect of gemini surfactants on binding interactions of Coumarin 485 with calf thymus deoxyribonucleic acid in presence of nanotubes of β -cyclodextrin", *Journal of Molecular Liquids*, 294, 111615.
10. Rishika Aggrawal, **Sayantana Halder**, Balaji Gopalan, Swati Biswas, and Subit Kumar Saha (2022): "Transformation of Aqueous Micellar Phase to the Bilayer of Gemini Surfactants on Gold Nanoparticles: A Steady-State and Time-Resolved Fluorescence and Fluorescence Anisotropy Study by Tuning the Precise Locations of Probes", *The Journal of Physical Chemistry C*, 126, 14, 6280-6299.
11. Sonu, **Sayantana Halder**, Sunita Kumari, Rishika Aggrawal, Vinod Kumar Aswal, and Subit Kumar Saha (2017): "Study on interactions of cationic gemini surfactants with folded and unfolded bovine serum albumin: Effect of spacer group of surfactants", *Journal of Molecular Liquids*, 243, 369-379.
12. Sunita Kumari, **Sayantana Halder**, Rishika Aggrawal, Vinod Kumar Aswal, Ganapathisubramanian Sundar, and Subit Kumar Saha (2020): "Refolding of protein unfolded by gemini surfactants using β -cyclodextrin and sodium dodecyl sulfate in aqueous medium: Study on role of spacer chain of surfactants", *Journal of Molecular Liquids*, 300, 112238.
13. Shalini Dyagala, Nilanjana Mukherjee[‡], **Sayantana Halder**[‡], Heena Charaya[‡], Mohammed Muzaffar-Ur-Rehman, Sankaranarayanan Murugesan, Shamik Chakraborty, Tanmay Chatterjee, and Subit Kumar Saha (2024): "Presenting a new fluorescent probe, methyl(10-phenylphenanthren-9-yl)sulfane sensitive to the polarity and rigidity of the microenvironment: applications toward microheterogeneous systems", *RSC Advances*, 14, 25865-25888.
14. Rishika Aggrawal, **Sayantana Halder**, Shalini Dyagala, and Subit Kumar Saha (2023): "Role of Dual Nature of Ionic Liquid in Solvation Dynamics and Rotational Diffusion in Mixed Micelles: A Time-Resolved Fluorescence and Fluorescence Anisotropy Study", *ChemistrySelect*, 8, e202204360.
15. Sunita Kumari, Sonu, **Sayantana Halder**, Rishika Aggrawal, Ganapathisubramanian Sundar, and Subit Kumar Saha (2018): "Effect of Urea on Solvation Dynamics and Rotational Relaxation of Coumarin 480 in Aqueous Micelles of Cationic Gemini Surfactants with Different Spacer Groups", *ACS Omega*, 3, 3079-3095.
16. Sunita Kumari, Rishika Aggrawal, Sonu, **Sayantana Halder**, Ganapathisubramanian Sundar, and Subit Kumar Saha (2017): "Effect of Hydrophobicity of Tails and Hydrophilicity of Spacer Group of Cationic Gemini Surfactants on Solvation Dynamics and Rotational Relaxation of Coumarin 480 in Aqueous Micelles", *ACS Omega*, 2, 5898-5910.

17. Shalini Dyagala, Milan Paul, Sneha Das, **Sayantana Halder**, Swati Biswas, and Subit Kumar Saha (2025): “Targeted Photo-triggered and pH-responsive Micellar Cancer Drug Delivery System with Real-time Monitoring through NSET Mechanism”, *ACS Applied Biomaterials*, 8, 9680-9695.

Other achievements:

1. Shalini Dyagala[‡], **Sayantana Halder**[‡], Rishika Aggrawal, Milan Paul, Swati Biswas, and Subit Kumar Saha “A COMPOSITION FOR PRODUCING A GENE DELIVERY SYSTEM” Indian patent, Application number: 202411056054 (*filed & under revisions*).
2. Invited & delivered a *Keynote Presentation* in the 38th European Colloid and Interface Society Conference (ECIS 2024), Scandic Falkoner, Copenhagen (Denmark), September 1-6, 2024.
3. Life member of Society for Positron Annihilation and Nuclear Probes (SPAN) of India.
