

SOURAV SIL

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EDUCATION

- **Michigan State University, East Lansing, USA** **2018 - Present**
Ph.D. Candidate in Chemistry
Advisor: Prof. Warren F. Beck
Dissertation: Excitation energy transfer and photoregulatory mechanisms in intact cyanobacterial phycobilisomes.
- **Indian Institute of Technology, Kharagpur, India** **2016 - 2018**
Master of Science in Chemistry
Advisor: Prof. Nilmoni Sarkar
Master's Thesis Project: The role of viscosity on various dynamical processes of coumarin 153 in room temperature ionic liquid-cosolvent mixture: a femtosecond fluorescence upconversion study.
- **University of Calcutta, Kolkata, India** **2013 - 2016**
Bachelor of Science in Chemistry

PUBLICATIONS

1. Sil, S.; Tilluck, R. W.; Mohan T M, N.; Leslie, C. H.; Rose, J. B.; Domingues-Martin, M. A.; Lou, W.; Kerfeld, C. A.; Beck, W. F. Excitation energy transfer and vibronic coherence in intact phycobilisomes. *Nat. Chem.* **2022**, *14*, 1286-1294, DOI: [10.1038/s41557-022-01026-8](https://doi.org/10.1038/s41557-022-01026-8).
2. Tilluck, R. W.; Mohan T M, N.; Hetherington, C. V.; Leslie, C. H.; Sil, S.; Frazier, J.; Zhang, M.; Levine, B. G.; Van Patten, P. G.; Beck, W. F. Vibronic excitons and conical intersections in semiconductor quantum dots. *J. Phys. Chem. Lett.* **2021**, *12*, 9677-9683, DOI: [10.1021/acs.jpclett.1c02630](https://doi.org/10.1021/acs.jpclett.1c02630).
3. Mohan T M, N.; Leslie, C. H.; Sil, S.; Rose, J. B.; Tilluck, R. W.; Beck, W. F. Broadband 2DES detection of vibrational coherence in the S_x state of canthaxanthin. *J. Chem. Phys.* **2021**, *155*, 035103, DOI: [10.1063/5.0055598](https://doi.org/10.1063/5.0055598).
4. Dutta, R.; Sil, S.; Kundu, S.; Nandi, S.; Sarkar, N. Multi-stimuli responsive fabrication of supramolecular assemblies using ionic self-assembly approach. *J. Mol. Liq.* **2019**, *286*, 110861, DOI: [10.1016/j.molliq.2019.04.138](https://doi.org/10.1016/j.molliq.2019.04.138).
5. Dutta, R.; Jana, G.; Mondal, D.; Pyne, A.; Sil, S.; Chattaraj, P. K.; Sarkar, N. The role of viscosity in various dynamical processes of different fluorophores in ionic liquid—cosolvent mixtures: a femtosecond fluorescence upconversion study. *Photochem. Photobiol. Sci.* **2019**, *18*, 1359-1372, DOI: [10.1039/C9PP00045C](https://doi.org/10.1039/C9PP00045C).

Manuscript in preparation:

6. Sil, S.; Mohan T M, N.; Leslie, C. H.; Rose, J. B.; Blanchard, G. J.; Kerfeld, C. A.; Beck, W. F. Cyanobacteria produce more energy trapping bilin sites in the core of phycobilisomes while growing under red light as compared to white light.

7. Leslie, C.; Mohan T. M., N.; Sil, S.; Beck, W. F. Nonadiabatic interexciton relaxation and dynamic exciton localization mechanisms in allophycocyanin trimers.
8. Yang, K.; Sil, S.; Kerfeld, C. A.; Beck, W. F. Kinetic modeling of the binding of orange carotenoid protein with phycobilisome from fluorescence quenching study.
9. Yang, K.; Sil, S.; Chase, L. H.; Espinoza, R.; Kerfeld, C. A.; Beck, W. F. Multi-dimensional spectroscopic study of OCP-dependent non-photochemical quenching mechanisms in cyanobacteria.
10. Biswas, S.; Sil, S.; Mondal, K.; Chakraborty, T. Estimation of Atmospheric Nitrous Acid at ppt Level. (Summer Project 2017 at IACS, Kolkata, India)

PRESENTATIONS

1. Sil, S.; Tilluck, R. W.; Mohan T. M., N.; Leslie, C. H.; Rose, J. B.; Domínguez-Martín, M. A.; Lou, W.; Kerfeld, C. A.; Beck, W. F. "Excitation energy transfer and photoregulatory mechanisms in intact phycobilisomes using two-dimensional electronic spectroscopy", *76th International Symposium on Molecular Spectroscopy*, June 2023, University of Illinois, Urbana-Champaign, Illinois, USA. (Oral)
2. Sil, S.; Tilluck, R. W.; Mohan T. M., N.; Leslie, C. H.; Rose, J. B.; Domínguez-Martín, M. A.; Lou, W.; Kerfeld, C. A.; Beck, W. F. "Excitation energy transfer pathways in intact cyanobacterial phycobilisomes", *15th Graduate Academic Conference at MSU*, April 2023, East Lansing, Michigan, USA. (Oral - **Best Oral Presentation Award**)
3. Sil, S.; Tilluck, R. W.; Mohan T. M., N.; Leslie, C. H.; Rose, J. B.; Domínguez-Martín, M. A.; Lou, W.; Kerfeld, C. A.; Beck, W. F. "Excitation energy transfer and photoregulatory mechanisms in intact phycobilisomes", *American Chemical Society National Meeting*, March 2023, Indianapolis, Indiana, USA. (Poster)
4. Leslie, C.; Mohan T. M., N.; Sil, S.; Beck, W. F. "Broadband multidimensional electronic spectroscopy studies of nonadiabatic interexciton relaxation and dynamic exciton localization mechanisms in allophycocyanin trimers", *American Chemical Society National Meeting*, March 2023, Indianapolis, Indiana, USA. (Poster)
5. Sil, S.; Tilluck, R. W.; Mohan T. M., N.; Leslie, C. H.; Rose, J. B.; Domínguez-Martín, M. A.; Lou, W.; Kerfeld, C. A.; Beck, W. F. "Excitation energy transfer and photoregulatory mechanisms in intact phycobilisomes", *48th Midwest Southeast Photosynthesis Conference*, October 2023, Turkey Run, Indiana, USA. (Oral)

AWARDS AND HONORS

Scholarships:

- CIBA Young Scientist Travel Award from ACS Younger Chemists Committee 2023
- Travel Funding Fellowship from Graduate School, Michigan State University 2023
- INSPIRE Scholarship from Department of Science and Technology, Govt. of India 2013 - 2018
Top 1% candidates (out of ~450,000) in 12th grade in the state of West Bengal, India
- Indian Oil Scholarship by Indian Oil Corporation Ltd. 2011 - 2013

National Level Exams Qualified:

- Admission Test (GATE) for M.Tech. and Ph.D. in Indian Universities and Institutes 2018
All India Rank 139 out of 19,500 candidates (arranged by IITs & IISc Bangalore)
- National Eligibility Test (NET) for starting Ph.D. in Indian Universities and Institutes Dec 2016
All India Rank 51 out of ~50,000 candidates (organized by CSIR and UGC)
- Graduate School Admission Test to pursue Ph.D. at TIFR 2018, 2016
Ranked in top 1% in all India (conducted by Tata Institute of Fundamental Research)

- Admission Test (JAM) for M.Sc. in IITs and IISc Bangalore 2016
All India Rank 339 out of 10,094 candidates (conducted by IITs and IISc Bangalore)

RESEARCH EXPERIENCES

Laboratory Experiences:

- Operated a novel two-dimensional electronic spectrometer (2DES) with adaptive pulse shaper technique that can generate 7-fs ultrashort pulses to study ultrafast energy transfer processes.
- Experienced in using noncollinear optical parametric amplifier (NOPA) to amplify Yb-laser, multiphoton interference phase scan (MIIPS) and nonlinear crystals to compress the pulses, different types of mirrors and lenses to align and collimate the laser beam.
- Carried out time-correlated single photon counting (TCSPC) experiments to detect the energy transfer process in the nanosecond time scale.
- Expert in isolating phycobilisomes from cyanobacteria cells; grown cyanobacteria cultures, optimized the growth conditions (light intensity, color of light, CO₂ concentration), and used column chromatography to purify the protein.
- Performed steady state spectroscopy in cryogenic temp (77K) using a cryostat.

Technical Experiences:

- Proficient in MATLAB programming; processed and analyzed 2DES experimental data using MATLAB scripts; developed new scripts to make the process faster; prepared new scripts for TCSPC experiments from scratch.
- Experienced in LabView programming; developed new scripts in LabView to make the data acquisition process smoother for 2DES experiments.
- Performed kinetic modeling extensively of the experimental data using CarpetView (Light Conversion) to determine the rate of the energy transfer for each step.
- Used Gaussian software to calculate energy of chromophores in ground state and excited states.

TEACHING EXPERIENCE

Undergraduate Teaching Assistant, Department of Chemistry, Michigan State University

- Introductory Physical Chemistry I (CEM 383, ~120 Students) Fall 2020, 2019
- Introductory Physical Chemistry I (CEM 383, ~20 Students) Summer 2023, 2022, 2020, 2019
- General Chemistry Laboratory (CEM 161, ~70 Students) Spring 2019

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Personal Website: <https://silsourav.wixsite.com/profile>

Github: