

Samruddhi Jewlikar

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Summary

6+ years of experience in protein engineering and molecular biology in photoreceptor proteins and in leveraging innovative molecular techniques like unnatural amino acid mutagenesis to gain mechanistic understanding of photochemistry and signal transduction in blue light activated proteins. Extensive experience in protein purification and characterization, assay development and troubleshooting with data analysis. Experience in determining the structure of a bacterial enzyme using X-ray crystallography to 1.95 Å resolution. Ability to multitask and possess an eager, proactive and collaborative approach with an insatiable appetite to learn, grow and contribute. Proven ability in leveraging AI tools to execute innovative ideas and solutions.

Education

Ph.D. in Biochemistry and Structural Biology, Stony Brook University, NY **2025**

Thesis title: Probing the signal transduction mechanism of the blue light-activated adenylate cyclase OaPAC using unnatural amino acid mutagenesis.

Thesis advisor: Prof. Peter J. Tonge

Bachelor of Technology and Master of Technology in Bioengineering, Indian Institute of Technology Madras, India **2018**

Thesis title: A conserved π -helix plays a key role in thermoadaptation of catalysis in the glycoside hydrolase family 4.

Thesis Advisor: Prof. N. Manoj

Publications

- **Jewlikar, S. S.**, Tolentino Collado, J., Ali, M. I., Sabbah, A., He, Y., Iuliano, J. N., ... & Tonge, P. J. (2025). Probing the Signal Transduction Mechanism of the Light-Activated Adenylate Cyclase OaPAC Using Unnatural Amino Acid Mutagenesis. *ACS Chemical Biology*.
- Tolentino Collado, J., Iuliano, J.N., Pirisi, K., **Jewlikar, S.**, Adamczyk, K., Greetham, G.M., Towrie, M., Tame, J.R., Meech, S.R., Tonge, P.J. and Lukacs, A., 2022. Unraveling the Photoactivation Mechanism of a Light-Activated Adenylyl Cyclase Using Ultrafast Spectroscopy Coupled with Unnatural Amino Acid Mutagenesis. *ACS Chemical Biology*, 17(9), pp.2643-2654.

Presentations

- “Adenylate cyclase as an enzyme switch: From BLUF photochemistry to signaling transduction”, 18th Women in Science and Medicine Research Day, Stony Brook Hospital, NY, March 2024 (*poster presentation*)
- “Elucidating the Signal Transduction Pathway in Light-Activated Adenylyl Cyclase Using Unnatural Amino Acid Mutagenesis”, Biophysical Society Annual Meeting, San Diego, CA, February 2023 (*oral presentation*)

- “Elucidating the Signal Transduction Pathway in Light-Activated Adenylyl Cyclase Using Unnatural Amino Acid Mutagenesis”, Institute of Chemical Biology & Drug Discovery 13th Annual Symposium, Stony Brook, NY, October 2021 (*poster presentation*)
- “A conserved π -helix plays a key role in thermoadaptation of catalysis in the glycoside hydrolase family 4”, American Society of Biochemistry and Molecular Biology Conference, San Diego, CA, April 2018 (*poster presentation*)

Technical Skills

- Protein Biochemistry: Protein expression and purification in bacterial systems
- Structural Biology: X-ray crystallography.
- Molecular Biology: SDS-PAGE, Western Blot, PCR, Primer design
- Biochemical techniques: In vitro enzyme assays, enzymology, enzyme kinetics
- Mass Spectrometry, NMR
- Biophysical techniques: Isothermal titration calorimetry (ITC)
- Spectroscopy: UV-Vis, FT-IR
- Bioinformatics Tools: NCBI BLAST, ClustalW, ExPASy
- Software: PyMOL, GraphPad Prism, Origin, KinTek Explorer, ChemDraw, TopSpin, Microsoft Office, Python

Research Experience

Graduate Research Assistant, Stony Brook University, Stony Brook, NY

August 2018-March 2025

Department of Biochemistry and Structural Biology, Advisor: Prof. Peter J. Tonge

- Successfully performed protein expression and purification for 4 different proteins on AKTA using various chromatography techniques, such as affinity, size-exclusion and ion-exchange, proving extensive experience and proficiency in optimizing protein expression and purification methods.
- Conducted site-directed and unnatural amino acid mutagenesis to produce mutants in a photoactivated adenylyl cyclase enzyme for mapping signaling transduction pathway exhibiting skills in molecular biology techniques.
- Designed and optimized biochemical in vitro assays to determine kinetic parameters for a photoactivated adenylyl cyclase enzyme, utilizing UV-Visible spectroscopy.
- Conducted protein structural dynamics studies to characterize wild type and mutants using steady-state and time-resolved IR spectroscopy.
- Executed biophysical protein-small molecule binding studies using isothermal titration calorimetry (ITC) to analyze protein interactions and affinities.
- Collaborated with 2 teams globally on various biochemistry projects proving interpersonal and communication skills to successfully achieve the project milestones.
- Mentored undergraduate and graduate students in experimental techniques, data analysis, and scientific communication, leveraging tools like GraphPad Prism, Origin, and PyMOL.

Master's Research Fellow, Indian Institute of Technology Madras, India

May 2017-May 2018

- Performed site-directed mutagenesis, PCR, SDS-PAGE, protein expression and purification for a bacterial enzyme showing proficiency in protein and molecular biology techniques.
- Conducted protein crystallization using hanging drop vapor diffusion method to collect X-ray diffraction data proving experience in protein structure determination techniques.

- Demonstrated skills in biophysical protein characterization with hands-on experience in Circular Dichroism studies on α -glucuronidase.

Teaching Experience

- Provided consistent scientific support and training to 50 undergraduate students in biochemistry and cell biology lab proving high adaptability and excellent communication, leading to 10% of the class being admitted to medical school.
- Excellent communication and training skills displayed by conducting recitation sessions in general chemistry lectures for a class of 200 undergraduate students and helped them build a strong foundation in general chemistry.
- Mentored undergraduate and graduate students in the lab in protein purification, AKTA chromatography, UV-Vis and FT-IR spectroscopy as well as data analysis using GraphPad Prism, Origin, PyMOL, bioinformatics tools and scientific communication as evidenced by mentees exceling at conference poster presentations and admission to graduate programs.

Collaborators

- **Prof. Stephen R. Meech** (University of East Anglia, UK),
- **Prof. András Lukács** (University of Pécs, Hungary)
- **Prof. John Haley** (Proteomics Core Facility, Stony Brook University)
- **Gregory M. Greetham** (Central Laser Facility, Rutherford Appleton Laboratory, UK)

Professional Associations

- Member of the American Chemical Society (ACS), 2022-present
- Member of the Biophysical Society (BPS), 2018-present

Awards and Hobbies

- Participant, 3-Minute Thesis Competition, Stony Brook University March 2022
- Graduate Outreach Volunteer, Stony Brook University Aug'21-Aug'24
- Volunteer, Stony Brook University Commencement ceremony May 2019
- I practice yoga and meditation, love traveling, am passionate about health and nutrition science, trained in Hindustani Classical Music, enjoy personal blogging and poetry.

References

- Prof. Peter J. Tonge (peter.tonge@stonybrook.edu)
- Dr. Christopher Brownlee (christopher.brownlee@stonybrook.edu)
- Dr. Jessica Seeliger (jessica.seeliger@stonybrook.edu)