Satirtha Saha Protya

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EDUCATION

Bachelor of Science in Biochemistry, Cognitive Science, & Data Analytics — May 2025
Beloit College, Beloit, WI

- GPA: 3.96/4.0
- Honors: Presidential Scholarship, Dean's List (All Semesters)
- Award: Best Presenter at the Wisconsin Science Education and Research Consortium (WiSER) Conference by the American Chemical Society (October 2024).

Queen's University, Belfast, Northern Ireland — Spring 2024
Study Abroad: Conducted an advanced research project on drug synthesis at the School of Chemistry and Chemical Engineering; enrolled in cutting-edge courses in Biology and Psychology.

RELEVANT COURSEWORK

- BIOL 237: Cell Biology
- BIOL 247: Biometrics/ Biostatistics
- BIOL 340: Neuroscience
- BIO 2205: Applied Genetics (Study Abroad)
- CHEM 220: Analytical Chemistry
- CHEM 230 & 235: Organic Chemistry I & II
- CHEM 300: Protein Biochemistry
- CSCI 204: Data Structures and Algorithms
- PSYC 252:Psychological Disorders
- COGS 205: AI: Facts and Fictions

UNDERGRADUATE THESIS

A Comprehensive Guide to Artificial Intelligence Enhanced Neuroimaging for Medical Diagnosis: My research covers a complete guideline for integrating AI/ML techniques with neuroimaging modalities to improve diagnostic accuracy and patient outcomes in the medical field.

RESEARCH INTERESTS

- Neurochemistry
- Computational Neuroscience
- Proteomics & Peptidomics
- Glycomics & Lipidomics
- Single-Cell Omics
- Immunohistochemistry
- Mass Spectrometry & Imaging

RESEARCH EXPERIENCE

Research Assistant — Aug 2024-Present
BIOL 392: Independent Research, Department of Biology, Beloit College

- Develop and optimize a Python-based pipeline to convert EEG data into wavelet scalograms and implement machine-learning algorithms for enhanced seizure detection in mouse and human epilepsy.
- Convert the existing MATLAB-based seizure detection model to Python, develop a user-friendly GUI for streamlined analysis, and conduct thorough performance evaluations to ensure model accuracy and reliability.

Research Intern June 2024-Present

Li Lab, School of Pharmacy and Department of Chemistry, UW-Madison

- Conduct advanced research on neuropeptides in crustaceans, optimize washing and hemolymph extraction methods for blue crabs and American lobsters, understand the effects of hypoxia on blue crabs, benchmark m/z fragmentation intensity profile prediction software for neuropeptide and enhance the EndoGenius platform to support post-translational modification (PTM) searches.
- Utilize cutting-edge mass spectrometry, isotopic labeling, tissue imaging, and data analysis software to enhance neuropeptide identification and quantitation and co-author multiple papers on both computational and wet lab projects.

Research Assistant Jan 2024-Present

CHE 3012: Research Project, Manyar Lab, School of Chemistry and Chemical Engineering, QUB

- Optimize the photocatalytic oxidation reaction of Ethyl Benzene to get higher selectivity, conversion, and yield of Acetophenone for drug synthesis and pharmaceutical applications.
- Conduct literature review, analyze catalysts, construct 3D-printed novel micro-reactors, analyze samples using GC-FID, apply kinetic modeling to understand continuous flow processes, and publish a paper on the findings.

Research Intern May 2023-Present

Sweedler Lab, Beckman Institute, UIUC

- Explore the novel rodent neuropeptides with chemical modifications, such as DAACP, that do not induce a mass change.
- Work with Aplysia samples for enzymatic screening of DAACP, develop Python-based scripts to filter and detect peptides of interest from IMS-MS data, conduct method development for CD-TIMS, and co-author a paper on the findings.

Research Assistant Jan 2023-Dec 2023

VillapolLab, Houston Methodist Research Institute, TX

- Analyzed 58 current research papers on Gut Microbiota, Brain, and COVID-19 to find correlations between these factors.
- Submitted a detailed literature review and report on the findings to Dr. Sonia Villapol.

TEACHING EXPERIENCE

Teaching Assistant Aug 2024-Present

BIOL 289: Genetics and Evolution, Beloit College

- Provide TA hours, assist with exam preparation, and contribute to lab setup for the Genetics and Evolution course, focusing on molecular and population genetics.
- Support students in understanding hereditary mechanisms, Mendelian and non-Mendelian genetics, and genomics through problem-solving and conceptual learning approaches.

Teaching Assistant Aug 2022-Dec 2022

ECON 199: Principles of Economics, Beloit College

- Tutored 33 students in learning analytical approaches to economic reasoning and contemporary economic issues and strengthened problem-solving skills.
- Graded assignments, provided detailed feedback, and instructed students on improving their performance.

PUBLICATIONS

Fields, L., Dang, T.C., Gray, M.D., **Protya, S.S.**, & Li, L. (2024). *EndoGenius: Enabling comprehensive identification and quantitation of endogenous peptides*. (Submitted to Bioinformatics - Oxford Academic)

Okyem, S., **Protya, S.S.**, & Sweedler, J.V. (In preparation). *CD-TIMS for site-specific localization of DAACPs in mammals.*

Tran, V.N.H., Lu, G., Duong, T., Del Mundo, Z., **Protya, S.S.**, & Li, L. (In preparation for ACS Chemical Neuroscience). *Neuropeptidomics of the American lobster Homarus americanus Hemolymph: Optimizing Buffer Systems for Enhanced Neuropeptide Extraction.*

Greene, G., **Protya, S.S.**, Mazumdar, N.J., Morrison, G., & Manyar, H. (In preparation). *Novel 3D Printed Reactors for Selective Photocatalytic Oxidation of Ethylbenzene to Acetophenone via Continuous Flow Reaction.*

Protya, S.S., & Zebrowski, R.L. (In preparation). *A Comprehensive Guide to Artificial Intelligence Enhanced Neuroimaging for Medical Diagnosis.*

PRESENTATIONS

Protya, S. S., Okyem, S., & Sweedler, J.V. (November 2023), *Computational Approach to Find Difference between CCS Values of All L vs D Amino Acid Containing Peptides and Calculating Peak Resolving Power*. Poster Presentation. Midstates Consortium Undergraduate Research Symposium in the Biological Science and Psychology, Washington University of St. Louis, MO.

Protya, S. S., Okyem, S., & Sweedler, J.V. (November 2023), *Computational Approach to Find Difference between CCS Values of All L vs D Amino Acid Containing Peptides and Calculating Peak Resolving Power*. Oral Presentation. Beloit and Beyond Conference, Beloit College, Beloit, WI.

Protya, S. S. (November 2023), *Navigating Research Opportunities: A Comprehensive Guide for Beloiters*. Oral Presentation. Beloit and Beyond Conference, Beloit College, Beloit, WI.

Tran, V.N.H., Lu, G., Duong, T., Del Mundo, Z., **Protya, S.S.**, & Li, L. (September 2024). *Neuropeptidomics of the American lobster Homarus americanus Hemolymph: Optimizing Buffer Systems for Enhanced Neuropeptide Extraction.* Poster Presentation. STEM Research Poster Presentation, Beloit College, Beloit, WI.

Tran, V.N.H., Lu, G., Duong, T., Del Mundo, Z., **Protya, S.S.**, & Li, L. (October 2024). *Neuropeptidomics of the American lobster Homarus americanus Hemolymph: Optimizing Buffer Systems for Enhanced Neuropeptide Extraction.* Poster & Oral Presentation. The Wisconsin Science Education and Research Consortium WiSER Conference, Medical College of Wisconsin, Milwaukee, WI.

Duong, T., Huang, P., Phetsanthad, A., Tran, V.N.H., **Protya, S.S.**, & Li, L. (November 2024). *Alterations in Neuropeptide Distribution in Blue Crab Callinectes sapidus Under Hypoxia.* Oral Presentation. Midstates Consortium Undergraduate Research Symposium in the Biological Science and Psychology, University of Chicago, IL.

Greene, G., **Protya, S.S.**, Mazumdar, N.J., Morrison, G., & Manyar, H. (November 2024). *Novel 3D Printed Reactors for Selective Photocatalytic Oxidation of Ethylbenzene to Acetophenone via Continuous Flow Reaction.* Oral Presentation. Beloit and Beyond Conference, Beloit College, Beloit, WI.

SUPPORTING EXPERIENCE

Residential Assistant Aug 2023-Present

Office of Residential Life, Beloit College

- Provide support and guidance to fellow students within the residential community, addressing concerns, facilitating conflict resolution, and fostering a positive living environment.
- Assist in the planning and execution of residence hall programs and events, promoting a sense of community and enhancing the overall residential experience for students at Beloit College.

Intern and Admissions Ambassador Jan 2022-Present

Office of Admissions, Beloit College

- Interview and counsel international applicants, provide campus tours, and draft communication letters in Bengali and English.
- Assist professional staff with projects, conduct independent projects, and analyze applicant data with Slate.

CO-CURRICULAR EXPERIENCE

Senior Class Officer, Class of 2025 — Aug 2024-Present
Academic Senator, Academic Senate — Sep 2023-Dec 2023
Executive Member, Clubs and Organizations Oversight Budget Committee — Jan 2023-May 2023
Executive Member, Funding Board — Aug 2022-May 2023
President (Administration), Notre Dame Science Club, Dhaka, Bangladesh — May 2021-July 2022

SKILLS

Lab Skills: Proficient in NMR Spectroscopy, IR Spectroscopy, Mass Spectrometry, Mass Spectrometry Imaging, Gas Chromatography, Liquid Chromatography, Cryosectioning, Micropipette techniques, XRF, Titration, Kirby-Bauer Assay, Microscope
Computer Software: Experienced with Microsoft Office, Google Suite, AutoCAD, ANSYS CFD
Programming Languages: Experienced with C, C++, Python, Java, HTML, R, SQL
Languages: Bengali (Native), English (Full Professional Proficiency), Hindi (Limited Proficiency)

TRAINING AND CERTIFICATION

Computational Neuroscience, University of Washington via Coursera — In Progress
Chemical Tags for Quantitative Omics Workshop, NCQBCS — Aug 2024
Workshop for Mass Spectrometry Imaging, IMSIS Americas — Aug 2024
North American Mass Spectrometry Summer School, NCQBCS — July 2024
Introduction to Neurohacking In R, Johns Hopkins University via Coursera — June 2024
AI for Medical Diagnosis, DeepLearning.AI via Coursera — May 2024
Fundamental Neuroscience for Neuroimaging, Johns Hopkins University via Coursera — March 2024
First AID, CPR & AED Certification, American Heart Association — April 2023

REFERENCES

Jonathan V. Sweedler
James R. Eiszner Family Endowed Chair in Chemistry, and Acting Head, Department of Chemistry, UIUC
600 South Mathews Avenue, Urbana, IL 61801
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