
Tanjeem Azwad Zaman

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RESEARCH INTEREST

Computational Biology, Machine Learning, Algorithms

EDUCATION

PhD in Computational Biology

2025 - Present

CMU-Pitt Joint Program in Computational Biology (CPCB)
Carnegie Mellon University, School of Computer Science

BSc in Computer Science and Engineering (CSE)

2019 - 2024

Bangladesh University of Engineering and Technology (BUET)
CGPA: 4.00/4.00, Position: 1/113

PUBLICATIONS

Published

T. A. Zaman, R. J. I. Momin, and M. S. Bayzid, “On the robustness to gene tree rooting (or lack thereof) of triplet-based species tree estimation methods,” *RECOMB-CG*, 2025. DOI: [10.1101/2024.11.22.624944](https://doi.org/10.1101/2024.11.22.624944)

A. Rafi, A. M. S. Rumi, S. A. Hakim, Sohaib, M. T. Tahmid, R. J. I. Momin, **T. A. Zaman**, R. Reaz, and M. S. Bayzid. “wQFM-TREE: highly accurate and scalable quartet-based species tree inference from gene trees,” *bioRxiv*, 2024, under revision in *Bioinformatics Advances*. DOI: [10.1101/2024.07.30.605630](https://doi.org/10.1101/2024.07.30.605630)

H. S. Shahgir, **T. A. Zaman**, K. S. Sayeed, M. A. Haider, S. S. R. Jony, and M. S. Rahman, “Leveraging Complementary Attention Maps in Vision Transformers for OCT Image Analysis,” *ICIP*, 2025. DOI: [10.48550/arXiv.2310.14005](https://doi.org/10.48550/arXiv.2310.14005)

Preprints

M. T. Tahmid, **T. A. Zaman**, and M. S. Rahman, “GraFusionNet: Integrating Node, Edge, and Semantic Features for Enhanced Graph Representations,” *bioRxiv*, 2024. DOI: [10.1101/2024.11.22.624875](https://doi.org/10.1101/2024.11.22.624875)

RESEARCH EXPERIENCE

Robustness to Gene Tree Rooting of Triplet-based Species Tree Estimation Methods

Supervised by **Dr. Md Shamsuzzoha Bayzid**

August 2023 - March 2025

(*Computational Biology, Phylogenetics*)

- Conducted rigorous empirical testing with different phylogenetic rooting techniques on input gene trees to evaluate its effect on the species trees estimated by triplet-based estimation methods like STELAR.
- Evaluated key parameters like RF Distance, Triplet and Quartet Scores for simulated datasets with varying ILS, gene counts, and base pairs. Considered correctness of inter-clade relationships for biological datasets.
- Identified and explained conditions where STELAR with algorithmic rootings yielded better performances than with Outgroup rooting, even outperforming the state-of-the-art species tree estimation method ASTRAL.
- Suggested an avenue for the underrated triplet-based methods to excel even when the true root is unknown.

Highly Accurate and Scalable Quartet-Based Species Tree Inference from Gene Trees

Supervised by **Dr. Md Shamsuzzoha Bayzid**

August 2023 - July 2024

(*Computational Biology, Phylogenetics, Algorithms*)

- Addressed the scalability issues of the quartet-based species tree estimation method wQFM.
- Introduced wQFM-TREE, which uses graph theory, combinatorics, and data structures efficiently to avoid explicitly enumerating all possible quartets, as done in wQFM.
- Benchmarked against other state-of-the-art (SOTA) methods on simulated datasets (up to 2000 taxa), and empirical datasets (the One Thousand Plant Transcriptomes Initiative dataset).
- Showed that wQFM-TREE consistently outperformed or matched the accuracy of SOTA methods, ASTRAL and TREE-QMC - especially in cases with higher taxa; showcasing its competitiveness in large-scale phylogenetic analyses.

Ophthalmic Biomarker Detection using Ensembled Vision Transformers

Supervised by [Dr. M. Sohel Rahman](#)

October 2023 - March 2025

(Medical Imaging, Machine Learning)

- Used extensive data augmentations and meticulous ensembling of vision transformers to detect ophthalmic biomarkers from OCT scans, placing 1st at the IEEE SPS VIP Cup 2023.
- Consulted an ophthalmologist to learn about local and global features. Ensembled MaxViT (utilizing its strided attention to focus on the former) and EVA-02 (that excels at detecting global features) for the winning idea.
- Used data augmentation strategies including random greyscale transformation, color jitter, random resized cropping, horizontal flipping, and random perspective shifts to enhance model robustness during training.
- Post-competition, utilized unlabelled data by adopting pseudolabeling and knowledge distillation to train a single MaxViT that matched our winning solution, while significantly reducing inference time and computational cost.

GraFusionNet: Dual Graph Autoencoders for Enhanced Graph Representations

Supervised by [Dr. Mohammad Saifur Rahman](#)

November 2023 - May 2025

(Cheminformatics, Machine Learning, Graph Neural Networks)

- Developed a Dual-Graph Autoencoder framework that effectively utilizes both node features and the traditionally overlooked edge features in graph-structured data.
- Made graphs using node and edge features from RDKit. Final features were composed of latent layers of separate Autoencoders trained on the graphs and their line-graphs, and the Embeddings extracted by ChemBERT from SMILES.
- Benchmarked on the Tox-21 dataset (a multi-label binary classification task) and the HIV dataset from MoleculeNet. Our approach was more accurate than other GNN-based methods using edge features (like Graph Transformers)
- Conducted ablation studies with different feature combinations, gaining insights into the efficiency of structural vs. semantic features in each classification task.

WORK EXPERIENCE

Lecturer - Department of CSE, BRAC University

January 2025 - July 2025

Courses:

- [CSE331] Automata and Computability (Theory)
- [CSE423] Computer Graphics (Theory + Lab)

Adjunct Lecturer - Department of CSE, BUET

August 2024 - December 2024

Courses:

- [CSE211] [Theory of Computation](#) (Theory)
- [CSE326] Information Systems Development and Management (Lab)
- [CSE322] Computer Networks (Lab)
- [CSE210] Computer Architecture (Lab)
- [CSE200] Technical Writing and Presentation (Lab)

Machine Learning Intern - North-West Power Generation Company Limited, BD

April 2023 - June 2023

- Part of an internship program organized by the Department of CSE, BUET
- Collected data from several sensors installed around the NWPGCL plant, and used ML models to predict the operational state of machinery

Software Development and Data Analytics Intern - [Infolytx](#)

May 2023 - June 2023

- I was part of a team in charge of developing an app with real-time data analysis and visualization for a foreign client.
- Built a full-stack module from scratch: Data-Analysis (pandas), Backend (FastAPI), and Frontend development. (JavaScript)

PROJECTS

Implementing Paging and Copy-on-Write Techniques in xv6 - Operating System Sessional [\[Link\]](#)

Building a Subset C - Compiler - Compiler Sessional [\[Link\]](#)

Implementing Ray-Tracing - Computer Graphics Sessional [\[Link\]](#)

Brainlytic: an Interactive Problem Solving App in Bengali - Head of Content Team - under [Dr. Anindya Iqbal](#) [\[Link\]](#)

DoctorAid: organized EHRs for Doctors - using NodeJS, React, PostgreSQL - Software Development Sessional [\[Link\]](#)

GRANTS, AWARDS & HONORS

<i>IEEE Upsilon Pi Epsilon Award 2023 - Winner</i> - by IEEE Computer Society [Link]	2023
<i>IEEE SPS Video and Image Processing Cup 2023 - Champion</i> - by IEEE SPS [Link]	2023
<i>University Gold Medal</i> - awarded to the highest CGPA holder in a graduating batch - by BUET	2024
<i>Prime Minister's Gold Medal</i> - awarded to highest CGPA holder in each faculty of grad. batch	2024
<i>University Merit Scholarship and Dean's List Award</i> - by BUET Authority	2020 to 2023
<i>Robi Datathon 3.0 - Runner-up</i> - by Robi, Axiata	2024
<i>International Physics Brawl</i> - 36 th , Category O - by Charles University, Prague, Czechia	2022
<i>AI for Bangla 2.0 - Honorable Mention</i> - by the Govt. of Bangladesh (BD)	2023
<i>Inter University AI Contest</i> - 1 st Place - by BUET CSE Dept.	2022
<i>Bangladesh Mathematical Olympiad (BdMO)</i> - National Champion and Camper	2011 to 2018
<i>Bangladesh Physics Olympiad (BdPhO)</i> - National Winner and Camper	2014 to 2018
<i>Bangladesh Biology Olympiad (BdBO)</i> - National Champion and Camper	2017
<i>Bangladesh Olympiad in Informatics (BdOI)</i> - 3rd Place, Nationals	2016
<i>Creative Talent Hunt</i> - National Winner, Math and ICT, Class 9-10 - by Govt. of BD	2015
<i>Board Talentpool Scholarship (HSC and SSC)</i> - by the Education Ministry of Bangladesh	2018, 2017
<i>International Assessment for Schools</i> - Gold in Math, Science and English - by UNSW	2016, 2015, 2008

AFFILIATIONS AND VOLUNTEERING

<i>IEEE Computer Society Student Branch Chapter, BUET</i>	
Technical Committee, Chair	2022-2023
Treasurer	2021-2022
Technical Committee, Executive	2020-2021
<i>Class Representative for 7 semesters - CSE, BUET</i>	2019-2024
<i>Content Team Head at Brainlytic</i> [Link]	2020-2024
In charge of organizing and setting problems for an interactive math and logic-based problem-solving app.	
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TEST SCORES

GRE

Verbal: 165 (95%) | Quant: 170 (92%) | AWA: 4.5 (83%)
November 7, 2024

TOEFL (iBT)

Score: 120/120
August 24, 2024

SELECTED PROGRAMMING LANGUAGE LITERACY

Python (PyTorch, Pandas, NumPy, Scikit-learn, Seaborn, Matplotlib), **C/C++**, **Bash**, **Java**, **JavaScript**

HOBBIES

Playing the violin, competitive football (soccer)

REFERENCES

Dr. Md. Shamsuzzoha Bayzid

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Dr. M. Sohel Rahman

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