Swethasree Bhattaram

PhD Student - School of CSE @ Georgia Tech

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Research Interests

PhD student specializing in High-Performance Computing (HPC) and Parallel Algorithm Design. Expertise in optimizing large-scale distributed systems, developing GPU-accelerated ML frameworks, and scaling complex algorithms for multi-modal data integration and analysis. Strong foundation in Python, C++, and MPI.

Education

- **Georgia Institute of Technology** — Atlanta, GA
  Doctor of Philosophy (PhD), School of CSE. Advised by Prof. Srinivas Aluru. — *2023 – 2026 (expected)*
  Master of Science (MS) in Bioinformatics. Advised by Prof. Rishikesan Kamaleswaran. — *2021 – 2022*

- **University of Illinois at Urbana-Champaign** — Champaign, IL
  Bachelor of Science (BS) in Bioengineering, Minor in Computer Science. — *2017 – 2021*

Work Experience

- **Georgia Institute of Technology** — Atlanta, GA
  Graduate Researcher — *August 2021 – Present*
  - (PhD) Developed a scalable implementation of Gromov-Wasserstein optimal transport that utilizes matrix-safe joint embeddings to ensure numerical stability during large-scale integration of single cell datasets.
  - (PhD) Parallelizing the Gromov Wasserstein algorithm for large scale single-cell data of multiple modalities.
  - (MS) Collaborated on early-stage PDAC detection by correlating sequencing data with radiological and histopathological image patterns using CNNs.
  - (MS) Designed and implemented an NLP pipeline to identify acute respiratory distress syndrome and sepsis severity from doctors' notes.

- **Exact Sciences** — San Diego, CA
  Research Intern — *May 2025 - Present*
  - Developed end-to-end ML pipelines for short-variant assay data; optimized classifier performance and conducted sensitivity analysis on protein degradation effects.

- **Oak Ridge National Laboratory** — Knoxville, TN
  Graduate Researcher — *May 2024 – Present*
  - Developed a knowledge-guided framework that augments hidden markov model based protein homology search and alignment with query-specific adaptation to local sequence context.
  - Implemented end-to-end GPU implementations of the HMMER suite (HMMBuild, HMMAlign, HMMSearch).

- **University of Maryland School of Medicine** — Baltimore, MD
  Bioinformatics Research Intern — *May 2022 - August 2022*
  - Implemented graph models of liver and kidney cellular data (gene network, and omics data analysis) to identify patterns representing organ rejection post transplant.

Publications

- **Bhattaram, S.**, Bhowmik, D., Kannan, R.
  CAHS: Context Aware Homology Search
  Under Review: ACM KDD, 2026

- **Bhattaram, S.**, Chockalingam, S., Aluru, M., Aluru, S.
  scSAGA: Single-cell Sampled Gromov Wasserstein Alignment for Scalable and Memory-efficient Integration of Multi-modal Single Cell Data
  Under Review: Bioinformatics, Oxford Academic

Relevant Graduate Coursework

High Perfomance Computing, Artifical Intelligence, Multivariate Statistic Analysis, Machine Learning Biosciences, Computational Genomics

Relevant Skills

Python, C++, R, MPI, OpenMP, PyTorch, spaCy, NLTK, Statistics/Probability Distributions

References

Prof. Srinivas Aluru (Georgia Tech; aluru@cc.gatech.edu)
Dr. Ramakrishnan Kannan (Oak Ridge National Lab; kannanr@ornl.gov)