AKANSHA SRIVASTAVA

PhD in Bioinformatics, IIIT Hyderabad

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Research Profile

PhD scholar specializing in computational systems biology and cancer research, with expertise in multi-omics data integration, deep learning, and single-cell/spatial transcriptomics. Interested in developing data-driven frameworks to understand complex biological systems and diseases, including cancer.

Education

PhD in Bioinformatics
IIIT Hyderabad

Hyderabad
Aug 2020 – June 2025

- Thesis Title: Uncovering the Molecular Landscape of Gynecologic and Breast Cancers from Bulk Omics to Single Cell and Spatial Transcriptomics
- Advisor: Dr Vinod P K

MSc in Bioinformatics
Banaras Hindu University (BHU)

Varanasi
July 2018 – Nov 2020

- MSc Project: Genome-wide analysis of codon usage bias in SARS-CoV-2
- Department Rank #2

BSc in Physics
Patna University

Patna
July 2014 – May 2017

- University Rank #1 - Gold Medal

Research Experience

PhD Researcher
IIIT Hyderabad

Hyderabad
Aug 2020 – June 2025

- Investigated the molecular characteristics of gynecologic and breast cancers using bulk multi-omics, single-cell RNA-seq, and spatial transcriptomics data, with a particular emphasis on metabolic reprogramming.
- Identified metabolic subtypes of endometrial cancer and characterized them using clinical, transcriptomic, and genomic features, including somatic mutations and copy number variations.
- Proposed a single-cell network approach to characterize metabolic heterogeneity and uncover regulatory programs involved in driving metabolic reprogramming in gynecologic and breast cancers.
- Uncovered transcriptional landscape of hallmark pathways in the tumor microenvironment of high grade serous ovarian cancer using spatial transcriptomics.
- Implemented graph-based deep learning framework for cancer subtype identification and prognosis prediction using multi-omics data.

Research Intern
IISER Kolkata Summer Research Program 2019

Kolkata
May 2019 – July 2019

- Worked in ROC (RNA, Origins & Complexity) group headed by Professor Supratim Sengupta.
- Project involved study of the evolutionary pattern of tRNA modifications in mitochondrial genome. We used annotated sequence data from UniProt database to detect modications over protein sequence data of eukaryote from NCBI.

Publications

- Srivastava A, P. K. Vinod, A single-cell network approach to decode metabolic regulation in gynecologic and breast cancers, npj Systems Biology and Applications 11.1 (2025): 26.
- Srivastava A, P. K. Vinod, Identification and characterization of metabolic subtypes of endometrial cancer using a systems-level approach, Metabolites 13.3 (2023): 409.
- Jose A, Srivastava A, Ansari A, P. K. Vinod, DeepGraphMut: A graph-based deep learning method for cancer prognosis using somatic mutation profile, Briefings in Bioinformatics, Volume 26, Issue 4, 2025, bbaf409.
- Srivastava A, P. K. Vinod, Deciphering Spatially Resolved Pathway Heterogeneity in Ovarian Cancer Post-Neoadjuvant Chemotherapy, bioRxiv, 2025, https://www.biorxiv.org/content/10.1101/2025.08.08.669449v1.
- Jain S, Srivastava A, P. K. Vinod, Somatic mutation-based stratification of an Indian breast cancer cohort, 2025 (under preparation).

Conference Presentations

- Srivastava A, P. K. Vinod, "Deciphering the Spatially Resolved Transcriptional Landscape of the Tumor Microenvironment in Chemotherapy-Treated Ovarian Cancer", at Genomics India Conference, IISc Bengaluru, August 12-14, 2025.
- Srivastava A, Jose A, P. K. Vinod, "A Graph-Based Deep Learning Approach for Cancer Subtype Identification and Prognosis", at 23rd International Conference on Systems Biology (ICSB), IIT Bombay, December 1-5, 2024.
- Srivastava A, P. K. Vinod, "Deciphering Metabolic Landscape of Gynecologic and Breast Cancers: A Single-Cell Network Perspective", at RECOMB/ISCB Conference on Regulatory & Systems Genomics with DREAM Challenges (RSGDREAM), Madison, Wisconsin, October 1-3, 2024 (virtual).
- Srivastava A, P. K. Vinod, "Deciphering Metabolic Heterogeneity in Endometrial Cancer: A Systems-Level Approach", at 4th Indian Cancer Genome Atlas (ICGA) Conference, IISER Pune, October 6-8, 2023.
- Srivastava A, P. K. Vinod, "Network-based Metabolic Characterization & Drug Repurposing using the Omics Data of Endometrial Cancer", at Network Biology conference, Cold Spring Harbor Laboratory, New York, March 14 - 18, 2023 (virtual).

Teaching Experience

- Teaching Assistant for Introduction to Biology during the monsoon semester for three consecutive years (2022-24).
- Contributed to assignment design, conducted tutorials, and graded students through assignments, quizzes, and semester examinations.
- Mentored and supervised master's students on research projects involving study design, data analysis, and thesis writing.

Technical Skills

- **Programming:** Python, R, Bash, C
- **Data Analysis & Visualization:** Pandas, NumPy, dplyr, ggplot2, matplotlib, seaborn
- **Bioinformatics:** DESeq2, limma, fgsea, GSEApy
- **Network Analysis:** Cytoscape, NetworkX, igraph
- **Machine Learning & Deep Learning:** scikit-learn, Biopython, PyTorch Geometric
- **Single-cell & Spatial Analysis:** Seurat, SingleCellExperiment, Scanpy, Squidpy, pyscenic

Additional Information

Qualified GATE 2020 with All India Rank 914 (Score 437) in Biotechnology Paper	2020
Awarded Elite+Gold certificate for performance in Data Science for Engineers course by NPTEL	2019
Awarded Elite+Gold certificate for performance in Data Mining course by NPTEL	2019
Received Gold medal from Patna University for securing 1st rank at undergraduate level	2017
Received Platinum Jubilee Scholarship by Patna Womens College for academic performance	2014-17