AKANSHA SRIVASTAVA

Ph.D. (Bioinformatics), IIIT Hyderabad

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Research Profile

I am a bioinformatics researcher with expertise in analyzing omics data (bulk RNA-seq, single-cell, and spatial transcriptomics) using statistical, network-based, and machine/deep learning approaches. My Ph.D. focused on cancer systems biology, and I am broadly interested in developing computational frameworks to study complex diseases.

Education

Ph.D. in Bioinformatics — **Hyderabad**
IIIT Hyderabad — *Aug 2020 – Nov 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

M.Sc. in Bioinformatics — **Varanasi**
Banaras Hindu University (BHU) — *July 2018 – Nov 2020*

- MSc Project: Genome-wide analysis of codon usage bias in SARS-CoV-2
- Department Rank #2 (GPA: 8.7/10)

B.Sc. in Physics — **Patna**
Patna University — *July 2014 – May 2017*

- University Rank #1 - Gold Medal (84.62%)

Research Experience

PhD Researcher — **Hyderabad**
IIIT Hyderabad — *Aug 2020 – Nov 2025*

- Characterized tumor heterogeneity in 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 the subtypes using clinical, transcriptomic, and genomic data, including somatic mutations and copy number variations.
- Proposed a single-cell network approach to characterize metabolic heterogeneity and uncover coregulatory networks involved in metabolic reprogramming in gynecologic and breast cancers.
- Identified distinct functional states within cancer tissues and uncovered spatial gene modules associated with chemotherapy response in high-grade serous ovarian cancer.
- Developed a graph-based deep learning framework for cancer patient stratification and prognosis prediction using somatic mutation data, and further extended it for multi-omics data integration.

Research Intern — **Kolkata**
IISER Kolkata Summer Research Program 2019 — *May 2019 – July 2019*

- Worked in ROC (RNA, Origins & Complexity) group headed by Professor Supratim Sengupta.
- Analyzed evolutionary patterns of tRNA modifications in mitochondrial genomes across eukaryotic kingdoms using annotated protein sequence data from UniProt and NCBI.

Publications

- 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. (manuscript under preparation)
- **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.
- Jain S, **Srivastava A**, P. K. Vinod, Somatic mutation-based stratification of an Indian breast cancer cohort, 2025 (manuscript 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

References

- **Dr. Vinod P K**
  Associate Professor, Centre for Computational Natural Sciences and Bioinformatics
  International Institute of Information Technology Hyderabad, India
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- **Dr. Mohit Kumar Jolly**
  Associate Professor, Department of Bioengineering
  Indian Institute of Science, Bangalore, India
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- **Dr. Nita Parekh**
  Associate Professor, Centre for Computational Natural Sciences and Bioinformatics
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