

R RANGA SUDHARSHAN

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EDUCATION

Indian Institute of Technology (BHU), Varanasi Oct 2023
Integrated Dual Degree (B.Tech + M.Tech) in Bioengineering and Biomedical Technology
CGPA: 8.63/10.0

WORK EXPERIENCE

University of Michigan, Ann Arbor Nov 2023 - Present
Lead Bioinformatician, Pancreatic Cancer Lab [\[link\]](#)
Research Specialist Lab Associate, Systems Imaging and Bioinformatics Lab [\[link\]](#)
Visa: H1B (Valid till Nov 2026)

PUBLICATIONS

Zhang, S., Daniels, E. R., McGue, J., **Sudharshan, R.**, Kim, H. C., Thomas, D. G., et al. (2026). Elevated TIGIT Expression and Immune Cell Dysfunction Characterize COMPASS-like Complex Gene-mutated Pancreatic Ductal Adenocarcinoma. *Modern Pathology*, 100972. [\[link\]](#)

Quantum Hamiltonian Learning using Time-Resolved Measurement Data and its Application to Gene Regulatory Network Inference M. Sohail, **Ranga Sudharshan**, S. Pradhan, A. Rao [\[link\]](#)
In Review - Nature Methods

Spatial multi-omics identify an immunosuppressive lipid-laden macrophage niche in primary CNS lymphoma L. Hong, M. Liu, S. Sridhar, ... **Ranga Sudharshan**, A. Tsang, A. Rao, E. T. Keller, et al. [\[link\]](#)
In Review - Blood Cancer Discovery

Rewiring Oncogenic Transcriptional Complexes with Domain-ALTeration Chimeras (DALTACs) in Prostate Cancer J. Luo, J. Yang, J. C. Tien, ... **Ranga Sudharshan**, A. Rao, A. Chinnaiyan, et. al
In Review - Nature

CONFERENCE PAPERS AND ABSTRACTS

Sohail, M. A., **Sudharshan, R.**, Pradhan, S. S., Rao, A. (2025). QubitLens: An Interactive Learning Tool for Quantum State Tomography. *Proceedings of the IEEE International Conference on Quantum Computing and Engineering (QCE)*, Vol. 3, 145–151. [\[link\]](#)

Hong, L., Liu, M., Sridhar, S., Ong, C., Jennifer, B., Hamberger, F., Lane, B., Sanchez, D., **Sudharshan, R.**, Tsang, A., Peng, Y. (2025). Spatial multi-omics reveal distinct immunosuppressive lipid-laden macrophages in primary CNS lymphoma compared to systemic DLBCL. *ASH Annual Meeting*. (Oral presentation) [\[link\]](#)

Zhang, S., Daniels, E., McGue, J., Kim, H. C., **Sudharshan, R.**, Thomas, D., et al. (2025). Abstract A061: TIGIT-mediated immune suppression in KMT2D-mutant pancreatic cancer. *Cancer Research*, 85(18 Suppl 3), A061. (AACR 2025) [\[link\]](#)

Kim, H. C., Acosta, H., Zhang, S., **Sudharshan, R.**, Shameon, S., Pasca di Magliano, M., Shi, J. (2025). Abstract A019: Epigenetic Tumor Suppressor KMT2D Shapes the Immune Landscape in Pancreatic Cancer. *Cancer Research*, 85(18 Suppl 3), A019. (AACR 2025) [\[link\]](#)

Ding, K., Kim, H. S., Zhang, S., **Sudharshan, R. R.**, Shi, J. (2025). Abstract A035: KMT2D Loss Induces Enrichment of Plod2+ Fibroblasts in Pancreatic Cancer. *Cancer Research*, 85(18 Suppl 3), A035. (AACR 2025) [\[link\]](#)

Sudharshan, R., et al. (2023). Comparing perturbagens from differential gene expression data analysis of ASD using random forest and statistical test. *Current Directions in Biomedical Engineering*, 9(1). [\[link\]](#)

AWARDS, TALKS AND OUTREACH

DAAD (KOSPIE) Scholar – Awarded Combined Study and Practice Stays Scholarship (declined).

IBGAA Graduate Student Admission Scholarship, IIT BHU Alumni Association (\$700).

Gave a talk titled "Simplifying quantum state tomography using maximum likelihood estimation"
IEEE International Symposium on Information Theory 2025 [\[link\]](#)

Founding Member, Research Community, IIT BHU

Mentored 25+ sophomores for research internships. [\[link\]](#)

ONGOING RESEARCH PROJECTS

Spatial Analysis of Dormant Breast Cancer Cells in the Bone Marrow Microenvironment

Collaborator: Dr. Grace Bushnell (University of Minnesota)

- Processed 2 μm Visium HD spatial transcriptomics data using Bin2Cell for segmentation and deconvoluted with a bone marrow single-cell atlas via RCTD; registered cytokeratin-positive cells from IHC and annotated tumor cells with nearest-neighbor mapping.
- Performed neighborhood enrichment and computed Moran's I to assess spatial co-localization and auto-correlation of cell types and top differentially expressed genes.

Transcriptomic Profiling of Alveolar Type II Cell Memory Programs using scRNA-seq

Collaborator: Dr. Anukul Shenoy (Department of Microbiology and Immunology, UM Ann Arbor)

- Performed scRNA-seq analyses on FACS-purified AT2 cells, validating conserved interferon-induced (MHC-I) and adaptive (MHC-II) memory programs.
- Conducted differential expression and pathway enrichment analyses (KEGG, GO, MSigDB) using clusterProfiler and inferred transcription factor activity with Decoupler (ULM + CollecTRI database) to characterize regulatory programs.

Variational Hamiltonian Learning of Cell-Cell Networks Across Tumor Progression Landscapes

Collaborator: Dr. Sandeep Pradhan (Dept. of Electrical Engineering, UM Ann Arbor)

- Converted CODEx image patches into continuous cell-density trajectories using kernel density estimation and ordered tumor cells into pseudo-temporal "quantiles" to approximate progression.
- Applied variational Hamiltonian learning using an Ising model, where cell-density trajectories serve as time-dependent observations to recover interaction weights of a parameterized Hamiltonian.
- Engineered POVM-based likelihood estimation with tensor contractions for 4^n outcome probabilities and fully JIT-compiled optimization using JAX and Optax.

TEACHING EXPERIENCE

Teaching Assistant

Computational Neuroscience Lab, School of Biomedical Engineering, IIT (BHU)

Jan 2023 – May 2023

Teaching Assistant

Nano-Cellular Medicine and Biophysics Lab, School of Biomedical Engineering, IIT (BHU)

Aug 2022 – Nov 2022

TECHNICAL SKILLS

Programming

Quantum/Computational Tools

Bioinformatics Tools

Python, R, C; Git; Bash (Slurm HPC)

PennyLane, Qiskit, TensorFlow, PyTorch, scikit-learn, NLTK
Scanpy, scVI, Seurat, ArchR, C-Side, Decoupler, InferCNV, Giotto