Vivek Ruhela

Postdoctoral Research Scientist, Columbia University

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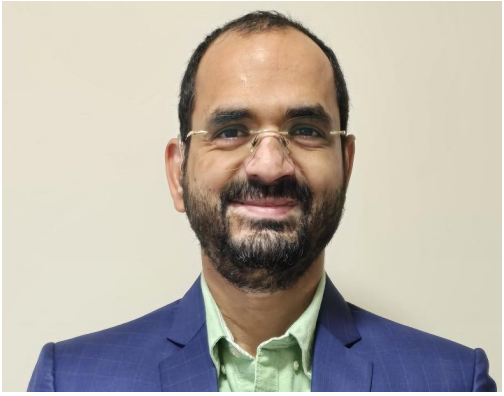

Research Statement

Computational biologist investigating how genomic variation and artificial intelligence converge to decode the biology of complex diseases. I develop scalable and reproducible pipelines for genetics (Runs of Homozygosity (ROH), Genome-wide Association Study (GWAS), and expression quantitative trait loci (eQTL) fine-mapping) and genomic modeling (bio-inspired GCN frameworks, integrative transcriptomic–genetic analysis, and end-to-end bioinformatics workflows) to uncover disease mechanisms across diverse populations.

Education

2018 – *2024*
P.hD., Computational Biology, IIIT-Delhi
Research Area – Cancer Genomics.
Thesis title: *Design and development of AI-based computational tools for identifying predictive biomarkers and signaling pathways for blood cancer.*
Advisors: Prof. Anubha Gupta (IIIT Delhi) and Prof. (Dr.) Ritu Gupta (AIIMS, Delhi)

2014 – 2016
M.Tech., Instrumentation & Control ZHCET, Aligarh Muslim University.
CPI – 9.0 (First Class Honours)
Thesis title: *Detection of Brain tumor in Brain MRI (Magnetic Resonance Imaging).*
Advisor: Prof. Yusuf Uzzaman Khan

2006 – 2010
B.Tech. Electrical Engineering, BSACET College, AKTU.
Marks – 68.78%

2003 – 2004
12th Std., P.D.D.S.V.M, Vrindavan.
Board – C.B.S.E.
Marks – 74.40%

2001 – 2002
10th Std., P.D.D.S.V.M, Vrindavan.
Board – C.B.S.E.
Marks – 79.20%

Research Experience

May 2024 – *Till Now*
Postdoctoral Research Scientist
Department of Neurology, Columbia University Irving Medical Center (CUIMC), New York, USA.
Project: Genetic fine-mapping of Alzheimer's disease using multi-omics integration, Runs of Homozygosity (ROH), and eQTL analysis across diverse populations.
Key Contributions: Developed scalable pipelines for ROH detection, ancestry-specific meta-analysis, and eQTL–GWAS colocalization across populations.

Research Experience (continued)

2018 – 2024 **Doctoral Researcher (Ph.D. in Computational Biology)**
Indraprastha Institute of Information Technology Delhi (IIIT-Delhi), India.
Thesis: AI-driven biomarker discovery and genomic modeling in Multiple Myeloma.
Key Contributions: Developed *miRPipe*, *miRSim*, and *Bio-DGI* frameworks for small-RNA sequencing and AI-based multi-omics integration to identify novel biomarkers distinguishing MGUS and MM.

2015 – 2016 **Graduate Researcher (M.Tech. Thesis)**
Aligarh Muslim University (AMU), Aligarh, India.
Thesis: Detection of brain tumors in MRI using image processing and machine learning techniques.
Tools: MATLAB, SVM, and feature extraction methods for biomedical imaging.

Teaching

Jan 2017 – Dec 2017 **Assistant Professor** Electrical and Electronics Dept., PSIT.

Aug 2016 – Dec 2016 **Assistant Professor.** Electrical Department, Sanskriti University.

Oct 2012 – March 2013 **Course Instructor (Ad-hoc)** Electrical Department, ADKMP College.

Jan 2013 – March 2013 **Lecturer(Ad-hoc)** Electrical Department, BSA College.

Aug 2010 – Sept 2012 **Lecturer.** Electrical Department, Mangalayatan University.

Research Publications

Journal Articles

1. Cieza, B., Pandey, N., **Ruhela, Vivek**, Ali, S., & Tosto, G. (2025). **SAGA** (**S**implified **A**ssociation **G**enomewide **A**nalyses): A user-friendly pipeline to democratize genome-wide association studies. *bioRxiv*, 2025–08. doi:https://doi.org/10.1101/2025.08.25.672146

2. **Ruhela, Vivek**, Gupta, R., Oberoi, R., & Gupta, A. (2025). A comprehensive targeted panel of 295 genes: Unveiling key disease initiating and transformative biomarkers in multiple myeloma. *Computers in Biology and Medicine*, *196*, 110619. doi:https://doi.org/10.1016/j.compbiomed.2025.110619

3. Farswan, A., Gupta, A., Jena, L., **Ruhela, Vivek**, Kaur, G., & Gupta, R. (2022). Characterizing the mutational landscape of mm and its precursor mgus. *American journal of cancer research*, *12*(4), 1919. Retrieved from https://pubmed.ncbi.nlm.nih.gov/35530275/

4. **Ruhela, Vivek**, Gupta, A., Sriram, K., Ahuja, G., Kaur, G., & Gupta, R. (2022). A unified computational framework for a robust, reliable, and reproducible identification of novel mirnas from the rna sequencing data. *Frontiers in Bioinformatics*, *2*, 842051. doi:10.3389/fbinf.2022.842051

5. **Vivek Ruhela**, Gupta, R., Krishnamachari, S., Ahuja, G., & Gupta, A. (2021). miRSim: Seed-based Synthetic Small Non-coding RNA Sequence Simulator. *Zenodo. https://doi.org/10.5281/zenodo.6546356.* doi:https://doi.org/10.5281/zenodo.6546356

6. **Ruhela, Vivek**, Farswan, A., Gupta, A., Sriram, K., Kaur, G., & Gupta, R. (2021). P-035: Ai-based models for the identification of critical genetic biomarkers to distinguish mm from mgus using the wes data. *Clinical Lymphoma Myeloma and Leukemia*, *21*, S57. doi:10.1016/S2152-2650(21)02169-8

7. Kaur, G., **Ruhela, Vivek**, Rani, L., Gupta, A., Sriram, K., Gogia, A., … Gupta, R. (2020). Rna-seq profiling of deregulated mirs in cll and their impact on clinical outcome. *Blood cancer journal*, *10*(1), 1–9. doi:10.1038/s41408-019-0272-y

Conferences

1. Pandey, N., **Ruhela, Vivek**, Cieza, B., Barral, S., Samper-Ternent, R., Montesinos, R., … Tosto, G. (2025). Genome-wide meta-analysis of cognitive performances in hispanics/latinos identifies novel rare variant locus pcat5. In *Alzheimer's & parkinson's diseases conference*. Retrieved from http://dx.doi.org/10.13140/RG.2.2.24659.90407

2. **Ruhela, Vivek**, Cieza, B., Mayeux, R., Reyes-Dumeyer, D., Teich, A. F., & Tosto, G. (2025). Genetic colocalization of expression quantitative trait loci (eqtl) mapping and gwas in a multiethnic brain bank: An insight into ancestry-specific regulatory architecture in alzheimer's disease. In *Alzheimer's association international conference*. ALZ. Retrieved from https://alz.confex.com/alz/2025/meetingapp.cgi/Paper/107199

3. **Vivek Ruhela**, Panday, N., Cieza, B., Barral, S., Samper-Ternent, R., Montesinos, R., … Tosto, G. (2025). Fine mapping of regions of homozygosity and their role in alzheimer's disease: Insights from the peruvian and mexican populations. In *Alzheimer's & parkinson's diseases conference*. Retrieved from https://doi.org/10.13140/RG.2.2.15642.15048

4. **Ruhela Vivek**, Yang, Z., Jacobson, S. W., Jacobson, J. L., Meintjes, E. M., Tosto, G., & Carter, R. C. (2024). Gene by prenatal alcohol exposure interaction effects on growth and cognition in mother- child dyads in a south african birth cohort. In *American society of human genetics (ashg)*. Retrieved from http://dx.doi.org/10.13140/RG.2.2.17434.56006

Skills

Languages	Strong reading, writing and speaking competencies for English.
Coding	MATLAB, Python, R, Bash, Awk, LaTeX
Misc.	Academic research, teaching, training

Miscellaneous Experience

Awards and Achievements

2010 **Competition Prize for Outstanding Performance in MATLAB Code Challange**, BSA Engg. College.

Certification

2017 **Medical Image Analysis**. Elite certification in NPTEL Online certification.

Enhancing Soft Skills and Personality. Elite certification in NPTEL Online certification.

References

Available on Request