

# Samuel Bharti

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## EDUCATION

- Aug 2022 – Present **Doctor of Philosophy (Biomedical Engineering and Bioinformatics)**  
The University of Alabama at Birmingham (UAB), Birmingham, AL, USA
- Aug 2023 – 2024 **Certificate in Translation of Biomedical Innovation to Clinical Practice**  
The University of Alabama at Birmingham (UAB), Birmingham, AL, USA
- Aug 2017 – Jul 2021 **Bachelor of Technology (Bioinformatics)**  
Amity University, Noida, India

## EXPERIENCES

- Aug 2022 – Present **Blazer Graduate Research Fellow (Ph.D. trainee), UAB**
- Leading multi-omics analysis of Neurofibromatosis Type1-associated cancers
  - Developing pipelines and web applications for single-cell RNA-seq and spatial transcriptomics.
- Dec 2023 – present **Innovate Fellow, Bill L. Harbert Institute for Innovation and Entrepreneurship, UAB**
- Conducting scientific and market research for UAB technologies
  - Assessing commercial viability and preparing technology marketing materials
- Aug 2020 – 2022 **International Research Volunteer, UAB**
- Developed SEAS<sup>1</sup> and PAGER 3.0 tools<sup>2</sup> for genomic data analysis.
- Feb 2021 – Jan 2023 **Chief Technical Officer, FundU Games Private Ltd., Delhi, India**
- Led 8-person tech team.
  - Managed FinTech product deployment using AWS and Docker.
- Oct 2021 – Aug 2022 **Bioinformatics Engineer, STEM-Away, USA**
- Developed Bioinformatics and Data Science course materials.
- June – Aug 2021 **Technical Lead (Bioinformatics Pathway), STEM-Away, USA**
- [Led](#) a diverse team of 40 international students to develop sMAP<sup>3</sup>, an R Shiny app for Microarray Data Analysis, delivering a functional product in 8 weeks while coordinating across time zones.
- Jan – Apr 2021 **Student Researcher, Centre for Computational Biology and Bioinformatics, Amity University, Noida, India**
- Developed GlucoKinaseDB<sup>4</sup> (a curated database of glucokinase modulators).
  - Developed PepEngine<sup>5</sup> (a bioactive peptide database).
- Apr – Sep 2020 **Student Researcher, SCIS, Jawaharlal Nehru University, Delhi, India**
- Developed microarray analysis pipeline in R to perform a meta-analysis of Parkinson's disease and identify blood biomarkers.

Apr 2019 – Jul 2020

**Student Researcher**, *Systems Biology and Data Analytics Research Lab, Amity University, Noida, India*

- Developed VIRdb2.0 (a comprehensive resource for Vitiligo)
- Developed R pipeline for Epidemiological modeling of COVID-19.
- Reconstructed genome-scale metabolic model (PluriMetNet) for human embryonic stem cell (hESC) and performed Flux balance analysis using COBRA toolbox in MATLAB.

Apr 2017 – Sep 2018

**Data Analyst**, *Creature Retail Private Limited, Delhi, India*

- Managed the company's e-commerce platform profiles (Amazon, etc.) and to handle sales, product listing, and inventory management.

May – Jun 2018

**Data Operations Field Intern**, *Park Smart, Delhi, India*

- Collected and compiled data on the parking spots in the city.

Apr – Jul 2017

**Data Operations Intern**, *QuickDoc E-Healthcare Private Limited, Delhi, India*

- Promoted QuickDoc Healthcare App at the hospital clinics and collected user feedback from patients.

## WEB-TOOLS AND PACKAGES DEVELOPED

- [1] [SEAS \(Statistical Enrichment Analysis of Samples\)](#): A tool for analyzing omics data to predict clinical outcomes, used in glioblastoma multiforme studies.
- [2] [PAGER 3.0 and PAGER WEB APP](#): A comprehensive database infrastructure for gene-set and pathway enrichment analysis, enhancing network biology applications.
- [3] [sMAP \(Standard Microarray Analysis Pipeline App\)](#): An R Shiny app designed for transcriptomics data analysis, featuring quality control, statistical analysis, and biomarker discovery.
- [4] [GlucoKinaseDB](#): A curated database of 1,723 glucokinase modulators for clinical and molecular research.
- [5] [PepEngine](#): A structural database for synthetic peptides, providing detailed information on sequences, structures, and dihedral angles.
- [6] [VIRdb 2.0](#): A vitiligo research tool featuring differentially expressed genes, curated protein targets, and natural compounds for drug discovery.
- [7] [PluriMetNet](#): A genome-scale metabolic model of human embryonic stem cells, used to study metabolic variations at fluctuating oxygen concentrations.
- [8] [R Shiny Template](#): A reusable template for developing bioinformatics web applications in R Shiny.
- [9] [Peacock](#) (In-dev): An R package to streamline project initialization and workflow management.
- [10] [LLM in R-Shiny](#) (In-dev): A module function to setup a chatbot application in R Shiny using OpenAI
- [11] [scRNA-seq Analysis Integration App](#) (In-dev): A Shiny application integrating nf-core pipeline outputs with Seurat, pseudobulk, CellChat, for comprehensive sn/scRNA-seq data analysis.

## AWARDS AND FELLOWSHIP

- **Professional Development Award** (\$400), Graduate Student Government, UAB, Oct 2024.
- **Travel Award**, (\$300), Center for Clinical and Translational Science, UAB, 2023
- **Travel Award**, (\$300), Center for Clinical and Translational Science, UAB, 2022
- **Blazer Graduate Research Fellowship** (16 months), UAB, Aug 2022 – Dec 2023.

## PROFESSIONAL CERTIFICATIONS

Jan 2024 – present

**Certified Instructor**, [The Carpentries](#)

## SKILLS

- **Programming & Scripting:** Proficient in R, Python, MATLAB, Bash for data analysis, statistical modeling, and bioinformatics pipelines.
- **Bioinformatics:** Experienced in single-cell and spatial transcriptomics, variant analysis, RNA-seq, and multi-omics integration for cancer research.
- **Data Analysis & Visualization:** Skilled in developing custom workflows for biological data analysis using tools like Seurat, DESeq2, and Pseudobulk. Strong capabilities in data visualization with ggplot2 and Plotly.
- **Cloud & High-Performance Computing:** Expertise in setting up and managing cloud infrastructure (AWS, GCP) and HPC environments, using SLURM and Docker for scalable computing.
- **Software & Web Development:** Developed bioinformatics web applications with R Shiny, Streamlit, and React, with a focus on interactive data exploration.
- **Machine Learning & Modeling:** Applied machine learning techniques to biomedical data, with experience in feature selection, classification models, and network analysis.
- **Workflow Management:** Experienced in workflow management using Nextflow and pipeline development for large-scale genomic data processing.

## RESEARCH PUBLICATIONS

- [1] Yadav, S., **Bharti, S.**, & Mathur, P. (2023). GlucoKinaseDB: A comprehensive, curated resource of glucokinase modulators for clinical and molecular research. *Computational Biology and Chemistry* <https://doi.org/10.1016/j.compbiolchem.2023.107818>
- [2] **Bharti, S.**, Krishnan, N., Veyssi, A., Momeni, M., & Raj, S. (2022). sMAP: An interactive microarray data analysis tool for early-stage researchers. *bioRxiv* <https://doi.org/10.1101/2022.05.27.492984>
- [3] Yadav, S., **Bharti, S.**, Srivastava, P., & Mathur, P. (2022). PepEngine: A manually curated structural database of peptides containing  $\alpha$ ,  $\beta$ - Dehydrophenylalanine ( $\Delta$ Phe) and  $\alpha$ -Amino Isobutyric Acid (Aib). *International Journal of Peptide Research and Therapeutics*. <https://doi.org/10.1007/s10989-022-10362-9>
- [4] Yue, Z., Slominski, R., **Bharti, S.**, & Chen, J. Y. (2021). PAGER Web APP: An interactive, online gene set and network interpretation tool of high-throughput functional genomics results. *Frontiers in Genetics* <https://www.frontiersin.org/articles/10.3389/fgene.2022.820361/abstract>
- [5] Nguyen, T. M., **Bharti, S.**, Yue, Z., Willey, C. D., & Chen, J. Y. (2021). Corrigendum: Statistical Enrichment Analysis of Samples: A general-purpose tool to annotate metadata neighborhoods of biological samples. *Frontiers in Big Data*, 4, 804141. <https://doi.org/10.3389/fdata.2021.804141>
- [6] **Bharti, S.**, Sengupta, A., Chugh, P., & Narad, P. (2020). PluriMetNet: A dynamic electronic model decrypting the metabolic variations in human embryonic stem cells (hESCs) at fluctuating oxygen concentrations. *Journal of Biomolecular Structure and Dynamics*, 1–9. <https://doi.org/10.1080/07391102.2020.1860822>
- [7] Srivastava, P., Talwar, M., Yadav, A., Choudhary, A., Mohanty, S., **Bharti, S.**, Narad, P., & Sengupta, A. (2021). VIRdb 2.0: Interactive analysis of comorbidity conditions associated with vitiligo pathogenesis using co-expression network-based approach. *F1000Research*, 9, 1055. <https://doi.org/10.12688/f1000research.25713.2>
- [8] **Bharti, S.**, Narad, P., Chugh, P., Choudhury, A., Bhatnagar, S., & Sengupta, A. (2020). Multi-parametric disease dynamics study and analysis of the COVID-19 epidemic and implementation of population-wide intrusions: The Indian perspective. *MedRxiv*, 2020.06.02.20120360. <https://doi.org/10.1101/2020.06.02.20120360>

## ORAL PRESENTATIONS

Nov 23, 2021

Live demo at STEM-AWAY: “**Deployment of R Shiny Bioinformatics App on AWS**”

- Delivered a talk on containerized bioinformatics and deployment using AWS followed by a [live demo](#) including launching an EC2 instance, connecting to an instance, and docker container deployment.

## CONFERENCES / SYMPOSIUMS

Jun 24 – 27, 2023

Virtually attended the 2023 NF Conference by Children Tumor Foundation.

## POSTER PRESENTATIONS

- Sep 27 – 29, 2023 Presented a poster titled “**Application of a Multi-Omics Approach in NF1 Deficient Tumors and Controls can Highlight Novel Associations and Therapeutic Targets**” CCTS Translational Training Symposium in Biloxi, MS
- Oct 27, 2022 Presented poster titled “**Exploratory Analysis of Cancer Clinical Samples using the new Web-based SEAS Software**” at O’Neal Research Retreat, UAB
- Sep 14 – 16, 2022 Presented a poster titled “**Exploratory Analysis of Cancer Clinical Samples using the new Web-based SEAS Software**” at CCTS Translational Training Symposium in Mobile, Alabama
- June 22-25, 2020 Presented a poster titled “**PluriMetNet: A dynamic electronic model deciphering the metabolic profiling of human embryonic stem cells (hESCs) and its applications**” at RECOMB 2020 conference, Italy.

## TEACHING EXPERIENCE

- Jul 9 – 10, 2024 **Helper**, Data Science workshop on “[Bulk RNA-seq](#)”, *UAB-Biological Data Science Core (U-BDS), UAB*
- Mar 18 – 19, 2024 **Instructor**, Carpentries workshop on “[Bash Shell, Git, Text Editor, and Python](#)”, *UAB-Biological Data Science Core (U-BDS), UAB*
- Dec 14 – 15, 2023 **Instructor**, Carpentries workshop on “[Bash Shell, Git, Text Editor, R and R Packages](#)”, *UAB-Biological Data Science Core (U-BDS), UAB*
- Jan 2016 - 2019 **Teacher**, Taught Science and Mathematics at a local institution to primary grade and high school students, Delhi, India

## LEADERSHIP AND VOLUNTEER EXPERIENCE

- Apr 2023 – Present **President**, [Informatics Club](#), *UAB, AL, USA*
- Leading collaborations with academic departments and industries to enhance bioinformatics learning.
- 2022 – Mar 2023 **Board Member**, [Informatics Club](#), *UAB, AL, USA*
- Organized student engagement events and handled technical logistics.
- Aug 2017 – 2021 **Class Representative**, *AIB, Amity University, Noida, India*
- Acted as the primary liaison between students and faculty, addressing academic and organizational matter.
- Jan – May 2019 **Volunteer**, *Sachhi Saheli, Delhi, India (NGO)*
- Educated financially underprivileged girls aged 12 – 17 years about menstruation and its myths and taboos, in rural areas of the city.
- 2017 – 2019 **Member**, *Bioinformatics Club, Amity Institute of Biotechnology, Noida*
- Assisted in logistics and organization of club events at the university.
- Sep – Jan 2017 **Volunteer**, *J.A.X. Healthcare Foundation (NGO)*
- Assisted with cancer fundraising event coordination and planning