

AVINASH KARKADA ASHOK

Biotechnology | Bioinformatics/Computational Biology

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EDUCATION

M.S. Bioinformatics

Johns Hopkins University

August 2024 - Ongoing

Baltimore, USA

B.E. Biotechnology

Visvesvaraya Technological University

June 2019 - July 2023

Karnataka, India

First Class with Distinction

RECENT EXPERIENCES

Bioinformatics Engineer

Johns Hopkins University School of Medicine

Sep 2024 - Ongoing

Baltimore, USA

- Develop and maintain computational pipelines for InFlux, a highly multiplexed NGS-based influenza A neutralization assay, analyzing samples to profile humoral immunity across diverse patient cohorts in **Dr. Benjamin H. Larman's** lab.
- Lead a PHIP-Seq antibody-profiling project investigating influence of microbial dysbiosis on humoral immunity in early-onset, late-onset colorectal cancer, and polyp/healthy control cohorts.

Summer Bioinformatics Intern

Infinity Bio, Inc.

June 2025 - August 2025

Baltimore, USA

- Contributed to EpitopeFINDER 2, a reproducible pipeline to align and cluster library peptide sequences to identify continuous and discontinuous epitopes, integrating FoldDisco-based structural mapping to localize antibody binding sites on 3D antigen structures.
- Developed **Latch Bio**-based analysis pipelines to improve customer experience, including a UMAP-based sequence-space analyzer and visualization module for EpitopeFINDER2.
- Benchmarked and optimized NGS based **MIPSA** analysis pipelines by comparing alignment strategies (Bowtie2, Minimap2, etc.), improving alignment quality and I/O handling while reducing overall runtime and resource usage.

Junior Research Fellow

Indian Institute of Science

Nov 2023 - Aug 2024

Bangalore, India

- Contributed to a comparative genomics study that decoded mammalian adaptive signatures in clade 2.3.4.4b H5N1 across non-human hosts, highlighting convergent mutations that may increase human adaptation risk and informing genomic surveillance priorities.

- Helped show that neuraminidase stalk length and haemagglutinin glycosylation patterns molecularly bias segment pairing, promoting reassortment routes that facilitated emergence of highly pathogenic clade 2.3.4.4b A(H5N1).
- Supported discovery and functional characterization of RHIM motifs in bat RNA viruses including a SARS-CoV-2 Nsp13 RHIM, that differentially engage ZBP1-RIPK3 signaling to orchestrate host cell death in bat versus human cells.

AREAS OF EXPERTISE/INTERESTS

Computational Biology and Bioinformatics.

Biostatistics and data visualization, Machine Learning, and OMICS Informatics.

Molecular modeling and Dynamics.

Immunology, Virology, and Cancer biology.

Pipeline engineering, HPC and cloud (Linux/AWS), Python, R, and shell scripting.

Drug discovery and structural biology.

SKILLS

Programming

Python R Bash Snakemake SQL Java Git/GitHub Linux HPC/SLURM
AWS EC2/GPU

Computational Tools & Techniques

PHIP-Seq RNA-seq scRNA-seq CHIP-seq WGS GROMACS AMBER gmx mmpbsa
RDKit Snakemake XGBoost LASSO SVM Latch Bioconductor Biopython Bowtie
BWA Kallisto Minimap2 STAR HISAT Trimmomatic SAMtools Git MODELLER
CP2K \LaTeX AlphaFold Rosetta ESMFold Cytoscape AutoDock Maestro CD-HIT
BLAST ORCA Gaussian FastQC PyMOL UCSF ChimeraX VMD EMBOSS
UCSC Genome browser Ensembl genome browser DESeq2 edgeR SRA Toolkit IGV Excel
GraphPad Prism Docker +Many more

Wet Lab Techniques

Bacterial cell culture Agarose gel electrophoresis PCR SDS-PAGE Western blot
Sample handling & QC Basic ELISA handling

RELEVANT PUBLICATIONS

- **Decoding non-human mammalian adaptive signatures of clade 2.3.4.4b H5N1 to assess its human adaptive potential**
R. Nataraj, A. K. Ashok, A. A. Dey, and S. Kesavardhana
Microbiology Spectrum.
- **High-throughput screening and molecular dynamics simulations of natural products targeting LuxS/AI-2 system as a novel antibacterial strategy for antibiotic resistance in *Helicobacter pylori***
A. K. Ashok, T. S. Gnanasekaran, H. S. S. Kumar, K. Srikanth, N. Prakash, and P. Gollapalli
Journal of Biomolecular Structure and Dynamics.

- **Bat RNA viruses employ viral RHIMs orchestrating species-specific cell death programs linked to Z-RNA sensing and ZBP1–RIPK3 signaling**
S. Mishra, D. Jain, A. A. Dey, S. Nagaraja, M. Srivastava, O. Khatun, K. Balamurugan, M. Anand, **A. K. Ashok**, S. Tripathi, *et al.*
Cell iScience.
- **Computational-driven discovery of AI-2 quorum sensing inhibitor targeting the 5'-methylthioadenosine/S-adenosylhomocysteine nucleosidase (MTAN) to combat drug-resistant *Helicobacter pylori***
M. Kumar, **A. K. Ashok**, T. Bhat, K. Ballamoole, and P. Gollapalli
Computers in Biology and Medicine.

ACHIEVEMENTS

- First-/co-author across peer reviewed journals on influenza genomics, viral cell-death signaling, and MD-backed discovery.
- Paper presentation - Immunology 2025
- Best paper presentation - JAIVIK 2022
- Best undergrad thesis - Final year dissertation
- Trained several students in practical Bioinformatics.

COMMUNITY SERVICE

- Peer reviewer for the Nature Communications, Journal of Crohn's and Colitis, Journal of Biomolecular Structure and Dynamics, and the Journal of Biological Macromolecules
- AICTE Activity Volunteer
- National Cadet Corps Volunteer
- National Service Scheme Volunteer

CERTIFICATES & RELEVANT COURSES

Certificates

Epigenetic Control of Gene Expression

University of Melbourne

SARS-CoV-2 Protein Modeling and Drug Docking

Coursera Project Network

Algorithms for DNA Sequencing

Johns Hopkins University

Drug Discovery

UC San Diego

Python for Genomic Data Science

Johns Hopkins University

Introduction to Genomic Technologies

Johns Hopkins University

Introduction to the Biology of Cancer

Johns Hopkins University

Summer School on Machine Learning in Bioinformatics

HSE University

Antibody Purification

Siddaganga Institute of Technology

Artificial Intelligence in Drug Discovery

CSIR-NEIST

Technical Hands-On Workshop: Molecular Docking

BDG Lifesciences

Relevant coursework

Introduction to Bioinformatics

Algorithms for Bioinformatics

Applied Machine Learning

Artificial Intelligence

Gene Expression Data Analysis and Visualization

Protein Bioinformatics

Practical Computer Concepts for Bioinformatics

Molecular Basis of Pharmacology

Molecular Biology

Epigenetics, Gene Organization and Expression

Genomic and Personalized Medicine

Biostatistics and Biomodelling

Biochemistry

Microbiology

Genetics and Genetic Engineering

Immunology and Immunotechnology

Biomolecular Simulations

Programming with Python

Genomics and Proteomics

Data Analytics

Enzyme Technology

Clinical Trials and Data Management

Biopharmaceuticals and Regulatory Affairs