Derrin Bright

Bioinformatics | Biotechnology

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Education

Vellore Institute of Technology (VIT)	**CGPA: 8.76**	Vellore, India
Bachelor of Technology in Biotechnology		*2022-Present*
Chettinad Vidyashram	**12th - 94.8%**	Chennai, India
CBSE Biology-Mathematics		*2008-2021*

Technical Experiences

Ashoka University — Delhi, India
Research Intern — *Jan 2024 - Present*

- Analyzed 5 assembled E. coli genomes to investigate carbapenem and beta-lactam resistance by performing BLAST and RGI-CARD analysis to identify mutations, and correlating genotype-phenotype relationships through AST report analysis.
- Evaluated penicillin-binding protein (PBP) status by performing Multiple Sequence Alignment (MSA) against a reference wild-type to detect conserved mutations and confirm resistance mechanisms.
- Automating genomic data processing by developing a custom script to systematically rename and organize FASTA files, creating a structured dataset necessary for phylogenetic analysis using the PhaME tool.

NovaLinks — Vellore, India
Project Leader — *February 2024 - Present*

- Leading a project integrating miRNA analysis and histopathological imaging with machine learning to enhance lung cancer subtype classification and improve diagnostic precision.
- Conducted research on miRNA biomarkers specific to lung cancer and provided biological insights to support the development of an accurate classification model for distinguishing adenocarcinoma from squamous cell carcinoma.

BioTech and AI/ML Intern — *December 2024 - February 2025*

- Developing an IoT-enabled UTI diagnostic device integrating CMOS sensors for real-time colorimetric analysis to quantify biomarkers using ligand-based dipsticks for accurate and rapid diagnostics in rural areas.
- Optimizing biosensor performance by researching suitable materials, while leveraging AI/ML model to detect multiple asymptomatic diseases and enhance diagnostic precision.

Teachnook — Bangalore, India
Data Science Intern — *September - October 2024*

- Developed and implemented machine learning models, including Random Forest, SVM, and ResNet, to analyze plant detection and defect detection tasks based on image inputs and specifications..
- Gained proficiency in Python, NumPy, and Pandas, alongside essential data visualization techniques, and foundational concepts on machine learning and deep learning.

Bversity — Vellore, India
Bioinformatics Intern — *February 2024*

- Conducted drug discovery research using computational tools like KNIME for molecular similarity searches and AlphaFold for protein structure prediction.
- Worked on targeted antiviral and antibacterial drug screening projects, gaining insights into therapeutic targeting and molecular interactions in infectious diseases.

Alpha Bio Cell, VIT University — Vellore, India
Vice Chairperson — *January 2024 - December 2024*

- Led several biotechnology and bioinformatics related events including hackathons, workshops, and quizzes, enhancing the club's engagement.
- Mentored junior core members, ensuring effective collaboration and event planning across different stages.
- Applied leadership, technical, and project management skills to drive various initiatives, significantly contributing to the club's growth and impact.

Technical Projects

Comparative Transcriptomic Analysis of HPV-Associated Cancers Using Co-Expression Network Modeling
- Extracting transcriptomic data from TCGA for HPV-infected cervical and oropharyngeal cancers using bioinformatics pipelines in R Studio.
- Implementing Weighted Gene Co-Expression Network Analysis (WGCNA) to construct gene co-expression networks, identifying key hub genes commonly expressed across both cancers.

3D Structure Prediction of Protein Complexes in Rabies Virus Infection
- Extracted protein sequence data from NCBI and predicted 3D structures using AlphaFold to study interactions between rabies virus glycoprotein (RABV-G) and nicotinic acetylcholine receptors (nAChRs).
- Analyzed predicted structures to understand critical interactions facilitating viral entry and infection, contributing to insights into rabies pathogenesis.

Screening Antimalarial Molecules Using 2D Fingerprint Similarity
- Screened a library of antimalarial molecules against a query (chloroquine drug) by generating molecular fingerprints and computing Tanimoto similarity coefficients using KNIME and RDKit nodes.
- Extracted molecular data from the Protein Data Bank (PDB) and utilized RDKit to represent chemical structures as molecular fingerprints.
- Visualized pairwise similarity scores between molecular fingerprints as heatmap representation, identifying high-similarity molecules as potential candidates for antimalarial drug development.

Data-Driven Machine Failure Detection
GitHub Link
- Developed an automated solution for machine failure prevention by analyzing key metrics such as operating temperature, proximity measurements, electrical current, and environmental factors like air quality and pressure.
- Employed a Random Forest model, achieving a 2.116% performance improvement over a baseline logistic regression model through feature engineering.

Asthma Risk Prediction Through Feature Selection and ML Optimization
GitHub Link
- Optimized asthma risk prediction by developing multiple machine learning models, including Random Forest, SVM, and Gradient Boosting, and finetuning hyperparameters using Grid Search Cross-Validation to maximize accuracy.
- Enhanced model accuracy and reduced data dimensionality by applying Recursive Feature Elimination (RFE) to identify the most predictive features.

Technical Skills

Computational Biology Tools	BLAST	AlphaFold	AutoDocK	GROMACS	Chimera	Bioconductor
Data Analysis Tools	Neo4J	KNIME
Programming Tools	Python	Bash
Machine Learning Tools	TensorFlow	Keras	NumPy	Pandas	Matplotlib
Relevant Coursework	Bioinformatics	Genomics and Proteomics	Molecular Biology	Cell Biology	Genetic Engineering	Biochemistry	Immunology	Biology	Probability and Statistics	Linear Algebra	Calculus
Certificates	International Genomics and Bioinformatics Bootcamp	Machine Learning A-Z	Python for Data Science, AI Development	Bioinformatic; Bulk RNA-Seq Data Analysis	Advanced Bioinformatics

Honors and Achievements

First runner-up in the Biomimicry Innovation Challenge and Showcase, Vellore Institue of Technology, 2024
Top 10 Winner of Bio-Inspired Design Fest (BIDFEST) Ideathon, Vellore Institue of Technology, 2024

Extra-Curricular

Volunteer | National Service Scheme, NGO
Conducted sessions in government schools on career opportunities and the importance of joining the armed forces.

Volunteer | Becoming I Foundation, NGO
Taught science, math, and English in government schools, supporting underprivileged communities.

Green Ambassador | Eco Club, Chettinad Vidyashram
Led tree plantations, recycling drives, and plastic waste collection, promoting sustainability and environmental awareness.

Event Coordinator | BioSummit, School of Biosciences and Technology
Organized a flagship event connecting academia and food industries, managing food distribution and ensuring smooth execution.