

# Derrin Bright

## Bioinformatics | Biotechnology

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Portfolio

GitHub

LinkedIn

### Education

#### Vellore Institute of Technology (VIT)

Bachelor of Technology in Biotechnology

#### Chettinad Vidyashram

CBSE Biology-Mathematics

CGPA: 8.76 Vellore, India

2022-Present

12<sup>th</sup>- 94.8% Chennai, India

2008-2021

### Technical Experiences

#### Ashoka University

Research Intern

Delhi, India

Jan 2024 - Present

- Analyzing E. coli genomes to identify carbapenem and beta-lactam resistance using ResFinder, RGI-CARD, PlasmidFinder, and BLAST.
- Investigating penicillin-binding protein (PBP) mutations, correlating findings with plasmid-mediated resistance mechanisms, and generating genomic resistance profiles.
- Supervisor:** Dr. Shraddha Karve

#### NovaLinks

BioTech and AI/ML Intern

Vellore, India

December 2024 - Present

- Developing an IoT-enabled UTI diagnostic device integrating CMOS sensors for real-time colorimetric analysis to quantify biomarkers such as NGAL, PCT, and TNF-alpha, uromodulin, HBP using single-use ligand-based dipsticks for accurate and rapid diagnostics in rural areas.
- Optimizing biosensor performance by researching suitable materials like nitrocellulose and synthetic polymer membranes for high ligand-binding efficiency, while leveraging AI/ML technologies to detect multiple asymptomatic diseases and enhance diagnostic precision.

#### Teachnook

Data Science Intern

Bangalore, India

September - October 2024

- Worked on multiple plant detection and defect detection tasks with the input image and plant specifications including the length and width of the sepals and petals.
- Implemented multiple algorithms including Random Forest, SVM, and Logical Regressor to analyze the plant specifications and ResNet with multiple layers for analyzing the input images.
- Gained proficiency in Python, NumPy, and Pandas, alongside essential data visualization techniques, and foundational concepts on machine learning and deep learning.
- Supervisor:** Meghana Gowda

#### Bversity

Bioinformatics Intern

Vellore, India

February 2024

- Explored drug design and discovery with a focus on bioinformatics using cutting-edge computational tools.
- Utilized KNIME for molecular similarity searches, enabling chemical space exploration and compound prioritization.
- Conducted protein structure predictions using AlphaFold, building a foundation in structure-based drug design.
- Completed targeted projects, including antiviral and antibacterial drug screening and protein interaction prediction, enhancing my understanding of therapeutic targeting and molecular interactions in infectious diseases.
- Supervisor:** Anjana Yagnapriya

#### Alpha Bio Cell, VIT University

Vice Chairperson

Vellore, India

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.
- Supervisor:** Dr. Ramesh Pathy

Technical Projects

RNA-Seq Analysis and Gene Interaction Modeling in Cervical Cancer and HPV Pathogenesis

- Conducting RNA-seq analysis on cervical cancer datasets to identify genetic similarities and potential causative factors of HPV infection.
- Visualizing complex biological data to extract meaningful insights into gene behavior and interactions.

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.