Derrin Bright

Bioinformatics | Biotechnology

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Personal Statement

A versatile and driven individual with a strong passion for utilizing computational technologies to decode complex biological systems. With a solid foundation in drug discovery, molecular modeling, and machine learning, I specialize in bridging the gap between biology and data science to drive transformative research.

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

NovaLinks Vellore, India
BioTech and AI/ML Intern *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 Bangalore, India
Data Science Intern *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 Vellore, India
Bioinformatics Intern *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 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.
- **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.