Grace (Ojemerenvhie) Alele

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SUMMARY

A graduate-level researcher in data science and AI-driven medicine specializing in computational genomics and multi-omics analysis, with a focused on uncovering non-coding regulatory mechanisms and disease heterogeneity in under-researched reproductive health conditions using interpretable machine-learning approaches.

EDUCATION

In - view **The Johns Hopkins University, Coursera**
Genomic Data Science Specialization – **Certificate**

2025 **BS IN COMPUTER SCIENCE** – Ambrose Alli University
- WES-Calculated GPA: 3.33 / 4.0 | Rank: Top 5% of Class
- Selected Coursework: Linear Algebra, Statistics, Calculus, Artificial Intelligence, Data Structures & Algorithms, Numerical Methods, Discrete Mathematics.

GRE: 331/340 (Quantitative: 164, Verbal: 167, Analytical Writing: 3.5)

RELEVANT RESEARCH EXPERIENCE

2025 – Present **ML Research Engineer, Hugging Face Science** – Open Source Project
- **Vision:** I contributed to the development of foundational tools for scalable integrative analysis of complex, longitudinal microbiome data using the Diabimmune cohort (1,000+ infants).
- **Technical Leadership:** I co-led the model-development phase, transforming prototypes into robust, reproducible systems by refactoring and modularizing the codebase (e.g., standardizing load_dataset_df and generate_embeddings.py).
- **Pipeline Engineering:** I engineered a Python API client with retry logic for querying microbial genomic databases and developed a rule-based labeling pipeline (regex/keyword scoring) to infer allergy phenotypes with 85% cross-validation accuracy.
- **Reproducibility & Quality Control:** I diagnosed and fixed a foundational bug in the embedding methodology by implementing proper attention masking, eliminating batch-size dependency and ensuring consistent results. View Project

2025 **Independent Research**
Title: Causal Graph Neural Networks for Endometriosis Etiology
- **Methodological Shift:** I developed a Graph Neural Network (GNN) using protein-protein interaction (PPI) data to move from simple correlation to active causal modeling of disease etiology.
- **Discovery:** The model revealed a dysregulation where inflammation excessively amplifies crosstalk between the TNF and JAK-STAT pathways in stromal cells, providing a testable, causal hypothesis about endometriosis pathology. View Project.

2025 **Final Year Research (Thesis)** – Ambrose Alli University
Title: Deep Learning for Endometriosis Biomarker Discovery
- **Challenge:** To address the high-dimensional, low-sample-size constraints in RNA-seq transcriptomic data from multiple public repositories.
- **Pipeline:** I developed a fully reproducible Python pipeline (Scikit-learn, NumPy) incorporating batch effect correction (ComBat) and transcriptomic normalization.
- **Model:** I designed a 1D Convolutional Neural Network for RNA-seq data, achieving a strong classification performance (**AUC-ROC = 0.92).**
- **Interpretability:** I applied gradient-based attribution methods to identify **47 candidate biomarker genes** plausibly associated with disease progression.
- **Publication:** Manuscript in preparation (targeting a peer-reviewed journal).

2023 **Undergraduate Group Project** – Ambrose Alli University, Nigeria
Title: Blockchain-Based Solar Energy Trading Platform

- I collaborated in a multi-member project team to design a decentralized peer-to-peer (P2P) solar energy trading platform using blockchain technology for secure, transparent transactions.
- I contributed to system architecture and research design and participated in the implementation of Ethereum smart contracts (Solidity) for automated energy trading and settlement.
- I integrated IoT-enabled smart meter concepts for real-time monitoring of energy production and consumption.
- I conducted literature review and technical analysis on scalability, security, and regulatory constraints in blockchain energy markets; co-authored the final technical report and presentation. View Project.

2023 – 2024 **Undergraduate Research intern** – Afe Babalola University (ABUAD)
Project: Bayesian Optimization for Multimodal Medical Image Segmentation

- **Problem:** Address the computationally expensive hyperparameter tuning for multimodal ML models segmenting Glioblastoma (aggressive brain tumors) in MRI scans.
- Solution: I developed a bayesian optimization pipeline (using GPyOpt) to intelligently combine high-dimensional MRI feature sets into a unified representation, automating the tuning process.
- **Impact:** I achieved a **40% reduction in GPU compute hours** and a **60% reduction in tuning trials**, while maintaining a clinically robust segmentation accuracy (**Dice Score of 0.89**).
- **Framework:** I established an efficient optimization framework scalable to other complex biological datasets (e.g., multi-omics), accelerating biomarker discovery. View Project.

RESEARCH INTEREST AND PROPOSED FUTURE RESEARCH

- **Generative AI for Data Augmentation:** I want to address data scarcity in reproductive health through intelligent augmentation to enable robust model training.
- **Multi-scale Data Fusion & Causal Modeling:** I would integrating diverse Omics (genomics, transcriptomics, epigenomics) with clinical factors to map the dynamic shifts in Gene Regulatory Networks (GRNs).
- **Probabilistic Patient Trajectory Modeling:** I hope to develop probabilistic machine learning models such as Bayesian nonparametric models to handle uncertainty and the time-based evolution of diseases, crucial for early flare detection using dynamic patient biosignal data.

PUBLICATIONS

- Akintayo, T.A., ..., **Ojemerenvhie, G.A.,** et al. (2024). Exploring the Possibilities of AI in Medical Settings: How Artificial Intelligence Can Transform Healthcare and Hospital Operations. *International Journal of Advances in Engineering and Management.* https://doi.org/10.35629/5252-06090613
- Akintayo, T.A., ..., **Ojemerenvhie, G.A.,** et al. (2024). Transforming Data Analytics with AI for Informed Decision-Making. *International Journal of Education, Management, and Technology, 2*(3), 196-215. https://doi.org/10.58578/ijemt.v2i3.3812
- Okereke, R.O., **Ojemerenvhie, G.A.,** et al. (2024). The Cloud Security Revolution: Unlocking the Potential of Al and Machine Learning to Stay Ahead of Threats. *Asian Journal of Science, Technology, Engineering, and Art, 2(5), 735-743.* https://doi.org/10.58578/ajstea.v2i5.3813
- **Ojemerenvhie, G.A.** & Nnebe, S.E. (Manuscript in Preparation). Deep Learning Approaches for Endometriosis Biomarker Discovery from RNA-seq Transcriptomic Profiles.

CONFERENCE AND PRESENTATION

2025 The International Conference on Artificial Intelligence and Robotics (ICAIR),
2024 Nigeria Association Of Computing Students (NACOS) Annual Conference, Enugu, Nigeria
2023 TEDx AAUE: Beyond Borders, Ambrose Alli University

Poster Presentation

2025 **Poster Presenter: ABUAD-CMHS Scientific Conference,** College of medicine & Health Sciences, Afe Babalola University

1. Development of smart footwear for continuous health monitoring
2. An infant incubator design for intermittent access to electricity

UNDERGRADUATE TEACHING AND LAB EXPERIENCE

2023 – 2025 **Undergraduate Teaching Assistant** – Ambrose Alli University

- I provided in-class instruction under faculty supervision and contributed to the revision of departmdental course textbooks (CSC211: Data Structure and Algorithm and CSC308: Operations Research), reviewing and refining explanations of core programming concepts for clarity and pedagogical effectiveness and updating examples, exercises, and code snippets to align with current course structure.
- I graded over 300 assignments per semester using standardized grading rubrics to ensure fairness across multiple sections, identified recurring misconceptions and communicated them, and provided structured feedback on correctness, efficiency and code readability to the course instructors.

2024 – 2025 **Undergraduate Lab Assistant** – Ambrose Alli University

- I delivered 8+ hours/week of academic support through labs and office hours, led lab sessions and supported over 120 students across multiple sections in an introductory programming course.
- I assisted students with development environment setup and provided debugging and algorithmic guidance in Python and Git-based workflows, helped troubleshoot version control, dependency, and runtime issues during lab sessions and supported course infrastructure via GitHub Classroom and automated grading tools.
- I collaborated with students on project-based learning assignments, mentoring teams through requirements definition, implementation, debugging, and evaluation.

RELEVANT PROFESSIONAL EXPERIENCE

2022 – Present **Robotics and Coding Instructor** – Edupoint Ltd.

- Coding: I teach primary and secondary school students logic, sequencing, problem-solving, and languages (like Scratch, Python, C++, Blockly).
- Robotics/Engineering: I apply this code to physical components, integrating mechanics, electronics, sensors, and systems thinking.

2019 – 2020 **Software Developer Trainee** – BrighterDays CodeLab

- I developed Flutter apps with Material Design, focusing on UI/UX and code reusability and integrated the apps with Facebook and Google APIs for authentication and maps.
- I collaborated with designers and translated project requirements into robust implementations.
- I was introduced to Machine Learning, Deep Learning and Artifical Intelligence basics by Mr Peter Oti.

SKILLS AND TOOLS

Omics & Single-Cell Analysis	**Scanpy** (Python-based single-cell toolkit), Seurat (R-based single-cell toolkit), **SCENIC/pySCENIC** (Gene Regulatory Network inference from scRNA-seq), **Cell Ranger** (10x Genomics pipeline), **BEDtools, SAMtools,** BLAST.
Machine Learning	**PyTorch**, TensorFlow, Keras, scikit-learn, CUDA/cuDNN (for GPU acceleration), Jupyter/Colab.
Modeling & Inference	**GENIE3/GRNBOOST2** (GRN Inference tools), **Bioconductor** (R package suite), **DESeq2/edgeR** (Differential Expression), GATK (Genome Analysis Toolkit).
Programming & Workflow	Python, R, SQL, Bash/Shell Scripting, **Snakemake** or Nextflow (Workflow management), Git/GitHub, HPC/Cloud Computing (AWS/GCP familiarity).

PROFESSIONAL AFFILATIONS & MEMBERSHIP

- Machine Learning Collective (MLC)
- International Society for Data Science and Analytics (ISDSA)
- Women in Data (WiD)
- Data Science Network (DSN)
- Nigeria Association Of Computing Students (NACOS)

AWARDS AND SCHOLARSHIPS

2025 CIT Non-Resident Graduate Tuition Scholarship, University of Michigan

2025 Global Graduate Merit Scholarship, University of Michigan
2025 Award of Recognition, NACOS, AAU
2024 Outstanding Leaders Award, Christian Fellowship International, AAU
2023 Data Science Network (DSN) Ambassador Scholarship, DataCamp.
2023 Innovative Minds Award, NACOS, AAU
2019 BCodeLab Merit Scholarship, BrighterDays CodeLab.

LEADERSHIP, OUTREACH AND VOLUNTEERING

2025 **Pioneer Trainer, Computer Science Research Lab (AAU):**
- I developed and implemented the practical curriculum for the first-ever internship cohort in Dr David's lab, focusing on essential skills for research environments.
- For the training, I concentrated on data handling techniques, version control (Git/GitHub), and foundational tools for computational projects, successfully preparing students for immediate involvement in ongoing research.

2024 – 2025 **Secretary General, Nigerian Association of Computing Students (NACOS), AAU Chapter:**
- I coordinated all administrative and secretarial duties of NACOS AAU chapter, including organizing meetings, keeping minutes, maintaining official records and enhancing academic engagement across the department by facilitating activities and strategic initiatives for over 800 students.
- I ensured effective communication within the chapter, liaised with other officers and implemented decisions of the executive committee and assisted in organizing departmental orientation and tutorials, coordinating schedules and resources for smooth delivery.

2024 – 2025 **Campus Lead and Community Manager, Data Science Network Nigeria:**
- I designed and delivered Python and data science tutoring programs for 100+ undergraduates, using hands-on projects to grow a local talent pipeline.
- I coordinated learning resources, led training sessions and provided one-on-one student support.

2024 **Data Clark Volunteer,** Centre for Reproductive Health Research and Innovation (CRHRI)
- I collected, organized, and entered data on women's health programs into databases like NOMIS, kept beneficiary records up to date, and ensured all information was accurate, complete, and confidential.
- I prepared regular reports (monthly/quarterly) with data summaries and progress updates, managed both physical and digital records, supported M&E and audits, and trained others in proper data management practices

2023 **Outreach & Mentorship with Django Girls Group:**
- I collaborated with Django Girls Zaria to organize a Python bootcamp for beginners on campus and in secondary schools, actively promoting technology education and inclusion for young women.

2023 **Lead Technical Coordinator, TEDxAAU (2023):**
- I spearheaded the design and deployment of the official event website (using HTML, CSS, JavaScript, and Firebase and managed all technical operations (including livestream integration, ticketing systems, and speaker portfolio setup)while mentoring junior developers and ensuring seamless online and on-site coordination.

2023 – 2022 **Google Developer Student Clubs (GDSC) Lead:**
- I founded and managed a core team to execute technical events (workshops, hackathons) focused on beginner friendly technologies, successfully growing the student community.
- Strategic Project Facilitator: I guided students in developing technical solutions for local challenges, overseeing thei participation in the GDSC Solution Challenge focused on the UN Sustainable Development Goals.

2023 – 2022 **Leadership & Resource Innovation (LRI) Director: Student Fellowship:**
- I coordinated and taught weekly leadership sessions, designing resources that fostered personal growth, teamwork, and service excellence while mentoring student leaders.

2025 – 2021 **Founded GEEKS Tutorial Group:**
- I provided peer mentorship to struggling students in core computing courses, including programming courses like Object-Oriented Programming (OOP), Artificial Intelligence and Operation Research.