Bongiwe Sandi Nandi Mkwananzi

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EDUCATION

Bethune-Cookman University **Daytona Beach, Florida**
B.S Computer Science| Presidential Scholar| 3.93 GPA May 2026

TECHNICAL SKILLS

Programming Languages: Python, MATLAB, Java, JavaScript, CSS, HTML, Swift
Technologies: Git, Linux, Tableau, MATLAB, Roadrunner, Figma, Bash, React, Kubernetes
Relevant Coursework: Ethics, Object Oriented Design, Discrete Structures, Linear Algebra, Statistics, Microeconomics, Databases, Data Structures, Computer Networks, Software Engineering.

PROFESSIONAL EXPERIENCE

EcoCAR EV Challenge **September 2023 - Present**
Software Engineering and Research Intern *Bethune-Cookman University/ Embry-Riddle Aeronautical University*

- Automated testing and debugging processes for autonomous vehicle simulations using Python, MATLAB, and CARLA, improving system reliability by 30%.
- Designed a facial gesture recognition and LLM-based driver assistance tools with OpenCV, Mediapipe, dlib, LangChain, and LLaMA 2.
- Collaborated with cross-functional teams to enhance system scalability and software performance in autonomous systems.

RISE and US Fish and Wildlife Service Data Engineering Intern **Hybrid (Daytona Beach and remote)**
March 2025 – Present

- Extracted and structured species observation data from unstructured PDFs using Python, Tabula, pandas, and OCR tools, improving conservation data accessibility for ecological analysis.
- Engineered automated data cleaning and summarization workflows with the OpenAI API (GPT-4), reducing manual processing time and increasing efficiency by 40%.
- Built and deployed a full-stack PDF extraction tool (React, Node.js, Python/FastAPI, OpenAI API) on Render with GitHub version control.
- Collaborated with scientists to validate results, ensuring accuracy for research and reporting.

AI4ALL - Research Fellow **Remote**
Readability assessment using Machine Learning **May 2025 - Present**

- Built ML models (Ridge, XGBoost, BERT) to predict reading levels of grade 3–12 texts using CommonLit datasets; outperformed traditional scores (e.g. Flesch-Kincaid) by reducing RMSE.
- Applied NLP methods (TF-IDF, BERT embeddings, semantic/syntactic features via SpaCy) and dimensionality reduction (PCA) to uncover latent structure in text data.
- Performed unsupervised clustering and cosine similarity analysis, revealing strong semantic coherence among texts and validating embedding-based approaches.
- Focused on model transparency and accessibility for educational equity; presented findings to researchers and peers.

Fermilab **Batavia, Illinois**
US CMS PURSUE Research Intern **June 2023 - August2023**

- Engineered automated Linux scripts for remote CERN data analysis via SSH and executed 10-week performance analysis comparing Run 3 and High Luminosity LHC simulations using advanced profiling tools.
- Quantified 43% CPU time increase from 29% track density growth in HL-LHC configurations, optimizing CMS software efficiency and contributing to particle discovery data economy
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PERSONAL PROJECTS

Hairspiration Finder

- Built a semantic search engine for hair braiding tutorials using all-MiniLM-L6-v2 transformer model to generate embeddings and cosine similarity for result ranking.
- Designed Streamlit-based frontend enabling natural language queries with video preview functionality and tag filtering for enhanced user experience.
- Architected modular backend structure for scalable data processing, embedding generation, and search functionality.

Leadership

Robotics Club *Hardware Lead, President* | **Ecocar EV Challenge Connected Automated Vehicle** *sub team Lead*

OTHER SKILLS & INTERESTS

Languages: English, IsiNdebele, Shona, Zulu
Affiliations: CODE2040, ColorStack, Rewriting The Code, HBCU 20 x 20, Codepath, AI4ALL