Tony Kabilan Okeke

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Education

Drexel University — **Philadelphia, Pennsylvania**
Master of Science in Biomedical Engineering — *Anticipated Graduation: June 2024*
Bachelor of Science in Biomedical Engineering — *Cummulative GPA: 4.00*
Concentrations: Bioinformatics & Neuroengineering — *Minor: Computer Science*

Experience

IVIVT - Non-Clinical Safety - Global Investigative Safety, GSK — **April 2022 – September 2022**
Scientific Student Worker — *Collegeville, Pennsylvania*

- Utilized the *Dash* and *Flask* libraries in python to develop an interactive web application for performing statistical analysis on data generated in high-content imaging toxicology studies. Also utilized *Dask* to parallelize computations on larger data sets to improve efficiency. The web application was then deployed via *RStudio Connect* on the internal HPC.
- Trained the *Noise2Void* deep neural network on HPC to perform noise reduction in microscopy images in order to improve the accuracy of CellProfiler pipelines for image segmentation and feature extraction.
- Developed a python package with tools for performing statistical analysis, visualization, and machine learning on high-content imaging data sets.
- Implemented pipelines in *CellProfiler* and *Columbus* to perform feature extraction for high-content images generated via cell painting assays.
- Utilized *Scikit-learn* to implement decision tree, random forest, and support vector machine models for biomarker discovery on high-content imaging datasets.

Invenio Lab, Hospital of the University of Pennsylvania — **March 2021 – August 2022**
Immunology Research Assistant — *Philadelphia, Pennsylvania*

- Developed SOPs and conducted assays for the isolation and extraction of DNA, RNA, and protein from human blood and urine samples, as well as the preparation of Next-Generation Sequencing libraries for Reduced Representation Bisulfite Sequencing (RRBS) and gene expression microarrays.
- Utilized *Scikit-learn*, *Pandas* and *NumPy* to apply unsupervised learning algorithms to clinical and multi-omic datasets, and presented results to colleagues using *Seaborn* in *Jupyter* notebooks.
- Developed python and R scripts for analyzing DNA methylation levels in data from Illumina microarrays.
- Developed *R* scripts for analyzing protein expression and clinical data from electronic medical records.
- Performed differential methylation, KEGG pathway enrichment, and Gene Ontology analysis on microarray results for patients who underwent cardiopulmonary bypass surgeries using *bash* and *R* scripts.

Zhou Lab, Children's Hospital of Philadelphia — **May 2020 – June 2021**
Undergraduate Research Intern — *Philadelphia, Pennsylvania*

- Contributed to the development of R packages for analyzing DNA methylation levels in data from Illumina microarrays.
- Validated R package performance using *GEO* public datasets.

Projects

MLGO, Deep Learning for GO Terms | *Python, TensorFlow* — **September 2022**

- Presented a neural network model for predicting enriched Gene Ontology (GO) terms from RNA-Seq differential expression analysis (DEA) data
- Trained an autoencoder model using log fold change (logFC) values from mouse RNA-Seq datasets curated from the Digital Expression Explorer 2 repository
- Tuned model hyperparameters using *TensorBoard* and *Keras Tuner* to improve model performance

CaBiD, Cancer Biomarker Discovery Tool | *Python, Flask, Qt* — **September 2022**

- Developed a web application to investigate variations in gene expression across various cancer types
- Preprocessed and curated datasets from GEO (Gene Expression Omnibus) and CuMiDa (Curated Microarray Database) in a SQLite database
- Identified key differences in gene expression between healthy controls and tumoral samples across various cancer types

ELISA Analysis Tool | *R, Shiny* — **September 2021**

- Processed Optical Density values from microplate readers using *tidyverse* packages.
- Developed *R* script for fitting OD values for ELISA standards to a 5-Parameter logistic regression model to estimate unknown sample concentrations.
- Built interactive web-application for ELISA curve fitting using the *RShiny* framework.

Technical Skills

Programming: Python, R, Bash, C++, MATLAB, SQL, AWK, Git, PHP
Machine Learning: TensorFlow, Keras, PyTorch, Scikit-learn
Wet Lab: PCR, qPCR, ELISA, Western Blot, DNA/RNA/Protein Extraction, NGS Library Preparation

Awards and Honors

Philly Codefest 2023 - Collaborative Team Award

Publications

- *Unbiased Analysis of Temporal Changes in Immune Serum Markers in Acute COVID-19 Infection With Emphasis on Organ Failure, Anti-Viral Treatment, and Demographic Characteristics.*
  Frontiers in Immunology 12:650465 (2021).
- *Longitudinal urinary biomarkers of immunological activation in COVID-19 patients without clinically apparent kidney disease versus acute and chronic failure.*
  Scientific Reports 11, 19675 (2021).
- *Dynamic Changes in Central and Peripheral Neuro-Injury vs. Neuroprotective Serum Markers in COVID-19 Are Modulated by Different Types of Anti-Viral Treatments but Do Not Affect the Incidence of Late and Early Strokes*
  Biomedicines 9, no. 12 (November 2021): 1791.
- *A disturbed balance between blood complement protective factors (FH, ApoE) and common pathway effectors (C5a, TCC) in acute COVID-19 and during convalesce*
  Scientific Reports 12, no. 1 (August 2022).
- *Persistent Depletion of Neuroprotective Factors Accompanies Neuroinflammatory, Neurodegenerative, and Vascular Remodeling Spectra in Serum Three Months after Non-Emergent Cardiac Surgery*
  Biomedicines 10, no. 10 (September 2022): 2364.

Conference Abstracts

- *174: LONGITUDINAL CHANGES OF NEURO-SPECIFIC SERUM PROTEINS IN COVID-19 PATIENTS*
  Society of Critical Care Medicine 51st Critical Care Congress, April 2022.
- *181: PATTERNS OF URINARY BIOMARKERS OF IMMUNOLOGIC ACTIVATION AND SEPSIS IN PATIENTS WITH COVID-19*
  Society of Critical Care Medicine 51st Critical Care Congress, April 2022.

Service and Leadership

- Vice President, *Drexel Computational Design*, March 2021 – May 2023
  Project Manager, *Drexel Computational Design*, May 2023 – Present
- Member, *Tau Beta Pi*, December 2021 – Present
- Member, *Drexel Society of Artificial Intelligence*, September 2022 – Present