TEMITOPE ADEOYE

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EDUCATION

University of South Florida, Tampa, USA
- MSc. Applied Physics: *Computational Biophysics and Neurobiology*. **Aug. 2019 – Dec. 2023**
- PhD. Applied Physics: *Computational Biophysics and Neurobiology*. **Aug. 2019 – Present**

University of Lagos, Lagos, Nigeria **Sep. 2012 – Jan. 2017**
- BSc. Applied Physics: Electronics. First Class. (Hons)
- Cumulative G.P.A: 4.63/5.00. Class Rank: Best Graduating Student.

EXPERIENCE

Graduate Research Assistant, Computational Biophysics and Neurobiology **May 2020 – Present**
University of South Florida *Tampa, Fl*
Advisor: Ghanim Ullah, PhD

- Developed and implemented computational models to simulate the pathogenesis of neurodegenerative diseases, with a focus on AD.
- Established cross disciplinary collaboration to investigate the interplay between neuronal signaling and synaptic impairments.
- Designed and executed bioinformatics methods to analyze single-cell multi-omics data to uncover novel insights into the molecular basis of AD.
- Created the lab's first transcriptomic analysis pipeline to facilitate reproducible data processing and analyses
- Authored two peer-reviewed first-author publications in international as part of the PhD thesis.
- Presented research findings through oral and poster presentations at three local and international professional meetings and conferences.
- Oversaw the organization and maintenance of the lab's code repository.
- Provided mentorship and guidance to 3 graduate, undergraduate and summer interns.
- Presented findings in internal research group meetings.

Research Intern, Human Multi-omics **May 2022 – Aug. 2022**
Cajal Neuroscience *Seattle, WA*
Mentor: Anatoly Buchin, PhD

- Designed and implemented a transfer-learning-based pipeline for reference mapping to leverage cell type knowledge from a reference scRNA-seq atlas to infer the state of cells in query data.
- Developed a biologically informed deep learning pipeline for interpretable latent representation based on explainable programmable mapping.
- Deployed pipeline to company's compute infrastructure (Software Development Kit (SDK)).
- Utilized the implemented pipeline for rapid integration of newly generated datasets into a reference atlas, contextualization of query datasets within the reference, rapid annotation of scRNA-seq queries, and discovery of novel populations, such as disease states unseen in the reference.
- Ingested publicly available scRNAseq and ATACseq data from human and mouse AD and PD studies into company's compute infrastructure.
- Conducted comprehensive analyses of scRNAseq and ATACseq datasets using standard analysis pipelines, including cell type identification and clustering, differential cell abundance, cell state trajectory inference, RNA velocity, co-expression analysis, and differential gene expression analyses using scanpy, scvi-tools, scGen, and scVelo.
- Routinely presented analysis results to Computational Biology and Preclinical teams to inform the Alzheimer's and Parkinson's Disease target prioritization database and guide the interpretation of relevant biology for prosecution in the in vivo/in vitro screening platforms.
- Summarized research methods and outcomes in formal reports and group meetings.

- Drafted the Computational Biology group's first Benchling documentation.

Bioinformatics Research Student *Aug. 2021 – May. 2022*
University of South Florida *Tampa, FL*
Mentor: Dr. Vladimr Uversky

- Collected and curated a comprehensive dataset of Ebola and Marburg virus proteins, along with their corresponding measures of intrinsic disorder, to enable a systematic analysis of the role of disorder in viral pathogenesis.
- Developed and implemented novel computational methods to quantify the effect of intrinsic disorder propensity in the binding partners of viral proteins.
- Designed and built a suite of automated data processing pipelines that efficiently integrate and analyze information from *Uniprot* and *STRING* databases, streamlining the research process and enabling the rapid generation of actionable insights.
- Coordinated frequent meetings between team members to ensure effective, collaboration, and progress towards project goals.
- Drafted the original report of project findings into a clear and concise narrative for presentation.

Deep Learning for Neuroscience Research, Neuromatch Academy *Aug. 2021 – Aug. 2021*

- Collaborated with a diverse team of 5 researchers to design and implement a deep-image reconstruction model that leverages recorded neural activity from the visual cortex to reconstruct visual stimuli.
- Fine-tuned and optimized state-of-the-art machine learning models, such as AlexNet and ResNet, to decode stimulus images from neural activity with high fidelity. This demonstrated the effectiveness of deep learning approaches in understanding neural representations.
- Conducted rigorous analyses and experiments to demonstrate that the primary visual cortex encodes the majority of the information necessary for image reconstruction and can be used independently for this purpose.
- Presented findings to a larger group of researchers and participants.

Computational Neuroscience Research, Neuromatch Academy *Jul. 2020 – Jul. 2020*

- Implemented advanced data preprocessing techniques to extract relevant features from high-dimensional neural data, enabling the identification of key factors influencing trial-to-trial variability.
- Designed and developed a novel Logistic Regression method that combines historical neural activity of the current trial with behavioral data to predict subject response type, providing a powerful tool for understanding the relationship between neural activity and behavior.
- Uncovered the role of trial-history in explaining trial-to-trial variability of behavioral and neural responses at stimulus onset.

Undergraduate Researcher, Nonlinear Dynamics and Chaotic Systems *Sep. 2015 – Nov. 2017*
University of Lagos *Lagos, NG*
Advisor: Kayode Ojo, PhD
- Undergraduate research experience focused on studying vibrational resonance in Van der Pol duffing oscillators driven by bi-harmonic forces.

PUBLICATIONS

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1. **Adeoye T.**, Shah S.I., Demuro A., Rabson D. A., Ullah G. *Upregulated Ca^{2+} Release from the Endoplasmic Reticulum Leads to Impaired Presynaptic Function in Familial Alzheimer's Disease*. **Cells** (2022). | **Paper** | **Code**.

2. **Adeoye T.**, Shah S.I., Ullah G. *Systematic Analysis of Biological Processes Reveals Gene Co-expression Modules Driving Pathway Dysregulation in Alzheimer's Disease.* **Aging and Disease,** 2024). | **Paper** | **Code**.

POSTER PRESENTATIONS

- **Systematic Analysis of Biological Processes Reveals Gene Co-expression Modules Driving Pathway Dysregulation in Alzheimer's Disease.** *Society for Neuroscience, Chicago, Illinois. (2024).*

- **Systematic Analysis of Biological Processes Reveals Gene Co-expression Modules Driving Pathway Dysregulation in Alzheimer's Disease.** *Consortium for Synapses Under Stress (RU 2795), University of Twente, Enschede, Netherlands. (2023).*

- **Upregulated Ca^{2+} Release from the Endoplasmic Reticulum Leads to Impaired Presynaptic Function in Familial Alzheimer's Disease.** *USF Health Research Day, University of South Florida, Tampa, US.* (2022)

HONORS AND AWARDS

Trainee Professional Development Award
Society for Neuroscience   *October 2024*

Tharp and Duckwall Summer Research Fellowship
University of South Florida   *May 2024 – Aug. 2024*

University of Lagos Endowment Prize.   *2012 – 2017*

University of Lagos Dean's Award   *2017*

TEACHING

Graduate Teaching assistant, General Physics Laboratory (PHY 2053L & 2048)
University of South Florida   *May 2019 – Present*

- Taught 9 undergraduate laboratory courses with class sizes ranging from 50-80 students.
- Developed comprehensive course materials, including engaging laboratory experiments, lectures, exams, homework, and practice problems.
- Facilitated weekly laboratory sections for groups of 12-24 students, with hands-on guidance and support to enhance their learning experience and develop their experimental skills.
- Trained students on the proper handling and analysis of datasets for data-driven insights.
- Provided individualized guidance and supervision for students conducting experiments.
- Promoted the development of students' teamwork abilities.
- Supervised students in their final projects, graded exams, and weekly homework.

SOFTWARE SKILLS

- **Programming/Scripting Languages:** Python | R | Bash | MATLAB | SQL | FORTRAN
- **Machine Learning Frameworks:** Keras | scikit-learn | TensorFlow | scipy | statsmodels
- **Parallel Computing:** CUDA | mpi4py
- **High Performance Computing:** Amazon Sagemaker | Terra Community Workbench
- **Code Development:** Git | Github | Visual Studio | Docker | Anaconda
- **Research-relevant Open-source Libraries:** scanpy | squidpy | scvi-tools | hdWGCNA | GSVA | SCENIC+ | ArchR | Single-cell (RNA, ATAC, & spatial) -omics libraries | Biopython

CORE COMPETENCIES

Computational and Statistical Modelling | single-cell RNA/ATAC sequencing analysis | Generative models | Bioinformatics | Computational Biology | Spatial Transcriptomics | Data Visualization | Single-cell epigenomics | Neuroscience | Neural Data Science | Deep Learning | Biophysics | Network Biology | Leadership | Collaboration

SERVICE

President, Physics Graduate Student Committee   *May 2023 – May 2024*
University of South Florida

My roles within PGSC include the following:

- Developed and maintained the **PGSC website.**
- Coordinated team of executives to organize departmental career talks and seminars.
- Spearheaded the planning and execution of professional and academic development workshops, including a workshop on applying to fellowships, scholarships, and internships, which attracted over 30 attendees.
- Launched the inaugural PGSC Three-Minute Thesis (3MT^{TM}) research competition, an in-person event featuring student talks and networking opportunities. The event drew over 20 attendees, including faculty and students.
- Organized high-profile career talks featuring prominent speakers from academia and industry.

President, National Association of Physics Students   *Sep. 2015 – Oct. 2016*
University of Lagos

- Served as the graduate student representative on the physics department curriculum committee. In this capacity I provided input on course offerings, degree requirements, and other policies affecting graduate students**.**
- Tutored first-third year physics students.