Morayo Ogunsina

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Education

3.51/4.0 **MS in Computer Science**, *California State University* | Los Angeles, USA *2022-23*

3.23/4.0 **BS in Computer Engineering**, *Pennsylvania State University* | Erie, USA *2015-19*

Achievements

2022 **Platinum Level**, National Cyber League *Remote*

2021 **Receipient**, DAAD Rise Professional @ Frounhofer IISB *Germany*

2020 **Co-awardee, 2nd Place**, Space Gov. Innovation contest *USA*

2019 **Co-awardee, 2nd Place, Best Oral Presentation in Comp Sci & Engr**, Sigma Xi Annual Conference *USA*

2018 **3 time-winner, Dean's List Award**, Penn State Behrend *USA*

2018 **Finalist, Abstract submission**, SWE Local Tampa *USA*

2017 **Skilled Participant**, 31st Robert D. Lynch Student Leadership Conference *USA*

2014 **Co-awardee, Semi-finalists for Africa sub-region**, GoGreen 2014 Challenge by Schneider Electric *Nigeria*

Research Experience

Research Intern. Mirosoft Research - Sound and Acoustics Group | Redmond *June 2019 - Sept 2019*

Research. Supervisor: Dr. Dimitra Emmanouilidou

- Integrated API-pipelined **Deep Learning** model for real-time audio event detection and identification feature into existing software modules.
- Collaborated with internal teams to fast-track product feature development.
- Presented research findings and documentation for future work.

Research Capstone Intern Penn State Behrend - Wireless & Computer Vision Group | Erie *November 2018 - April 2019*

Research Supervisor: Prof. Abdallah Abdallah

- Examined classical ml algorithms, including **SVM**, in tandem with **image processing** techniques for facial expression recognition (***FER***) using **MATLAB**'s Neural Net Toolbox.
- Configured single-board and camera hardware for ***FER*** compute including live image acquisition, feature extraction, and localization.
- Integrated **deep learning** model for emotion prediction into FER compute, replacing classical ml; achieved over 80% success rate.
- Attained 2nd Place in Oral Presentation for Comp Sci. and Engr. Category @ SigmaXi

Data Analyst Penn State Behrend MIS 345 - Data Analytics | Erie *Feb 2019 - April 2019*

Supervisor: Dr. Babajide Osatuyi

- Conducted analytics on Amazon Echo Dot Purchase Analyticsusing **SPSS**, **StatTools**, **R**, **Excel**, including sentiment analysis on customer reviews of the Amazon Echo Dot.
- Generated insight into customer behaviour and trends using R and python for semantic analysis; positive reviews on the charcoal echo dot tend to drive more purchases.

Work Experience

CalState LA ECST, *Graduate Teaching Associate & Research Assistant* | Los Angeles *August 2022 - May 2023*

- Instructed students in **Java** and **Python** programming. Provided individual and group tutoring to students.
- Evaluated students' assignments, proctored tests, and supplemented course materials.

Microsoft – Azure Mobility Group, *Software Engineer Intern* | Redmond *June 2022 - August 2022*

- Engineered software framework via **WSL** to support **k3s** for production workloads on IoT and Edge platforms.
- Utilized **C++** to create wrapper interface for a **C** client library for kubernetes, integrated into framework.
- Incorporated unit , and integrated testing frameworks with **VALGRIND** and **BOOST** to validate infrastructure.

Penn State Behrend – Sam and Irene Black School of Business, *Software Engineer* | Erie *June 2018 - May 2019*

- Designed and developed a full-functioning app for donating and receiving food items using **Android Studio**.
- Utilized authentication, database design, and location features libraries, including **Firebase** and **Google Places API**.
- Adapted **UI/UX** design patterns to enhance visual appeal; maintained and tracked project codebase with **Git**.

Chegg , *STEM Tutor* | Remote *Aug 2016 - May 2018*

- Tutored students in Android Development, Logic Design, Algorithms, HCI, Linear Algebra, Number Theory, Vector Math, Basic Chemistry, African History, and Economics. Received **80% positive** ratings from students.

Publications

Publicactions: ***Toward African Space Autonomy: Developmental Framework and Incorporated Synergies***. New Space, 9(1), pp. 49-62. *Asiyanbola, O.A.,* **Ogunsina, M.A.**, *Akinwale, A.T. and Odey, J.B.*

Writing Samples: **A General Survey of Hand Pose Estimation Projects.** |
Memory Architecture in Processing In-Memory Computing - A new approach to near memory architecture.

Presentations: MSR Redmond Research Intern Talks. Summer 2019 | SigmaXi Oral Presentation. Spring 2019.

Skills

Coursework	Adv. Linear Algebra , Digital Image Processing, Path-Planning , ML , Data Analytics
Programming	Python, C/C++, Java, CUDA, R, Matlab, Git, Jupyter Notebook , CMake, LaTeX, MIPS, VHDL
Robotics	ROS 1/2, V-Rep, Gazebo, Arduino, Raspberry Pi B3+, Linear Algebra, Sensor Interfacing, Motion Planning
Software	Linux, Tensorflow, Docker, OpenCV, ImageJ, Solidworks, UE4, Unity3D, Android Studio, MSOffice

Robotics and AI Projects

Vehicular Kinodynamics *May 2023*

Introduction To Self-Driving Cars

- Implemented **longitudinal** and **lateral** controls using classic methods such **PIDs**, **feedforward**, and **Stanley** controls to accurately track an autonomous vehicle in a predefined path with a given speed profile in **CARLA**.

Full Vehicle State Estimator *July 2023*

State Estimation and Localization for Self-Driving Cars

- Implemented **ES-EKF**-solver to compute estimated trajectory of a vehicle given sensor data from LIDAR, IMU and GNSS.

Drivable Space and Lane Estimator *August 2023*

Visual Perception For Self-Driving Cars

- Applied **stereo depth** equations and OpenCV library functions to compute vision tasks like extrinsic camera calibration and **depth map** to estimate collision/obstacle distance in a driving scenario.
- Implemented drivable space, lane estimation, and obstacle distance from semantic segmentation neural network output.

Image Processing + Computer Vision *April 2021*

EE 569 - Digital Image Processing (Course Labs)

- Implemented various image processing algorithms including demosaicing, edge detection, histogram manipulation, half-toning, denoising, geometric modification, texture analysis, and segmentation.
- Developed **CNN** architecture, derived from **LeNet-5**, trained and tested on MNIST, Fashion-MNIST and CIFAR-10 dataset with satisfactory results.
- Successfully implemented green learning architectures **FeedForward CNN**, **PixelHop** and **PixelHop++**, with impressive training and testing results on MNIST and Fashion-MNIST.

Aerial Kinodynamics (UAVs) *May 2020*

Robotics: Computational Motion Planning

- Successfully implemented a linear controller and motion planning model for a 3D quadrotor, achieving agile manoeuvres and autonomous operations.
- Attained familiarity with **kinodynamic** modelling of 1, 2, and 3-D quad controls, including path planning algorithms - **Dijkstra**, **A***.

Path Planning + Little Go + PixelHop using Fashion MNIST *Dec 2020*

CSCI 561 - Fundamentals of Artificial Intelligence

- Implemented and observed the behaviour of traversal algorithms **BFS, DFS, UCS, A*** on a large grided dataset.
- Integrated **RL** strategies for board game play (Little Go); Achieved 100% wins against random, smart, and q-learning opponent agents and over 80% wins against aggressive agents.
- Implemented a classic neural network that classifies the handwritten dataset (MNIST).

Compute Projects

Operating Systems and IPC *May 2023*

CS 5440 - Adv. Topics in Operating Systems

- Gained proficiency in **inter-process communication** concepts, including shared memory, pipes, message queues, signals, multithreading, and multiprocessor operations.Implemented IPCs using **C++**, run on **Linux** OS via **VMWare** and **PUTTY** tools.

Embedded Systems C, Microcontrollers *December 2018*

CMPEN 352 - Embedded Systems Design (Course Project)

- Implemented multiple **C** programs to develop software interfacing with sensors for embedded systems and microcontrollers.

Electronic Circuitry Lab *December 2018*

EE 210 - Circuits and Devices

- Gained proficiency in using **PSpice** for **OpAmps** circuit analysis including frequency response of single-stage amplifiers.

Logic Design for Digital Sound Analyzer - FPGAs *December 2017*

CMPEN 371 - Advanced Digital Logic Design II (Course Project)

- Collaborated in a 2-person team to design and implement **digital logic** for a unique audio-visual system using **VHDL**, on the Digilent Nexys 4 DDR FPGA board.
- Implemented module to convert sampled audio signals using ***FFT*** modules to simple image representations, displayed on a VGA screen.

Simon Says in MIPS *December 2015*

CMPEN 351 - Microprocessors

- Developed a fully functional Simon Says game in **MIPS** Assembly language. Created engaging graphics and gameplay using I/O, arithmetic operations, and program flow components.

Web and Mobile Tech Projects

Multiple Projects in Network Security *December 2022*

CS 5781-Computer Networks & Security

- Attained proficiency in packet tracing, network intrusion and vulnerability testing, firewall, and VPN configuration.
- Achieved **Platinum level** in National Cyber League 2022.

Campus Wayfinder *December 2022*

CS 5337-Advanced Software Engineering

- Utilized Unity3D engine and AR plugin to implement low-resource **indoor navigation** stage for wayfinding Android app.

Non-Degree Programs

2023	**Introduction to Self-Driving Cars**, U of Toronto (By Coursera)	*Canada*
2023	**State Estimation and Localization for Self-Driving Cars**, U of Toronto (By Coursera)	*Canada*
2023	**Visual Perception for Self-Driving Cars**, U of Toronto, Canada (By Coursera)	*Canada*
2023	**Introduction to Parallel Programming with CUDA**, University of Colorado, Boulder (By Coursera)	*United States*
2023	**Visual Perception for Self-Driving Cars**, U of Toronto (By Coursera)	*Canada*
2020	**Mathematics for Machine Learning Specialization**, Imperial College (By Coursera)	*United Kingdom*
2020	**Robotics : Computational Motion Planning**, UPenn (By Coursera)	*United States*
2020	**Aerial Robotics**, UPenn (By Coursera)	*United States*
2019	**Fundamentals of Deep Learning for Computer Vision**, NVIDIA	*United States*

Miscellaneous

Teaching	TA for Intro to Programming. Math + Science Tutor. Children's teacher at local church.
Leadership	President and Treasurer @ AAUW PSU Behrend. Organizer and workshop lead. Teamlead for group projects.
Workshops	***Speak To Lead***, AAUW Behrend semesterly student development workshop, 2018.
Volunteering	2+ Food Drives. Social good advocacy. Recruitment drives. GED Tutor for Adult Learning Program.
Mentoring	Mentor on SWE Mentor Network.