Elisha A. KOMOLAFE

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Research Interests

Robot-assisted Stroke Rehabilitation, Computational Neuroscience, Brain-Computer-Interface, Reinforcement Learning.

Education

University of Cape Town Sep 2025 –
M.Sc. Applied Mathematics
Undertaken with AIMS AI for Science Masters 2025-2026

World Federation of Neurorehabilitation Sep 2023 –Dec 2023
Teaching Course on Clinical Pathways in Stroke Rehabilitation
Relevant Coursework: Arm Rehabilitation, Mobility after stroke: Relearning to Walk

Obafemi Awolowo University (O.A.U.), Ile-Ife, Nigeria 2016 – 2022
Bsc. Electronic and Electrical Engineering. — GPA 3.97/5.00
Relevant Coursework: Control Systems Engineering I & II, Introduction to Modern Control, Intelligent Control and Instrumentation Engineering.

- **Dissertation Topic: "Design and development of a small scale bilateral rehabilitation robot for stroke rehabilitation and a low-cost force-torque sensor".** Supervised by Dr. K.P. Ayodele

The Neurological Association of South Africa EEG Online May 2020 – Nov 2020
Web Based Electroencephalography (EEG) Distance Learning Programme
Relevant Coursework: Principles of Electroencephalography, Application of Encephalography in Clinical Practice

Research Experience

Applied Artificial Intelligence and Robotics Research Lab A^2IR^2 Dec 2019 – Dec 2022
Research Assistant to Dr. K.P. Ayodele

- **Developed the data collection pipeline for a multi-axis load cell array.**
- **Engineered the impedance control system, pivotal to the development of hybrid end-effector rehabilitation robots, through a coordinated team effort.**

Biosignal Processing, Instrumentation and Control Lab Dec 2017 – Dec 2022
Undergraduate Research Assistant to Dr. K.P. Ayodele

- **Developed a Sequential logic for the operation of a IoT based network of weather stations**
- **Contributed to the testing and development of an EMG controlled orthosis**
- **Led the collaboration project on an autofocusing Microscope, and Implemented an Image detection algorithm**

Teaching Experience

Department of Electronic and Electrical Engineering O.A.U. Nov – Dec, 2021
Teaching Assistant to Year II engineering lab

Conferences

Nigerian Society of Neurological Sciences (Annual Scientific Conference) March 2022
Theme: Multidisciplinary Care and Collaboration in the Neurological sciences

O.A.U. Faculty of Technology Conference 2019 Sep 2019
Theme: Diversification of Developing Economies

Nigerian Federation for Neurorehabilitation (Sub-Saharan Regional Conference) Dec 2018
Theme: Neurorehabilitation in Africa: Challenges and New Horizons

Publications

Ayodele, K.P., Omolayo, I., **Komolafe, E.A.**, Jubril, A.M., Obreba, P., Ogunmodede, A., Olateju, E., Ajayi, O., Olaogun, M.O.B., & Komolafe, M.A. (2023). A Technique for End-Effector Force Estimation in Parallelogram Arm Robot using Link-Integrated Load Cells. FUOYE Journal of Engineering and Technology, 8(2). https://doi.org/10.46792/FUOYEJET.V8I2.1035

Ayodele, K.P., Omolayo, I., **Komolafe, E.A.**, Eghrudje, M., John, V. Determination of Human finger pose using kalman filtering for a articulated wearable hand orthosis. *(In Preparation)*

Komolafe, E.A., Ayodele, K.P., Sanusi A.A, Ogunbona, P.O. (2023). A review on the structure and control techniques used in bilateral rehabilitation robots for stroke rehabilitation. *(In Preparation)*

Summer Schools and Additional Training

G.tec Medical Engineering Gmbh 17 – 26 April 2023
BCI & Neurotechnology Spring School

IBRO-SIMONS Computational Neuroscience Imbizo Aug 2022 – Sep 2022
Cape Town, South Africa

- **Mini-project: "Exploring generic decoding of seen objects using visual features."** Using linear regression methods to decode seen images from brain activity in different regions.
- **Final-project: "Learning to walk in a simulation."** Trained a Actor2Critic agent to learn how to walk in the Bipedal Walker v-3 in Open Ai gym.

Neuromatch Academy

Deep Learning Course July 2022
- **Project:Multi Agent Reinforcement Learning in Gambling and the effect on Group fMRI readings.** To utilize reinforcement learning to create a multi-agent simulation from single-person fMRI data.

Computational Neuroscience Course July 2020
- **Project: Decoding of the Visual Cortex using Kay-Gallant Dataset.** Decoding seen images from brain activation data using edge Detection and machine learning techniques.

Other Publications and Presentations

Komolafe, E.A., Ayodele, K.P., Sanusi A.A, Akinniyi, O.T, Ogunbona, P.O., Komolafe, M.A.. Review on the components of bilateral rehabilitation robots for stroke rehabilitation. Presented at the 17th World Stroke Congress

PULSR V2.0 Oral presentation at the O.A.U. College of Health Sciences Research Fair 2021 on the second generation of the hybrid rehabilitation robot. (2021)

Adaptive load cell calibration using Transfer learning Oral presentation at the Applied Artificial Intelligence and Robotics Research lab group meeting (2020)

Design and development of a motorized autofocusing microscope Oral presentation for Group II course (2019)

Overview of the effectiveness between Unilateral and Bilateral Rehabilitation robots Oral presentation at the Applied Artificial Intelligence and Robotics Research lab group meeting (2019)

Hybrid rehabilitation robots Oral presentation at the Applied Artificial Intelligence and Robotics Research lab group meeting (2019)

Ayodele, K.P, Komolafe, M.A., Olugbon, F.J., **Komolafe, E.A.** (2019). A Myoelectric Robotic Orthosis For Hand Neuro-rehabilitation of Stroke Patients in resource-poor settings. Poster presentation at N.F.N.R. (2018).

Climate modelling, Regional climate models of Africa Oral presentation at the Applied Artificial Intelligence and Robotics Research lab group meeting (2018)

Development of Laboratory Circuit boards for electronics experiment. Oral defence for Group Design I course (2017)

Awards and Honors

Google DeepMind Scholar 2025 – 2026

Simons Trust Imbizo Follow Up Grant (STIFUG) [$387] 2022

IBRO-Simons Computational Neuroscience Imbizo Scholarship and Travel Grant 2022

Professional Societies

World Stroke Organization July 2025 - Present
Trainee Member

ACM (Association for Computing Machinery) Jan 2024 – Present
ACM Professional Membership

WFNR (World Federation of Neurorehabilitation) July 2022 – Present
Member of Special Interests groups: Young WFNR & Robotics

ICORR (International Consortium for Rehabilitation Robotics) Aug 2022– Present
Member

Black in AI Nov 2022 – Present
Member

Work Experience

MindForge Sep 2024 - present
AI Engineer

BAATS Clinical Engineering Limited, Ibadan Aug 2023 - Aug 2024
Graduate Engineering Intern

Gilead Biomedical Engineering Sep 2019 – Jan 2020
Undergraduate Intern to Dr. K.P. Ayodele
Projects:

- **Applications of Reinforcement Learning for Robotic control in a virtual environment.** researched in using reinforcement learning to train robots in the CoppeliaSim environment, worked on training the NAOqi robot in walking and the Uarm robot in picking a cylinder.
- **Repair of a faulty wheelchair car lift** Served as the Lead to diagnose the cause of the fault and fully repair the wheelchair lift.

Faculty of Technology Conference OAUTekConf2019 Sep 2019
Assistant Technician

Activities

Institute of Electrical and Electronics Engineers - (OAU Student Chapter) 2017 – Dec 2020
Student member both R.A.S and C.I.S

BR4IN.IO BCI Hackathon participation April 2023
Participated in the 3 day hackathon working on the stroke rehab data analysis project.

Software, Coding and Languages

Software LaTeX, Rhino 3D, Matlab, Corel Draw, k40D, Diagrams.Net
Programming Languages Python, C
programming Frameworks PyTorch, Scikit Learn, Farama Gymnasium, Langchain
Languages English, Yoruba