Brhanu Fentaw Znabu

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EDUCATIONAL BACKGROUND

University of Nebraska-Lincoln, USA August 2024 - Present

Ph.D. Biomedical Engineering

Gwangju Institute of Science and Technology (GIST), Korea 2024

M.Sc. Biomedical Science and Engineering GPA: 4/4.5

Advisor: Dr. Euiheon Chung

Thesis Title: Deep behavioral phenotyping of diabetic neuropathy mouse model

Using Unsupervised machine learning algorithm

Jimma University, Jimma, Ethiopia 2018

B.Sc. Biomedical Engineering GPA: 3.64/4

Thesis Title: Fast delivery of medical supplies using drone technology

RESEARCH EXPERIENCE

University of Nebraska-Lincoln, School of Biological Science August 2024 – Present

Graduate Research Assistant Advisor: Nicole Sexton, PhD

Sexton Lab

- Conduct research on arbovirus host adaptation using AI, deep learning, and bioinformatics
- Developed scalable pipelines for calculating codon usage bias (RSCU) from viral genomes
- Integrated RNA-seq data to correlate codon patterns with gene expression changes
- Developed advanced deep learning models, DNABERT, and NLP methods to analyze DNA/RNA sequences
- Designed transformer models to predict mRNA stability and translation efficiency

Gwangju Institute of Science and Technology Feb 2024 – Jun 2024

Researcher, Department of Biomedical Science and Engineering

Neurophotonics Lab

- Conducted experiments on **diabetic-induced mice** to analyze **3D behavioral patterns** using **DeepLabCut**, a state-of-the-art pose estimation software
- Successfully tracked and quantified intricate behavioral metrics in diabetic neuropathy models
- Identified novel patterns in mouse behavior, advancing understanding of disease-related motor and behavioral changes
- Integrated advanced computational tools for high-resolution behavioral analysis, contributing to ongoing studies in diabetic neuropathy research

Gwangju Institute of Science and Technology Mar 2021- Feb 2024

Research Assistant, Department of Biomedical and Engineering

Neurophotonics Lab

- Developed an **unsupervised Autoregressive model** to discern temporal dependence between behavioral motifs in a diabetic neuropathy mouse model.
- Designed an **unsupervised Hidden Markov model** to identify transitions between distinct behavioral states in the same mouse model
- Compared the performance of the devised models with traditional 2D behavioral analysis methods using a **logistic regression model**
- Enhanced the understanding of behavioral patterns in diabetic neuropathy, contributing to more accurate characterization of disease-associated behaviors

INTERNSHIP EXPERIENCE

Dessie Comprehensive Specialized Hospital, Dessie, Ethiopia Mar 2017- Jun 2018

Biomedical Engineering Intern, Engineering team

- Troubleshot and installed medical equipment, including **patient monitoring systems, oxygen concentrators, chemistry analyzers, and suction machines**.

- Designed a **fuse failure indicator** for oxygen concentrators using **C programming**, improving device reliability and safety
- Developed a **water level indicator** and integrated an **alarm system** to notify nurses in the nursing room using **C programming,** enhancing operational efficiency
- Gained hands-on experience in medical device maintenance and software-hardware integration in healthcare settings

Agaro Primary General Hospital, Jimma, Ethiopia Mar 2016-May 2016

Biomedical Engineering Intern, Team Training program

- Troubleshot and installed hospital medical devices, including CBC machines, chemistry analyzers, patient monitoring systems, oxygen concentrators, and suction machines
- Provided training sessions to lab technicians on proper use and maintenance of medical devices

PUBLICATIONS

1. **Brhanu F. Znabu**, Akm A. Zaman, Eunbin Lee, Euiheon Chung. **"**Deep behavioral phenotyping of diabetic neuropathy mouse model". (Submitted to Scientific Report)

PRESENTATION

1. An Automated Homecage System for Stimulus-Evoked Pain Measurement and Quantification in Mice. Presented at winter workshop, Gwangju, South Korea, January 2022
2. Design of a New Pressure Sensing Probe to Prevent Episodes of Fecal Incontinence for Dementia Patients. Presented at summer workshop, Gwangju, South Korea, July 2021

GRANTS AND AWARDS

1. Ranked **4th** out of **180** in Undergraduate Study (Graduated with Distinction) Jun 2018
   Jimma University, Jimma, Ethiopia
2. Best **BSc. Thesis** Award Jun 2018
   Awarded by Ethiopian Science, Technology, and Innovation, Jimma, Ethiopia
3. Research Grant for Colostomy Device Development Jun 2020
   Hawassa University, Hawassa, Ethiopia
4. Korean Government Scholarship for Master's Study Dec 2020
   Gwangju Institute of Science and Technology, Gwangju, Korea

TEACHING EXPERIENCE

Hawassa University, Hawassa, Ethiopia, Lecturer Aug 2019-Jan 2021

1. BMEg3182: Biomechanics (Fall 2019)
2. BMEg3183: Biomaterials (Spring 2020)
3. BMEg2171: Biophysics (Fall 2020)

SKILLS

Programming and Computational Tools

1. **Programming Languages:** C++, R, MATLAB, LABVIEW
2. **Bioinformatics Tools and Software:** Geneious Software, DeepLabCut, BLAST, MEGA, Clustal, Omega, CodonW

Experimental Techniques

1. Mouse colon harvesting
2. Colon tumor modeling in mice
3. Cranial window surgery in mice for in vivo imaging
4. Endoscopic imaging techniques
5. Mosquito and human cell splitting

PROFESSIONAL AFFILATIONS

1. Biomedical Engineering and Biotechnology Graduate Student Association Aug 2024-Present
   University of Nebraska-Lincoln, USA
2. Ethiopian Biomedical Engineers and Technologist Association Mar 2017- present
   Addis Abeba, Ethiopia

OUTREACH

Project Coordinator and Evaluator for Undergraduate Students Dec 2019- Jan 2021

Hawassa, Ethiopia

1. Coordinated and evaluated undergraduate student projects, providing feedback and guidance to ensure academic success

High School Mathematics and Physics Teacher (Summer Program) 2014-2017

Wollo, Ethiopia

1. Taught Mathematics and Physics to high school students during summer programs, fostering a strong foundation in STEM subjects.

Laboratory Microscope Repair Volunteer Mar 2016- May 2016

Jimma, Ethiopia

1. Repaired non-functional laboratory microscopes in high schools, enabling students to access hands-on science education

STEM Outreach Program Volunteer Apr 2016-May 2016

Jimma, Ethiopia

1. Promoted STEM education through interactive workshops and presentations, inspiring high school students to explore science and technology careers