ANANNA BISWAS

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GitHub: https://github.com/anannabiswas

EDUCATION

Ph.D. in Computational Science & Engineering — August 2023 – Present
Michigan Technological University (MTU) — Michigan, USA

B.Sc. in Electronics and Communication Engineering — April 2015 – February 2019
Khulna University of Engineering and Technology (KUET) — Khulna, Bangladesh

RESEARCH EXPERIENCE

Graduate Research Assistant — May 2025 – Present
Michigan Technological University (MTU) — Michigan, USA
Working on AI-based health diagnostics:
- EEG-based Prediction of Antidepressant Medicine Response in Pediatric Depression.
- Stress, Anxiety, and Depression Classification using multimodal biomedical signal.

Visiting Ph.D. Researcher — Sep 2024- Dec 2024
University of Southern California (USC) — California, USA
Worked on the neuromorphic closed-loop neural prosthetic project:
- Sorted hippocampal spikes using kilosort4.
- Estimated rodents' movement trajectories using DeepLabCut.
- Implanted polymer microelectrode arrays (MEA) in the rats' hippocampus.
- Collected and recorded neural signals (Local Field Potential) during behavior tests.

Graduate Research Assistant — August 2023 – Sep 2024
Michigan Technological University (MTU) — Michigan, USA
Worked on the closed-loop DBS system:
- Designed a neuromorphic controller for a closed-loop Deep Brain Stimulation (DBS) system for Parkinson's disease.
- Built a computational dataset for Parkinson's disease.

Research Engineer — September 2021 – March 2022
Advanced Intelligent Multidisciplinary Systems (AIMS) Lab, UIU. — Dhaka, Bangladesh
Worked on a neuromarketing project:
- Designed experiments, collected and analyzed EEG signals and eye tracking data from human subjects watching marketing stimuli, and predicted their responses (preference, purchase intention, and attention) through a Support Vector Machine (SVM) classifier.

Research Assistant — August 2019 – August 2021
Brainekt-Computer Software Company — Dhaka, Bangladesh
- Worked on the following projects:
  - Wheelchair patient monitoring system using EEG signals.
  - Anomaly detection of ECG signal by dot Residual LSTM Network.
- Worked on the collaboration among independent researchers.

Operator — February 2018 – February 2019
Fabrication (FAB) Lab, KUET — Khulna, Bangladesh
- Organized workshop on "Laser Cutting & Engraving".
- Organized workshop on "Cutting Edge Fabrication Facilities".
- **https://www2.kuet.ac.bd/fablab/operators-2018/**

GRANT & FELLOWSHIP

MTU Fellowship by the Graduate School and the College of Engineering	2025
NSF AccelNet NeuroPAC Fellowship	2024
Institute of Computing and Cybersystems (ICC) Student Travel Grant	2024
Graduate Student Government (GSG) Travel Grant	2024

Shahjalal Islami Bank HSC Scholarship (Offered for poor & scholar Bangladeshi students) 2014

Higher Secondary School Certification (HSC) Scholarship (Offered by the Government of Bangladesh) 2014

Secondary School Certification (SSC) Scholarship (Offered by the Government of Bangladesh) 2012

PREPRINTS & PRESENTATIONS

Ananna Biswas, Hongyu An, **"Preliminary Results of Neuromorphic Controller Design and a Parkinson's Disease Dataset Building for Closed-Loop Deep Brain Stimulation"** arXiv, 2024.

Ananna Biswas and Hongyu An, **Designing LIF-based Controllers for Neuromorphic Closed-Loop Deep Brain Stimulation by Building a Parkinson's Disease Dataset**. International Conference on Neuromorphic Systems (ICONS), Arlington, Virginia. Poster: July 31, 2024.

Ananna Biswas, Abraham George, Asutosh Routa, Bhavika Gopalani, Cristian Lazo Quispe, Jongwon Yun, Joshua Philippe Olorocisimo, Manasa Boggarapu, Rouhong Wang, Tanushka Bhatia **"Exploring the Mouse Visual Cortex"**, Neuromatch Conference. Flashtalk: August 2022.

PUBLICATIONS

Ananna Biswas, Md Akhtaruzzaman, Hongyu An, **Energy-Efficient Neuromorphic Closed-Loop Modulation System for Parkinson's Disease,** 2025 26th International Symposium on Quality Electronic Design (ISQED). IEEE, 2025.

Ananna Biswas, Fazla Rabbi Mashrur, Khandoker Mahmudur Rahman, Mohammad Tohidul Islam Miya, Farhana Sarker, Khondaker A. Mamun, **An Overview of Neuromarketing Research in Developing Countries: Prospects and Challenges,** 2nd International Conference on Computing Advancements (ICCA) (2022).

Ananna Biswas, Zabir Al Nazi, Tasnim Azad Abir, **Invasive Ductal Carcinoma Detection by A Gated Recurrent Unit Network with Self Attention**, International Conference on Electrical Information and Communication Technology (EICT) (2019).

Zabir Al Nazi, **Ananna Biswas**, Md. Abu Rayhan, Tasnim Azad Abir, **Classification of ECG Signals by dot Residual LSTM Network with data augmentation for anomaly detection**, International Conference on Computer and Information Technology (ICCIT) (2019).

TECHNICAL SKILLS

Languages: Python: 4 years of full-time experience in research, MATLAB: 3 years of full-time experience in research, HTML & CSS: 1 year of part-time experience, C& C++: CSE-OOP, Data Structure & Algorithm, Spring'16 & Fall'16.
Framework/ Tools: Kilosort, DeepLabCut, EEGLAB, Keras, TensorFlow, scikit-learn, OpenCV, Pandas
Paper writing: LaTex, Endnote
Data Analysis and Presentation: SQL, MS Excel, MS Word, MS PowerPoint
IDEs: Jupyter Notebook, Spyder, Code Blocks.
Operating Systems: Windows, Ubuntu, Linux

ONLINE COURSES AND TRAINING

- NMA Summer School of Computational Neuroscience 2022 by Neuromatch Academy.
  - Intro to Modeling
  - Machine Learning
  - Dynamic Systems
  - Stochastic Process
- The BCI & Neurotechnology Spring School 2022 by g.tec medical engineering GmbH.
- Ada Lovelace DATATHON 2021 by HERWILL and BdOSN:
  - Descriptive Analysis
  - Feature Engineering

- Machine learning Models
- Validation and Evaluation

- Introduction to Python (**datacamp**)
- Intermediate Python (**datacamp**)
- Neural Networks and Deep Learning by deeplearning.ai (**Coursera**).
- Improving Deep Neural Networks: Hyper parameter Tuning, Regularization and Optimization by deeplearning.ai (**Coursera**).
- Git for Developers Using GitHub by Coursera Project Network (**Coursera**).

GRADUATE & UNDERGRADUATE COURSES

Predictive Modeling, Human-Robot Interaction,
Artificial Intelligence (AI), Artificial Intelligence in Healthcare,
Probability & Stochastic Processes, Neuromorphic Robotic System,
Machine Learning (ML), Intro to Big Data Analytics,
Data Structure & Algorithms, Database System, Internet Programming,
Object-Oriented Programming,
Digital Image Processing, Digital Signal Processing,
Numerical Analysis, Information Theory,
Computer Networks.

ACTIVITIES & LEADERSHIP

STEM Judge, **Western U.P. STEM Fair & Festival**	2024
Judge, **Design Expo, MTU**	2024
Publication Secretary, **MEC, KUET**	April 2018 – April 2019
Treasurer, KUET Career Club (**KCC, KUET**)	March 2018 – March 2019
IT executive, KUET Unit Face of **ESAB** (**Engineering Students Association of Bangladesh**)	July 2017 – July 2019
Organizing committee member of Technival'18, **KUET**	April 2018
Organizing committee member of Career Carnival, **KUET**	July 2017
Organizing committee member of Robi Career Carnival, **KUET**	August 2017