AFTAB ANWAR

aftab202203860@st.jmi.ac.in | aftabaishaanwar@gmail.com

linkedin-profile

EDUCATION

- **Post Graduation** *2022 - 2024*
  From Jamia Millia Islamia[🌐] New Delhi, India
  - Course: MSc (Electronics)
  - CGPA: 8.18/10.00, First Division with Distinction

- **Graduation** *2018 - 2021*
  From Jamia Millia Islamia[🌐] New Delhi, India
  - Course: BSc
  - CGPA: 7.95/10.00, First Division

EXPERIENCE

- **Junior Research Fellow** *August 2024 – March 2025*
  Indian Institute of Technology Jodhpur [🌐] Jodhpur, India

  Project: Development of an oscillator network model of the brain that will enable hypothesis driven perturbation response experiments for early detection of neurodegenerative disorders.

  - Implementation of a TMS (Transcranial Magnetic Stimulation) model into the Wilson-Cowan neural population framework.
  - Modeled large-scale brain networks using the Wilson-Cowan framework.
  - Simulated brain perturbations by integrating Transcranial Magnetic Stimulation (TMS) into network models to study perturbation response behavior.
  - Hands-on experience with EEG and TMS, including preprocessing, analysis, and interpretation of neural signals in computational frameworks.
  - Processed and analyzed diffusion-weighted imaging (DWI) data for generating structural connectomes used in whole-brain simulations.
  - Gained hands-on experience with advanced neuroimaging tools like MRtrix3 and FSL for structural connectivity analysis.

- **Research Intern** *June – July 2023*
  Indian Institute of Technology (BHU) [🌐] Varanasi, India
  - Made a biosensor using a CMOS Sensor.
  - Gained hands-on experience with a variety of laboratory equipment, cultivating practical skills in experimental techniques.
  - Contributed to ongoing research efforts, applying theoretical knowledge to real-world problems.

- **Workshop Participant** *July 2023*
  Indian Institute of Technology Hyderabad [🌐] Hyderabad, India
  - Participated in a workshop on Mathematical Modeling in Biophysics and Simulation at IIT Hyderabad.
  - Gained insights into using mathematical approaches to analyze biological systems.
  - Acquired practical experience in simulation techniques relevant to interdisciplinary neuroscience research.
  - Enhanced problem-solving abilities through applied modeling exercises.

PROJECTS

- **Master's Degree Project** *January 2024 - May 2024*
  Project Supervisor: Dr. Mukesh Prartap Singh, D/O Applied Sciences and Humanities, Jamia Millia Islamia [👤]

  Project: Optogenetic Modulation of Neural Activity in Alzheimer's Disease Using Channelrhodopsin-2 [GitHub]

  Description:
  This project aimed to simulate and analyze the effects of optogenetic stimulation on Alzheimer's-affected neural circuits using the light-sensitive ion channel, Channelrhodopsin-2 (ChR2). By integrating the ChR2 model into a Hodgkin-Huxley-based neuron model, we investigated how targeted light pulses could modulate neural firing patterns disrupted by Alzheimer's pathology.

  - Successfully modulated neural activity using the Channelrhodopsin-2 (ChR2) ion channel.
  - Demonstrated precise control over neuronal functioning in Alzheimer's disease using optogenetic techniques.

- **Master's Minor Project** *June 2023 - July 2023*
  Project Supervisor: Dr. Sanjeev Kumar Mahto, School of Biomedical Engineering, IIT (BHU) [👤]

  Project: Optimizing Fabrication Method and Surface Modification of Polyvinyl Acetate-Benzophenone Emission Filters for Complementary Metal-Oxide-Semiconductor Imager Chips towards Biosensing Applications

  - Project focused on optimizing the fabrication method and surface modification of Polyvinyl Acetate-Benzophenone emission filters for complementary metal-oxide-semiconductor (CMOS) sensors, aimed at detecting levels of Thyroid Stimulating Hormone (TSH) in human blood.
  - Implemented sensor to emission filter and performed image analysis using ML techniques.

PUBLICATIONS

- **Title:** Decoding Cognitive Performance from EEG using Energy-Based and Biophysical Models
  Preprint: PsyArXiv Preprints
  DOI: https://doi.org/10.31234/osf.io/8yqxp_v1
- **Title:** Optimizing Fabrication Method and Surface Modification of Polyvinyl Acetate-Benzophenone Emission Filters for Complementary Metal-Oxide-Semiconductor Imager Chips towards Biosensing Applications
  Journal: Springer Nature: Journal of Analytical Chemistry
  DOI: https://doi.org/10.1134/S1061934824701363

SKILLS

- **Programming Skills:** Python, ML, MATLAB, C++
- **Neuroimaging and Data Analysis Skills:** EEG Analysis, DWI Analysis
- **Experimental Skills:** Analog and Digital Circuit Design, Signal Processing, PCB Design, Arduino, Raspberry Pi
- **Mathematical Skills:** Differential equations, linear algebra, probability theory, dynamical systems, control theory, real analysis, and statistical analysis
- **Other Skills:** Mathematical Modeling, Neuronal Modeling, Modeling in Soft Matter and Biophysics, Data Analytics

ACHIEVEMENTS

- 2024 GATE Qualified Successfully qualified for the Graduate Aptitude Test in Engineering.

EXTRACURRICULAR ACTIVITIES

- Delivered a talk on "Understanding Connectomes through Neuroimaging" at NeuroTech Society, AIDE, IIT Jodhpur. https://sites.google.com/iitj.ac.in/neurotechsociety/events
- I am a part of the NGO 'Alhikmah Foundation' for educational betterment and social awareness among underprivileged people from 2021."
- Class Representative and Placement Coordinator in BSc
- Athletics, Singing

LANGUAGE SPOKEN

English: ★ ★ ★ ★ ★; **Hindi**: ★ ★ ★ ★ ★; **Urdu**: ★ ★ ★ ★ ☆