

# HASAN JEHANGIR

hasanjehangir6@gmail.com | +92-349-9262254 | [linkedin.com/in/hasanjehangir](https://linkedin.com/in/hasanjehangir) | Peshawar, Pakistan

**Research Interests:** Computational Neuroscience · Neuroimaging · Multimodal Biosignal Processing · AI in Healthcare · BCI · NeuroAI · Time-Series Modelling

## EDUCATION

### BS Data Science

Nov 2021 – Oct 2025

#### University of Engineering and Technology (UET) Peshawar

CGPA: 3.53 / 4.00 | Graduated: October 2025 | Departmental Rank: 3rd in Department

- Background: Medical sciences (pre-university); transitioned independently into data science and AI — ranked 3rd in department among students from engineering/computer science backgrounds
- Coursework: Machine Learning, Deep Learning, Statistical Analysis, Biomedical Signal Processing, Database Systems, NLP
- Final Year Project: NeuroShield — Multimodal Wearable Seizure Detection System (manuscript in preparation; patent in progress)

## RESEARCH EXPERIENCE

### Lead Researcher — NeuroShield: Multimodal Wearable Seizure Detection

2024 – 2025

#### UET Peshawar (Final Year Research Project)

- Designed and built a real-time seizure detection pipeline fusing EMG, PPG, and IMU signals acquired via ESP32 microcontroller
- Implemented a ChronoNet-based deep learning architecture for sequential physiological signal classification with reduced false-positive rates
- Engineered GPS-based alerting module and end-to-end firmware for embedded deployment in clinical and out-of-hospital settings
- Optimised model for early seizure warning — extending prediction horizon before onset under real-world noise conditions
- Manuscript in preparation for peer-reviewed journal submission; patent application in progress

### Machine Learning Intern — AI in Healthcare Lab

2024

#### National Centre for Artificial Intelligence (NCAI), Pakistan

- Conducted biomedical signal processing research on clinical datasets using Python (NumPy, SciPy, PyTorch)
- Developed and evaluated predictive models for patient outcome classification from physiological time-series data
- Collaborated with interdisciplinary team of clinicians and data scientists on healthcare AI pipeline design

## PUBLICATIONS & INTELLECTUAL PROPERTY

[1] Jehangir, H. et al. "NeuroShield: Multimodal Wearable Seizure Detection System using EMG, PPG, and IMU Sensors." *Manuscript in preparation* (2025–2026).

[2] Jehangir, H. "Human Body Sound Analysis for AI/ML." Medium (Published Article, 2024).

[P1] **Patent (In Progress):** AI-based Wearable Seizure Detection System — multimodal sensor fusion with real-time embedded inference.

## RESEARCH & TECHNICAL PROJECTS

- NeuroShield — Multimodal Wearable Seizure Detection System**
2024–2025

  - Real-time seizure detection fusing EMG, PPG, and IMU signals; ChronoNet deep learning backbone on ESP32
  - Early seizure warning with GPS alerting; manuscript in preparation for journal submission; patent in progress
- RespiraSense — Lung Disease Detection via Audio Signals**
2024

  - CNN-based classifier trained on respiratory audio using MFCC and Chroma spectral features
  - Achieved ~90% accuracy across multiple respiratory disease categories on held-out test data
- MelanoGuard — Skin Cancer Screening Platform**
2023

  - Melanoma detection model built on Azure Custom Vision with 94% accuracy
  - Deployed as a full clinical screening platform with user-facing interface
- Sautt-ul-Haq — Retrieval-Augmented Generation System**
2024

  - Designed RAG pipeline over structured textual data sources using vector search and LLM generation
  - Optimised retrieval precision for domain-specific question answering

## TECHNICAL SKILLS

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|                                |                                                                              |
|--------------------------------|------------------------------------------------------------------------------|
| <b>Programming</b>             | Python (advanced), C++, SQL                                                  |
| <b>ML / DL Frameworks</b>      | PyTorch, TensorFlow, Scikit-learn, Keras                                     |
| <b>Signal Processing</b>       | EMG, PPG, EEG (fundamentals), IMU, MFCC, time-series analysis (SciPy, NumPy) |
| <b>Neuroimaging</b>            | fMRI concepts, EEG/ERP methodology, EEGLAB familiarity                       |
| <b>Tools &amp; DevOps</b>      | Jupyter, Git/GitHub, Google Colab, Embedded (ESP32, Arduino)                 |
| <b>Cloud &amp; AI Services</b> | Microsoft Azure AI, Azure Custom Vision                                      |
| <b>Writing &amp; Comms</b>     | Scientific writing, LaTeX (basic), technical documentation                   |

## CERTIFICATIONS & PROFESSIONAL DEVELOPMENT

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- Computational Neuroscience** — *University of Washington (Coursera)*
- Neuroimaging and the Neuroscience of Human Learning** — *Johns Hopkins University (Coursera)*
- Deep Learning Specialization (5 courses)** — *deeplearning.ai — Andrew Ng (Coursera)*
- IBM Data Science Professional Certificate** — *IBM / Coursera*

## TEACHING & INSTRUCTIONAL EXPERIENCE

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- GenAI Instructor — Wrapify Labs**
2025–current

  - Designed and delivered curriculum on Generative AI, Large Language Models (LLMs), and Retrieval-Augmented Generation (RAG) systems
  - Trained 400+ students across cohorts; developed hands-on labs and project-based assessments
- Deep Learning Instructor — TCPC / Data Science Society**
2024–2024

  - Delivered structured training on CNNs, RNNs, NLP, and Transformer architectures to undergraduate cohorts
  - Developed course materials, code walkthroughs, and project assignments used by 150+ students

## LEADERSHIP & COMMUNITY ENGAGEMENT

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### President — Data Science Society, UET Peshawar

2023–2025

- Led society operations, organised workshops, hackathons, and speaker events for 200+ student members

### Microsoft Learn Student Ambassador (MLSA)

2023–2025

- Organised and delivered community learning events on Azure AI services, cloud computing, and responsible AI

### AI Community Lead — AICP & TCPC

2023–2024

- Coordinated interdisciplinary AI learning communities; mentored junior students in ML research and project development

## HONOURS & AWARDS

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- **2024** Top 5 Global Finalist — Microsoft AI Ambassador Competition (among thousands of international applicants)
- **2025** 3rd in Department — BS Data Science cohort, UET Peshawar (among students predominantly from engineering/CS backgrounds)
- **2025** Patent in Progress — AI-based Wearable Seizure Detection System (multimodal sensor fusion)
- **2025–2026** Manuscript in Preparation — NeuroShield: Multimodal Wearable Seizure Detection (targeting peer-reviewed AI/biomedical journal)

## REFERENCES

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### Dr. Syed Adeel Ali Shah

#### Associate Professor & Chairperson

Department of Computer Science

University of Engineering and Technology (UET) Peshawar

[adeel@uetpeshawar.edu.pk](mailto:adeel@uetpeshawar.edu.pk)

### Dr. Wajeeha Khalil

#### Assistant Professor

Department of Computer Science

University of Engineering and Technology (UET) Peshawar

[wajeeha.khalil@uetpeshawar.edu.pk](mailto:wajeeha.khalil@uetpeshawar.edu.pk)

*References available to contact upon request.*