

## EXPERIENCE

### BISE Lab, UNIST

Research Graduate Student

March 2026 - Present

Ulsan, South Korea

- Developing an EEG-fMRI simultaneous analysis pipeline using EEGLAB and MATLAB for multimodal neural signal integration and preprocessing.
- Building workflows for synchronized preprocessing, artifact correction, signal alignment, and feature extraction across EEG and fMRI modalities.
- Conducting multimodal sensor data analysis for Parkinson's patients using IMU, hand movement tracking, and video-based behavioral assessment.
- Designing machine learning pipelines for motor symptom quantification and progression analysis using wearable and visual sensor streams.
- Supporting clinical interpretation through multimodal fusion of neuroimaging and behavioral biomarkers for neurological disorder assessment.
- Used: Python, PyTorch, MATLAB, EEGLAB, signal processing, multimodal analysis, IMU sensors, computer vision, and neuroimaging workflows.

### HSBC

Senior Software Engineer

August 2023 - March 2026

Hyderabad, India

- Engineered a Legal RAG system for procurement contract parsing, implementing document processing pipelines for structured/unstructured legal documents with hierarchical entity recognition.
- Developed evaluation metrics framework (precision/recall, semantic similarity, citation accuracy) to ensure quality across 500K+ legal documents.
- Optimized Azure Cosmos DB ingestion with vectorized embeddings, reducing query latency by 78% through custom indexing and partition optimization.
- Implemented hybrid search (vector + keyword + metadata) and query rewriting for legal terminology normalization.
- Created evaluation dashboard with performance tracking (retrieval accuracy, user metrics, failure analysis) for targeted improvements.
- Automated extraction of 15+ key legal provisions from contracts, reducing manual review by 85%.
- Architected system delivering \$1.1M annual savings through automated compliance checks and risk identification.
- Used: Python, PyTorch, Azure Cosmos DB, LangChain, FastAPI, Prometheus/Grafana, legal NLP pipelines.

### Nox Lab, University of Cambridge

Research Collaborator

March 2022 - May 2025

Cambridge, United Kingdom

- Ideating and conducting research studies on statistical learning of noxious stimuli under Dr. Flavia Mancini.
- Completed a study on statistical learning in pain perception and currently involved in understanding neural pain signatures of chronic back pain using fMRI.
- Engineered SLURM-based HPC pipelines for preprocessing 480+ fMRI scans across 120 participants, implementing parallelized Savitzky-Golay filtering, HRF modeling, and motion correction workflows.
- Conducted rigorous statistical validation of neuroimaging findings using permutation testing and multiple comparison corrections, identifying key brain networks involved in pain chronification.
- Developed Gradient Boosting Machine classifiers achieving ROC AUC > 0.8 to predict chronic pain outcomes using early fMRI data, linking BOLD activity in pain-processing networks with clinical trajectories.
- Used: Python, Nilearn, TensorFlow, scikit-learn, SLURM HPC scripting, Matplotlib, neuroimaging preprocessing pipelines, and statistical learning frameworks.

### HashedIn by Deloitte

Software Engineering Intern

March 2023 - June 2023

Bangalore, India

- Built a LLM system specialized for tabular data that automatically interprets datasets and user queries.
- Created features like automatic cleaning, visualization, feature selection, and modelling in Django rest framework.
- Used: Python, Django, Next.js, Langchain, Docker, Postgres, and Milvus (vector database).

## ACADEMIC QUALIFICATIONS

### Ulsan National Institute of Science and Technology (UNIST)

M.S. in Biomedical Engineering (Expected 2028)

March 2026 - Present

Advisor: Prof. Hyung Joon Cho

Focus: Machine Learning, Computational Neuroscience, Multimodal Modeling

### BML Munjal University

B. Tech. in Computer Science & Engineering

June 2019 - June 2023

Overall CGPA: 8.8

Vice President of Scimat Club

RESEARCH

Poonia Ansh, **Jain Maeghal** (2025) Dissecting Persona-Driven Reasoning in Language Models via Activation Patching, EMNLP <https://aclanthology.org/anthology-files/pdf/findings/2025.findings-emnlp.1335.pdf>

**Jain Maeghal**, Poonia Ansh, Modalavalasa Kishor, Kotni Krishna, Ayyagari Kameswari Prasada Rao (2024) Predicting Glass-forming-ability of Bulk Metallic Glasses using Recurrent-Neural-network, Materials Letters, Volume 361 <https://doi.org/10.1016/j.matlet.2024.136070>

Onysk Jakub, Gregory Nicholas, Whitefield Mia, **Jain Maeghal**, Turner Georgia, Seymour Ben, Mancini Flavia (2023) Statistical learning shapes pain perception and prediction independently of external cues, eLife 12:RP90634 <https://doi.org/10.7554/eLife.90634.1>

**Jain Maeghal**, Uddin Ziya, Ibrahim Wubshet (2024) SIR-RL: Reinforcement Learning for Optimized Policy Control during Epidemiological Outbreaks in Emerging Market and Developing Economies <https://doi.org/10.48550/arXiv.2404.08423>

TECHNICAL STRENGTHS

|                                |                                                                 |
|--------------------------------|-----------------------------------------------------------------|
| <b>Certifications</b>          | Deep Learning Specialization, Computational Neuroscience        |
| <b>Competitive Programming</b> | Python, C++, Data Structures                                    |
| <b>Machine Learning</b>        | PyTorch, TensorFlow, Scikit-learn, XGBoost                      |
| <b>Generative AI</b>           | LangChain, LlamaIndex, RAG Systems, LLM Fine-tuning             |
| <b>MLOps</b>                   | MLflow, DVC, Kubeflow, FastAPI, Docker, CI/CD                   |
| <b>Cloud &amp; Databases</b>   | AWS, GCP, Azure, Cosmos DB, Vector Databases (Milvus, Pinecone) |
| <b>Big Data</b>                | Apache Spark, HPC (SLURM), Distributed Computing                |
| <b>Neuroimaging Tools</b>      | Nilearn, MNE, FSL, fMRI preprocessing pipelines                 |
| <b>Tools</b>                   | Git, Jira, Digital Signal Processing                            |

REFERENCES

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