

# Mohammed Junaid Anwar Qader

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## Education

### University of Toronto

Master of Science in Applied Computing (MScAC) Concentration: Artificial Intelligence

Sept. 2025 - Dec. 2026

### National Institute of Technology, Warangal

Bachelor of Technology, Computer Science and Engineering

2021 - 2025

Institute Merit Award for all Academic Years

## Industry Experience

### Wells Fargo

SDE Intern

May - July 2024

Chennai, India

- Developed a secure chatbot extension for VS Code and IntelliJ IDEA, integrating NLP with Confluence API for real-time, developer query resolution and a Harness API extension to display logs and pipeline states within IDEs, reducing context switching and improving developer productivity.
- Leveraged JavaScript, VS Code API, Java AWT Swing, NLTK, and SpaCy while ensuring compliance with Wells Fargo's security protocols through collaboration with cross-functional teams.

## Research Experience

### CathepsinDL: QSAR-Inspired Deep Learning for Cathepsin Inhibitors

Aug 2024 - Mar 2025

- Developed CathepsinDL, a deep learning framework using BindingDB and ChEMBL data to predict Cathepsins B, S, D, and K inhibitor potency by IC<sub>50</sub> ranges for early-stage drug screening.
- Applied feature elimination techniques to obtain an optimal descriptor set and trained 1D CNN models with SMOTE to address class imbalance, achieving 97% accuracy in identifying potent inhibitors.
- Qader, M.J.A., Sah, C.M., Sahoo, T.K., Majhi, S.K. and Mishra, K., 2025. CathepsinDL: Deep Learning-Driven Model for Cathepsin Inhibitor Screening and Drug Target Identification.** IEEE Access.

### Deep Learning and IoT-based Mosquito Wingbeat Event Detection

Jan - Apr 2024

- Preprocessed mosquito wingbeat audio into log-mel spectrograms with PCEN and augmentation for robustness in noisy conditions.
- Trained a custom CNN model with attention, and optimized it for real-time inference on edge IoT devices, achieving over 90% accuracy in mosquito wingbeat audio event detection.
- Seervi, A., Mulani, N., Anwar, M. J., & Venkanna, U. (2025). **IoT-Enabled Intelligent Framework for Real-Time Mosquito Detection and Monitoring.** SN Computer Science, 6(5), 484.

## Projects

### Frequency-Aware UDC Restoration via Knowledge Distillation

Nov 2025

Developed a deep learning pipeline to restore images from Under-Display Cameras (UDC) for mobile deployment.

- Engineered a PyTorch-based distillation framework that transfers spectral reasoning from a MambaIR state-space teacher to a lightweight UNet student, utilizing FFT-based amplitude and multi-scale phase losses to correct global diffraction artifacts.
- Optimized the model on the real-world UDC-SIT dataset to achieve teacher-level perceptual quality while reducing inference latency by 40x (from ~2.5s to <100ms), demonstrating viability for real-time mobile applications.

### Surgi-Sync: Voice-Enabled Hospital Assistant

Oct 2025

Agentic LLM Framework for Real-Time Emergency Care Management

- Developed an agentic AI system for hospital workflows, enabling nurses to admit, discharge, transfer, and query patients via natural voice commands using Boson AI's Higgs Audio for real-time transcription and intent recognition.

### SLM-nanoGPT

Sep 2025

Recreated a GPT-2-style model trained on the TinyStories dataset to explore transformer internals and LLM training.

- Implemented a small-scale LLM from scratch, gaining hands-on experience with tokenization, dataset preparation, and pretraining. Currently focused on learning more about advanced LLM architectures and techniques.

## Skills & Interests

**Programming Languages/ Frameworks:** C++, Java, Python, PyTorch, NumPy, Pandas, LangChain, LangGraph

**Tools:** Git, GitHub, MySQL Intermediate: AWS, Docker and Containers

**Interests:** LLMs, RAG, Agentic AI Systems, Computational Biology & Healthcare AI (Protein–Ligand Binding, QSAR etc.)

## Coursework

Computational Imaging, Neural Networks and Deep Learning, Visual and Mobile Computing, AI for drug discovery