Ahsan Bilal

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Education

University of Oklahoma — Oklahoma, USA
MS in Computer Science — *Sep. 2024 – Present*

- **CGPA** – 3.8/4.0
- **Advisor**: Dr. Dean Hougen | Research includes Deep Learning, Reinforcement Learning, & LLMs
- **Research Focus**: Deep learning for optimization, with emphasis on theoretical foundations and robust LLM reasoning models. Currently exploring reinforcement learning approaches to enhance structured decision-making and interpretability in large language models at scale.

National University of Sciences & Technology (NUST - SEECS) — Islamabad, Pakistan
Bachelors of Engineering in Electrical Engineering — *Aug. 2020 – June 2024*

- **CGPA** – 3.66/4.0 | **Specialization GPA** – 4.0/4.0 | **Merit Scholarship** 2020
- **Person identification using gait with fused graph and 3D-convolutional architectures** | **Presentation** |

Research Experience

Graduate Researcher — REAL Lab, University of Oklahoma
Advisor: Dr. Dean Hougen — *Aug 2024 – Present*
Research on structured generative models and RL-driven reasoning for LLMs (targeting ICML'26), including designing discrete diffusion models and agentic RL controllers, with ongoing theory-focused work on robust generative modeling. Contributed to continual-learning and diffusion-based wireless channel prediction models, including two submissions to *ICASSP'26*.

Research Collaborator — MLCN Lab, Stanford University
Supervisor: Prof. John M. Cioffi — *Collaborator: M. A. Mohsin* — *Aug 2024 – Present*
Developed diffusion-based wireless estimation, neural fields (nGRF), continual learning under distribution shift, and RAG pipelines for multimodal wireless systems. Publications include *ICLR'26 (under review)*, *NeurIPS'25*, *ICML'25*, *AAAI'25*, and *ICC'25 (Best Paper)*.

Undergraduate Researcher — Optimal ML Lab, NUST
Supervisor: Dr. Ahmad Salman — *Jan 2023 – June 2024*
Built robust CV/biometric models: boosted-attention ViT for shadow removal and fused GCN + 3D-CNN for gait recognition. Papers under review: *Shadow Removal with Boosted Attention*, *Gait ID using Fused Graph + 3D-CNN*.

Publications | Google Scholar

ITDPDM: Information-Theoretic Discrete Poisson Diffusion Model — NeurIPS'25
S. Bhattacharya, A.R. Gorle, A. Bilal, C. Ding, A.K.S. Yadav, T. Weissman

On the Fundamental Limits of LLMs at Scale — (Submitted) TMLR'26
A. Mohsin, A. Bilal, W. Zhao, M. Umer, and Researchers from DeepMind and Meta

Neural Gaussian Radio Fields for Channel Estimation — (Submitted) ICLR'26
M. Umer, M.A. Mohsin, A. Bilal, J.M. Cioffi

Channel Prediction Under Network Distribution Shift Using Continual Learning-Based Loss Regularization — (Submitted) ICASSP'26
M.A. Mohsin, M. Umer, A. Bilal, M.I. Qadir, M.A. Jamshed, D.F. Hougen, J.M. Cioffi

Conditional Prior-Based Non-Stationary Channel Estimation Using Accelerated Diffusion Models — (Submitted) ICASSP'26
M.A. Mohsin, A. Bilal, M. Umer, A. Ali, M.A. Jamshed, D.F. Hougen, J.M. Cioffi

Transformer-Based Sparse CSI Estimation for Non-Stationary Channels — (Submitted) ICC'26
M.A. Mohsin, M. Umer, A. Bilal, H. Rizwan, S. Bhattacharya, M.A. Jamshed, J.M. Cioffi

Continual Learning for Wireless Channel Prediction — ICML'25
M.A. Mohsin, M. Umer, A. Bilal, M.A. Jamshed, J.M. Cioffi

Task Aware Distributed Source Coding for Correlated Audio Signals Using Perceptual Loss — AAAI'25
S. Bhattacharya, M.A. Mohsin, A. Bilal, J.M. Cioffi

Retrieval Augmented Generation with Multi-Modal LLM Framework for Wireless Environments — ICC'25
M.A. Mohsin, A. Bilal, S. Bhattacharya, J.M. Cioffi

HDRL for Spectrum Resource Optimization in Integrated Terrestrial and Non-Terrestrial Networks — AAAI'25
M.A. Mohsin, H. Rizwan, M. Umer, S. Bhattacharya, A. Bilal, J.M. Cioffi

Abstract – LLM for Explainable AI IEEE DSAA'24
A. Bilal, B. Lin

Meta-Thinking in LLMs via Multi-Agent Reinforcement Learning: A Survey (Submitted) IEEE TAI
A. Bilal, M.A. Mohsin, M. Umer, M.A.K. Bangash, M.A. Jamshed

On Shadow Removal With Boosted Attention in a Vision Transformer (Submitted) Springer ML
A. Bilal, A. Salman, K. Khurshid, D.F. Hougen

Person Identification using Gait with Fused Graph and 3D-Convolutional Architectures (Submitted) ACM TAIS
A. Bilal, A. Salman, K. Khurshid

Industry Experience

Machine Learning Engineer Islamabad, PK
Cowlar Design Studio (Y Combinator 21) – Based in USA *Feb 2024 – August 2024*

- Developed an Action Recognition system for Smart Carts with 95% accuracy, built dual inference deployment for edge devices and Nvidia cluster. Automated fiber cable alignment using computer vision and machine learning with 96% success, improving precision to 5 micrometers and scaling production 40x.

UI Developer Dubai, UAE
SJCurve – Remote *March 2023 – August 2024*

- Created responsive web applications using WordPress and React.js, customized themes, integrated frontend with backend, and collaborated with teams to implement modern UI trends.

UX/UI Designer Wah Cantt, Pakistan
Meraki-IT – Remote *Nov 2022 – Mar 2023*

- Led UI/UX design for multiple projects, analyzing problem statements, designing intuitive interfaces, and developing wireframes and prototypes for the technology sector.

Teaching Experience

Teaching Assistant University of Oklahoma
CS-1313: Programming for Non-majors in C *Fall 2024 – Present*

- Worked with **Dr. Neeman** to design weekly lab assignments, grade with clear rubrics, and lead help sessions supporting students with C programming and course material.

Talks & Reviewing

- Gave a talk on **"AI in Healthcare"** at Norman Regional Hospital under **Dr. Lubna Mirza**.
- Reviewer for conferences: ICASSP, PAKDD.
- Reviewer for journals: TMLR, IEEE WCM, Springer MT&A, IP&M, Aquaculture Int., IJIM, IEEE Access.

Honors and Awards

- Best Student Presentation **Runner-up** Award at **IEEE DSAA'24** Student Forum.
- Recipient of the **Gallogly College of Engineering Graduate Fellowship 2025**
- Awarded **Best Paper** at the **ICC Workshop 2025** in Montreal.
- Awarded the **Student Travel Grant** for **IEEE DSAA 2024** in San Diego.
- My Final Year Project received the **1st Best Adjudged Industrial Project Award** at the **NUST Open House 2024**.
- Selected as an Undergraduate Research Intern for the First Cohort of UGRIP by MBZUAI.
- Selected as **Emerging Young Researcher** in IEEE.
- Winner of **Prime Minister Laptop Scheme**.

Certifications

- Google UX Professional Certificate.
- Deep Learning Specialization Certificate.
- The Advanced Communication Skills Course.

Skills

Programming & Deep Learning: PyTorch, Tensorflow (Keras), OpenCV, Docker, Mlflow,EC2 Instance
Languages: Python, C/C++, Embedded C, Javascript (React.js), HTML/CSS, Next.js
Tools: MATLAB, VS Code, Git, AutoCad, Figma, PyCharm, Raspberry Pi OS, NginX
Design: Figma, AdobeXD, Adobe Illustrator, Adobe Photoshop, Sketch, WordPress Theme Design