

Mohamed Abdelnaby

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EDUCATION

Virginia Tech <i>Doctor of Philosophy in Computer Science</i>	Blacksburg, VA <i>Expected May 2030</i>
The University of Oklahoma <i>Master of Science in Computer Science; GPA: 4.0/4.0</i>	Norman, OK <i>May 2025</i>
The University of Oklahoma <i>Bachelor of Science in Computer Engineering; GPA: 3.75/4.0</i>	Norman, OK <i>May 2024</i>

TECHNICAL SKILLS

Specialized Skills: Machine Learning, Deep Learning, Computer Vision, Natural Language Processing, Distributed Training, Model Optimization, Data Preprocessing, Hyperparameter Tuning
Languages: Java, Python, C, C++, SQL, JavaScript, R
Frameworks: React, Node.js, Flask, JUnit, React Native, FastAPI
Developer Tools: Git, Jenkins, Docker, GCP, AWS, CUDA, OpenMP, MPI, NVIDIA TensorRT, MLflow

EXPERIENCE

Graduate Research Assistant <i>The University of Oklahoma</i>	July 2024 – May 2025 <i>Norman, OK</i>
<ul style="list-style-type: none">Developed optimized dimensionality reduction and clustering pipelines for single-cell RNA sequencing, benchmarking PCA and Random Projection methods on high-dimensional datasets, and implemented parallelization on multi-CPU systems to significantly reduce computation time.Presented research advancements at RECOMB 2024 and ISMB 2024, with a paper presented at ICCABS 2025, highlighting improvements in clustering accuracy and efficient large-scale data processing workflows.	

LEADERSHIP EXPERIENCE

Technology Director <i>Hacklahoma</i>	May 2024 – May 2025 <i>Norman, OK</i>
<ul style="list-style-type: none">Promoted to lead a team of 4 software developers in the creation of the Hacklahoma 2025 website, targeting a 30% increase in user engagement.Administered the integration of 3 key features and tools, projected to enhance user interaction by 15% and streamline the event management process, aiming to improve overall efficiency for the upcoming Hackathon.	
Vice President Internal <i>OU UI/UX Design Club</i>	August 2023 - May 2024 <i>Norman, OK</i>
<ul style="list-style-type: none">Hosted and arranged key events, including inviting industry-leading keynote speakers from Microsoft, Paycom, and IBM, which enhanced the learning experience for over 100 members.Led conference submissions for ACM-CHI, coordinated and ensured the acceptance of 3 workshop papers, including a workshop on Inclusive AR, which focused on designing accessible augmented reality experiences	
Software Developer <i>Hacklahoma</i>	May 2023 – May 2024 <i>Norman, OK</i>
<ul style="list-style-type: none">Managed full-cycle development of the Hacklahoma 2024 website, creating an interactive and user-friendly interface for 1,000+ users seeking organization and event information.Engineered an online registration system to optimize data collection for 300+ students, streamline the sign-up process, and boost participant registration and engagement by 20%.	
Project Manager <i>OU Artificial Intelligence Organization</i>	May 2022 – May 2023 <i>Norman, OK</i>
<ul style="list-style-type: none">Led technical projects (workshops, seminars, tutorials, and competitions) for the AI Organization at OU, with 100+ members, focusing on practical applications of machine learning and AI.Organized OU AI Symposium to facilitate learning, innovation, and collaboration among students, with 100+ participants, featuring talks and projects on machine learning, natural language processing, and computer vision.	

PROJECTS

- XR Cupid** | *Unity, Meta Quest 3, Convai, Cognitive3D - MIT Reality Hack Founders Lab Winner* January 2025
- Winner of the Founders Lab at MIT Reality Hack 2025 for developing XR Cupid, an AI-powered dating coach designed for neurodivergent individuals and those with social anxiety.
 - Developed and implemented the AI system in Unity, leveraging Convai for AI-powered interactions and integrating Cognitive3D for real-time user analytics and behavior tracking.
 - Designed and tested the Mixed Reality experience, utilizing the Meta SDK to create immersive AI-driven dating coaching with real-time feedback on eye contact, body movements, and posture.
- HomeGen.ai** | *ShapesXR, Meta Quest 3, AWS - Stanford XR Hackathon Winner* November 2024
- Winner of the ShapesXR track at the Stanford XR Hackathon for developing an innovative VR app that transforms 2D floor plans into immersive 3D walkthroughs.
 - Leveraged AWS EC2 instances to automatically convert 2D floor plans into precise, navigable 3D environments, ensuring high fidelity and accuracy for architectural designs.
 - Seamlessly integrated AWS services, ShapesXR, and Meta Quest 3 to create an intuitive design visualization tool, enabling client approvals and reducing costly design revisions.
- MuseumBot App** | *React Native, FastAPI, LLaMA 3.2 (90B Vision-Instruct), FAISS* November 2024
- Developed an interactive React Native museum app featuring a chatbot powered by LLaMA 3.2 (90B parameters), designed to provide accurate, context-aware answers about artworks, artists, and museums.
 - Implemented a Retrieval-Augmented Generation (RAG) system with FAISS indexing and Sentence-BERT embeddings, enabling efficient semantic search and precise information retrieval from structured art datasets.
 - Optimized model performance using mixed-precision training with half-precision autocast, dynamic quantization of model layers, and fine-tuned tokenizers, achieving low inference latency and efficient memory utilization on GPU.
- HomeDecorAR** | *Lens Studio, JavaScript, TypeScript* October 2024
- Developed an AR tool enabling users to visualize furniture placement in real-time using Spectacles, featuring seamless virtual and real furniture integration with accurate dimension measurements.
 - Utilized Lens Studio's World Tracking Planes API to detect surfaces and display dimensions dynamically, integrating 3D models and interactive touchpoints to enhance user interaction and layout customization.
 - Delivered a fully functional app in a highly competitive SnapAR Challenge at CalHacks, one of only nine teams out of 25 to submit a working app for the Snapchat challenge.
- Predictive Soccer: Accelerometers & Neural Networks** | *OpenCV, CNNs, RNNs* January 2024 - May 2024
- Developed a computer vision system with OpenCV to analyze 500+ soccer videos, tracking balls, drawing grids, and predicting landing spots, boosting game analysis and detection efficiency by 25%.
 - Enhanced CNN and RNN models (LSTM, GRU) for real-time ball tracking and grid prediction, achieving a 30% accuracy improvement in tracking and 65% accuracy in landing grid predictions.

RESEARCH PUBLICATIONS & POSTERS

- **Mohamed Abdelnaby** and Marmar Moussa. "A Benchmarking Study of Random Projections and Principal Components for Dimensionality Reduction Strategies in Single Cell Analysis". In: *Proceedings of the 13th International Conference on Computational Advances in Bio and Medical Sciences (ICCABS 2025)*, Lecture Notes in Bioinformatics (LNBI), Vol. 15599, Springer, January 2025, Georgia, USA.
- **Mohamed Abdelnaby** and Marmar Moussa. 2024. "Benchmarking Principal Component and Random Projection dimensionality reduction methods for single cell RNA sequencing data". Poster presented at: 2024 International Conference on Intelligent Systems for Molecular Biology (ISMB); July 2024, Quebec, CA
- **Mohamed Abdelnaby** et al. 2024. "Enhancing Inclusivity in Education through XR and AR with Cognitive-Affective Learning Principles for Students with Special Needs". Workshop paper, 2024 ACM Conference on Human Factors in Computing Systems (CHI); May 2024; Hawaii, USA
- **Mohamed Abdelnaby** and Marmar Moussa. 2024. "Random Projections techniques for locality-preserving representation of high-dimensional single cell RNA-seq". Poster presented at: 2024 International Conference on Research in Computational Molecular Biology (RECOMB); April 2024; Massachusetts, USA
- **Mohamed Abdelnaby** et al. 2024. "Integrating Accelerometers & Neural Networks for Enhanced Soccer Analytics". Poster presented at: 2024 University of Oklahoma – Tulsa REACH-OUT Poster Forum; April 2024; Oklahoma, USA