

Luke James Miller

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Ph.D. candidate in computer science with active research in quantum graph algorithms, graph-theoretic representation learning, and efficient learning on structured data. NSF Research Traineeship Fellow; IBM Quantum Advocate and certified Qiskit Developer. First-author papers accepted at ICML 2026, ECCV 2026, and IEEE QCE 2026.

Education

Ph.D., Computer Science

Aug 2024–Present

University of Missouri–Kansas City

- Dissertation: *Graph-Theoretic Representations as Computational Primitives for Quantum Computing and Artificial Intelligence* (in progress)
- GPA: 3.89 Advisor: Dr. Yugyung Lee

M.S., Computer Science

July 2024

University of Missouri–Kansas City

- Thesis: *Weisfeiler–Lehman Graph Kernels for Out-of-Distribution Graph Detection*
- GPA: 3.96 Best Thesis Award Nominee

B.S., Business Administration, *Magna Cum Laude*

Trident University, Apr 2015

Research Appointments & Projects

NSF Research Traineeship Fellow

2024–Present

University of Missouri–Kansas City

- One of 20 funded fellows on a \$3M interdisciplinary program in AI and Secure Networked Sensing.
- Developing graph-theoretic methods for substance-use network analysis across CS, public health, and social science.

IBM Quantum Mentorship Program Mentee

2024–Present

IBM Quantum

- QAMP Project #26: developed QuIC, a training-free quantum graph embedding for graph invariant construction and hardware evaluation.
- Resulting work accepted to IEEE QCE 2026 for oral presentation.

Graduate Research Assistant

Summer 2025

University of Missouri–Kansas City

- WeListen project: quantum graph neural network embedding optimization under supervision of Dr. Yugyung Lee.

Undergraduate Research Assistant

Oct 2022–May 2023

Missouri Institute for Defense and Energy

- Developed ML pipelines for real-time signal classification.
- Contributed to experimental effects measurement on the DARPA WARDEN project under supervision of Dr. Ahmed Hassan.

Publications

Conference Papers

- **L. J. Miller** & Y. Lee, “QuIC: A Training-Free Quantum Graph Embedding from Ideal Analysis to Practical Hardware Evaluation,” *IEEE QCE 2026*, accepted for oral presentation.
- **L. J. Miller** & Y. Lee, “SEMIR: Semantic Minor-Induced Representation Learning for Visual Segmentation,” *ICML 2026*, accepted.

- **L. J. Miller** & Y. Lee, “SEMIR: Topology-Preserving Graph Minors for Thin-Structure Segmentation,” *ECCV 2026*, accepted.
- G. Roman-Barroso, D. Ho, **L. J. Miller** et al., “Trust-Aware Task Allocation with Quantum Optimization,” *ICDM Workshops*, 2025.
- J. Ko, J. Stiles, A. Alanazi, **L. J. Miller**, D. Ho, and Y. Lee, “Resilient Multi-Agent Task Allocation Through Trust-Aware Quantum-Inspired Optimization,” *2025 IEEE International Conference on Data Mining Workshops (ICDMW)*, pp. 2726–2735, 2025.
- N. Hofer, **L. J. Miller** et al., “Detecting Pilot Task Saturation,” *AIAA SciTech*, 2024.

Under Review

- **L. J. Miller** & Y. Lee, “QuIC-Mol: A Training-Free Quantum Molecular Embedding for Hybrid Machine Learning,” *AAAI*, 2027.
- **L. J. Miller** & Y. Lee, “Quantum Graph Neural Networks: A Survey,” *ACM Computing Surveys*, 2025.
- **L. J. Miller** & Y. Lee, “Support-Carrying Minor Representations for Dense Prediction,” *NeurIPS*, 2026.
- **L. J. Miller** & Y. Lee, “Efficient Clinical Minority-Structure Segmentation via Target-Conditioned Inference-Domain Reduction,” *WACV*, 2027.

Funding & Awards

Fellowships, Grants, & Competitive Awards

- NSF Research Traineeship (NRT) Fellowship UMKC, 2024–Present
Fellowship support through a \$3M interdisciplinary program in AI and Secure Networked Sensing
- Balaji Student Travel Grant UMKC, 2026
- Chancellor’s Graduate Research and Professional Development Grant UMKC, 2026
- UMKC Research-a-thon Award UMKC, 2023, 2024, 2025, 2026.
- IBM Quantum Advocate, Tier 1 IBM Quantum, 2024–Present
- IBM Quantum Developer Certification, Qiskit v2.X IBM Quantum, 2025

Assistantship Support

- Graduate Research Assistant, full funding with tuition remission UMKC, Fall 2025
- Graduate Research Assistant, partial funding UMKC, Summer 2025
- Graduate Teaching Assistant UMKC, Spring 2025
- Undergraduate Research Assistant MIDE, Oct–Dec 2022

Professional Service & Leadership

- Reviewer, *ACM Computing Surveys*** *2025–Present*
- President, IEEE UMKC Student Branch** *2025–Present*
 - Lead student branch with 64 members.
- President, IEEE Computational Intelligence Society Student Branch Chapter** *2025–Present*
- President, IEEE Eta Kappa Nu Honor Society, Theta Pi Chapter** *2025–Present*
- Founder & President, Quantum Society for AI & Computing, UMKC** *2025–Present*
 - Founded and lead quantum computing student organization with 62 members.

Teaching Experience

- Graduate Instructor — CS5590: Quantum Computing for AI** *Fall 2025*

University of Missouri–Kansas City

- Designed and taught UMKC’s first quantum computing course.
- Received **4.94/5.0** course rating and 100% “Strongly Agree” on critical thinking assessments.

Graduate Teaching Assistant — AI & AR/VR for Spatial Computing

Spring 2025

University of Missouri–Kansas City

- Supported curriculum design and instruction for COESC spatial computing courses serving approximately 100 students.

Instructor — NSF/NSA GenCyber Camp

2024

University of Missouri–Kansas City

- Provided cybersecurity instruction for 42 high school students.

Air Traffic Control Instructor

2010–2019

United States Air Force

- Completed over 12,000 hours of accredited technical instruction.
- Named Instructor of the Year in 2016.

Mentorship & Outreach

NSF REU Mentor

Summer 2025

University of Missouri–Kansas City

- Mentored 10 undergraduates in quantum optimization.
- Student projects resulted in two ICDM Workshop publications.

Lead Organizer — IBM Qiskit Fall Fest 2025

Nov 2025

University of Missouri–Kansas City

- Organized UMKC’s IBM Qiskit Fall Fest as one of 10 U.S. universities selected by IBM.
- Event included 76 participants and 21 sessions.

Technical Skills

Quantum Qiskit SDK, Qiskit Runtime, VQE, QAOA, QSVM

Languages Python, Rust, C++, Bash

AI / ML PyTorch, TensorFlow, scikit-learn, computer vision

Tools Git, Linux, Unity, Jupyter, Canvas LMS