

Education

May 2026 (expected) **Bachelor of Science in Computer Engineering**, *University of Kansas*
GPA: 3.40/4.0 (Cumulative), 3.55/4.0 (Major)
Research Interests: Quantum Computing, Quantum Information Processing, Nonlinear Photonics

Research Experience

Aug 2024–present **KU Advanced, Reconfigurable, and Quantum Computing (KUARQ) Research Group**

- Performed research on quantum circuit optimization using genetic algorithms to reduce circuit depth and improve noise resilience.
- Analyzed FPGA-accelerated quantum simulation workflows and compared performance benchmarks to classical simulators.
- Co-authored two peer-reviewed journal publications on quantum circuit synthesis and optimization.
- Assisted with internal manuscript reviews for conference and journal submissions.

Publications (Google Scholar)

Journal Articles

- [1] Islam, I., Jha, V., Thomas, S., **Egan, K.**, Nobel, A., Kim, S., Chaudhary, M., Ogundele, S., Kneidel, D., Phillips, B., Singh, M., El-Araby, K., Bontrager, D., & El-Araby, E. (2025). Quantum Circuit Synthesis Using Fuzzy-Logic-Assisted Genetic Algorithms. *Algorithms*, 18(4), 178. Special Issue on Algorithms for Quantum Computing and Quantum-Centric High-Performance Computing. doi: 10.3390/a18040178
- [2] Chaudhary, M., El-Araby, K., Nobel, A., Jha, V., Kneidel, D., Islam, I., Singh, M., Ogundele, S., Phillips, B., **Egan, K.**, Thomas, S., Bontrager, D., Kim, S., & El-Araby, E. (2025). Solving Multidimensional Partial Differential Equations Using Efficient Quantum Circuits. *Algorithms*, 18(3), 176. doi: 10.3390/a18030176

Conference Proceedings

- [3] Chaudhary, M., El-Araby, K., Nobel, A., Islam, I., Singh, M., Ogundele, S., **Egan, K.**, Thomas, S., Vordtriede, V., Bontrager, D., Kim, S., & El-Araby, E. (2025). A Quantum Solver for Multidimensional Partial Differential Equations: Practical Case Studies. *Proc. SC25: Int'l Conf. for High Performance Computing, Networking, Storage, and Analysis*, St. Louis, MO, Nov 2025.
- [4] Chaudhary, M., El-Araby, K., Nobel, A., Islam, I., Singh, M., Ogundele, S., **Egan, K.**, Thomas, S., Vordtriede, V., Bontrager, D., Kim, S., & El-Araby, E. (2025). A Practical Quantum Solver for Multidimensional Partial Differential Equations. *Proc. SCWorkshops '25*, St. Louis, MO, Nov 16–21, 2025. ACM. doi: 10.1145/3731599.3767550
- [5] Chaudhary, M., El-Araby, K., Nobel, A., Jha, V., Islam, I., Singh, M., Ogundele, S., **Egan, K.**, Thomas, S., Bontrager, D., Kim, S., Vordtriede, V., Hoopes, H., & El-Araby, E. (2025). Utilizing Quantum Computing for Solving Multidimensional Partial Differential Equations. *QCUF 2025*, Oak Ridge, TN, July 2025. **(Best Poster Award)**
- [6] Pratibha, F., Jha, V., Islam, I., Maurya, A., Chaudhary, M., Nobel, A., **Egan, K.**, Mahmud, N., & El-Araby, E. (2025). High-Level Acceleration of Quantum Simulation Frameworks on Reconfigurable Hardware. *DAC 2025*, San Francisco, CA, June 2025.

Industry/Professional Experience

Summer 2026 (Upcoming) **Software Engineering Intern (Graduate)**, *Garmin International*

- Aug 2025–present **Engineering Student Ambassador, KU School of Engineering**
- Guided engineering tours for prospective students and families, highlighting key facilities such as research labs, classrooms, and academic support centers within the School of Engineering.
 - Promoted the student experience by engaging with high school students and their parents, providing insight into academic life at KU, and answering questions about engineering programs and campus resources.
- Summer 2025 **Software Engineering Intern, Garmin International**
- Established a Jenkins-based automated testing process that integrates comprehensive unit tests and is triggered automatically through Garmin's version control system.
 - Developed a new Bluetooth feature using C++ and C.
 - Collaborated with Camera & Optics team to develop embedded software for dash and backup cameras.
- Feb 2023–Oct 2023 **Undergraduate Research Assistant, KU Civil Engineering Concrete Lab**
- Assisted in the preparation of concrete samples for testing, including batching materials, mixing concrete, and molding specimens.

Fellowships

- 2025–present **Undergraduate Research Fellows (UGRF) Program, University of Kansas**
Funded undergraduate research fellowship supporting independent engineering research under faculty mentorship.
- 2021–2025 **Self Engineering Leadership Fellows (SELF) Program, University of Kansas**
Selected as one of only 30 students per cohort for a four-year fellowship centered on leadership development, business strategy, and entrepreneurship.

Projects

- Fall 2025 **Linear Voltage Regulator (Power Supply), EECS 541**
- Developed a linear regulated power supply to provide stable output under varying loads.
 - Evaluated performance through load regulation, current limiting, and thermal management tests to ensure reliable operation.
 - Compiled documentation and delivered a technical presentation that describes design methodology and test results.
- Fall 2025 **Infrared Optical Communication System, EECS 541**
- Designed and implemented an infrared optical transmitter–receiver system enabling digital signal transmission.
 - Calibrated and tested the communication link for bit error rate, frequency stability, and operational range, achieving reliable transmission up to 3 meters under strict design constraints.
 - Received the course award for the longest communication distance.
 - Documented and presented system performance through a comprehensive technical report and live demonstration.
- Spring 2024 **Design and Implementation of an Autonomous Vehicle Control System, EECS 388**
- Integrated TF mini Lidar sensor for dynamic braking system responsive to real-time data.
 - Refined a Python-based DNN model to analyze video inputs for adaptive steering.
 - Developed a Hi-Five board program to translate steering outputs into servomotor control.
- Spring 2023 **High-Altitude Weather Balloon, AE 360**
- Employed Arduino-based circuitry and sensors for atmospheric data collection.
 - Conducted data analysis and comparisons with US Standard Atmosphere 1976 data.
 - Presented findings and conclusions in a comprehensive report.
- Fall 2021 **Autonomous Unmanned Aerial Vehicle (UAV) Design, Testing, and Evaluation, AE 245**
- Collaborated with engineering students to build and test an autonomous flying wing UAV
 - Collected and analyzed flight data (altitude, roll, pitch, yaw) using MATLAB
 - Installed and calibrated electronic components, including flight sensors, fly-by-wires, and power elements

Honors and Awards

- Apr 2025 **SELF Fellowship Business Pillar Award**
- Spring 2022 **Engineering Honor Roll**
- Apr 2022 **Certificate of Excellence for French 152**
- 2021–2025 **University of Kansas Excellence Scholarship**

Leadership and Service

2024–2025 **Director of Finance**, *HackKU25*

Managed a \$35,000 budget and directed financial planning and expenditures for the university's annual hackathon.

2022–present **Member, Treasurer (2023–2025)**, *University of Kansas Men's Soccer Club*

Managed a \$12,000 annual budget for the university's nationally competitive soccer club and served on its leadership board.

Teaching

Spring 2026 **Supplemental Instructor, Circuits and Electronics Lab (EECS 318)**

(Upcoming)

- Will hold office hours and conduct help sessions to support student learning.
- Will answer student questions and provide in-class assistance to the course instructors.
- Will contribute to course development and provide additional instructional support as needed.

Skills

Programming Python, C++, C, MATLAB, Verilog, VHDL

Quantum Qiskit, Berkeley Quantum Synthesis Toolkit (BQSKit)

Tools Git, Docker, Jenkins, Linux/Unix, LaTeX

Hardware FPGA (Xilinx, Intel), Raspberry Pi, Arduino, Hi-Five

Professional Memberships

2025–present Institute of Electrical and Electronics Engineers (IEEE) Student Membership

2024–2025 Association for Computing Machinery (ACM) Student Membership