

TIMUR JAVID

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Education

University of Illinois Urbana-Champaign (UIUC)

August 2022 – Present

Doctor of Philosophy in Electrical and Computer Engineering
Advisors: Paul Kwiat and Eric Chitambar

University of Illinois Urbana-Champaign (UIUC)

August 2017 – May 2022

Master of Computer Science (5-year BS/MCS)
Bachelor of Science in Computer Science

GPA: 3.90

Relevant Coursework: Applied Machine Learning • Artificial Intelligence • Autonomous Vehicle Systems Eng. • Computer Vision • Distributed Systems • Information Theory • Quantum Cryptography • Quantum Info Processing Theory • Quantum Optics & Info • Quantum Optics & Devices • Quantum Opto-Electronics • Scientific Visualization

Technical Skills

Languages: Java • Python • C • C++ • JavaScript/TypeScript • MySQL • Haskell • Rust

Tools & Packages: SciPy • NumPy • MongoDB • InfluxDB • Git • Qiskit • React • Redux • Carbon • LaTeX

Presentations, Proceedings and Papers

- A. Conrad, S. Isaac, R. Cochran, D. Sanches-Rosales, T. Rezaei, **T. Javid**, A.J. Schroeder, G. Golba, D. Gauthier, and P. Kwiat. *Drone-based Quantum Communication Links*. Proceedings of the SPIE Quantum West Conference, San Francisco CA, March 2023.
- D. Gauthier, R. Cochran, A. Conrad, G. Golba, A.Gutha, S. Isaac, **T. Javid**, AJ Schroeder, D. Sanchez-Rosales, B. Wilens, and P. Kwiat. *Technologies for drone-based quantum key distribution*. Proceedings of the SPIE Defense + Commercial Sensing Conference, Orlando FL, May 2022.
- S. Isaac, A. Conrad, AJ Schroeder, **T. Javid**, D. Sanches-Rosales, R. Cochran, A. Gutha, D. Gauthier, and P. Kwiat. *Drone-Based Quantum Key Distribution*. Proceedings of the Conference on Lasers and Electro-Optics (CLEO), San Jose CA, May 2022.
- A. Conrad, S. Isaac, R. Cochran, D. Sanchez-Rosales, T. Rezaei, H. Jones, AJ Schroeder, **T. Javid**, K. Meier, D. Gauthier, and P. Kwiat. *Drone-Based Quantum Key Distribution*. Poster presented at Chicago Quantum Summit, Chicago IL, November 2021.

Professional Experience

IBM Research

May 2023 – August 2023

Quantum Researcher Intern, Quantum State Transfer Systems

- Produced an experimental quantum optical set-up for ancilla-assisted quantum process tomography with spontaneous parametric downconversion (SPDC) waveguides and superconducting nanowire single photon detectors (SNSPD) in Bluefors dilution refrigerator.
- Cooperated with experimentalists and theorists on analysis of novel quantum state transfer systems.
- Analyzed novel quantum state transfer systems by implementing and executing quantum process tomography protocols, using Qiskit to gather data.
- Hands-on experience with fiber splicing, opto-mechanics, dilution refrigerator bring-up, optical alignment, and set-up and control of SPDC waveguides and SNSPDs.

IBM Research

May 2022 – August 2022

Quantum Researcher Intern, Quantum Observability

- Incorporated three live data sources from quantum systems monitoring into a backend data pipeline utilizing Apache, Kafka, MQTT, and InfluxDB in Python, enabling observability for IBM Quantum systems.
- Enhanced data logging for existing alerts and notification system with a new data pipeline, bypassing logging to hard disk.
- Analyzed historical data to develop data visualizations with feedback from quantum researchers across teams.
- Constructed a front-end interface with the Carbon/React framework to display live data from quantum systems, linked with our InfluxDB backend.

Amazon Web Services (AWS)

May 2020 – August 2020

Software Development Engineer Intern, IoT Edge Qualification

- Spearheaded and developed a front-end user interface for an existing hardware qualification tool using React and Redux and a Golang backend within two months.
- Developed a web API in Golang, allowing device tests to be run from HTTP requests and allowing users to obtain results from qualification tests.
- Integrated web API with a React/Redux front-end, providing users a visual representation of device tests, documentation for qualification standards, and feedback for which IoT services their hardware is compatible with.
- Led design meetings for the project, producing design documents and integrating feedback from code reviews and weekly meetings with peers and supervisors.

Academic Experience

Kwiat Quantum Information Group at UIUC

May 2021 – Present

Graduate Research Assistant

- Developing a drone-to-drone based quantum communication channel for quantum key distribution (QKD) utilizing a variation of BB84 decoy-state protocol.
- Adapting LDPC codes for QKD error correction and implementing privacy amplification for free-space QKD data using numerical key-rate analysis.
- Improving drone-to-drone locking performance through embedded systems development, such as integrating a high-performance ADC to interface with a RaspberryPi gimbal controller (C++).
- Integrated OpenCV detection and multi-threaded C++ code with PID and LQG control to improve locking performance, decreasing the average channel loss during air-to-air locking from 20.6 dB to 9.68 dB.
- Designing and implementing communications firmware on STM32 for self-annealing entanglement source to be tested on the International Space Station, in collaboration with the Laboratory for Advanced Space Systems at Illinois.

ScribeAR Group at UIUC

September 2019 – August 2022

Student Researcher

- Maintained a codebase for an augmented reality (AR) compatible web application providing live captioning services, utilizing Web Speech API and integrating Microsoft Azure captioning in a React and Redux front end.
- Prototyped hardware using Arduino for sound localization to provide users with directionality in a heads-up display.
- Formulated an experiment to gather feedback on effectiveness of AR-based captioning in academic settings.

CS 125 - Intro to Computer Science Staff

January 2018 – May 2018

Course Assistant

- Collaborated with teaching assistants in labs to teach students about the basics of Java programming and guided them through lab projects.
- Tutored students one-on-one during office hours to cement understanding of course concepts and mentored them through software development.

Extracurriculars

Midwestern Robotics Design Competition

August 2019 – May 2021

Director

- Built and maintained the organizational website to provide teams and sponsors with easy access to information.
- Established relationships with other corporations for fundraising and sponsorships and worked closely with the Engineering Open House committee for event logistics.
- Organized community outreach events, presenting at a local children's science museum to get children interested in robotics.
- Initiated media coverage of the competition to increase promotion and awareness.

Miscellanea

Hobbies & Interests

- Hiking & Backpacking: Backpacking and hiking is a great way to unwind and disconnect. I frequently look for new hiking trails locally and drive out to new places.
- Photography: you can check out some of my photos on my website! Taking photos in nature helps me appreciate my surroundings.
- Cooking: I see cooking as a way to connect with other people and cultures. I like to experiment with different cuisines and cooking styles. One of my favorite foods to make (and eat) is Neapolitan style pizza.