Cordell Mazzetti

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Education

The University of Texas at Austin **May 2024**

- Bachelors: Electrical Engineering: Software Engineering (minor: Quantum Information Science)
- **GPA: 3.9 Upper / Relevant, 3.86 Overall**

Work Experience

NASA - Quantum Clock Synchronization Research Intern **June - August 2024**

- Created two new algorithms for data post-processing in quantum clock synchronization protocols that identify the temporal offset orders of magnitude faster than current industry and research implementations
- Submitted second algorithm which scales linearly instead of quadratically with input size and noise rate as a New Technology Report after it found temporal offset in data that was 99.999% noise **(patent in progress)**
- Implemented in-lab optical circuit of a Quantum Clock Synchronization protocol and collected data from it using multiple fiber-coupled entangled photon sources, photodetectors, and timetaggers
- Commended with the *Shining Star Recognition* for my "exceptional dedication, unwavering commitment, and extraordinary efforts"; one of five interns selected across the entire NASA 2024 cohort of ~1300 interns

NASA - NRO - Quantum Clock Synchronization Research Intern **June - August 2023**

- Invented quantum clock synchronization protocol **(patent in progress)** that utilizes time-correlated, entangled photon pairs from an arbitrarily located spontaneous parametric down-conversion photon source to isolate and identify offsets between clocks
- Created a polarization-entangled photon source using a type-I spontaneous parametric down-conversion and a class 3B 780nm laser pump for NASA-GSFC's quantum optics lab
- Designed and implemented experimental setup for proof-of-concept quantum clock synchronization apparatus
- Developed code to perform pre- and post-processing on voltage data from the oscilloscope in the aforementioned apparatus, demonstrating the efficacy of quantum clock synchronization protocols inside SCaN's laser lab
- Co-authored a conference poster for the Lunar Surface Innovation Consortium

Amazon - SDE Intern in Catalog System Services **May - August 2022**

- Completed two summer projects (Extractor Client and Automatic Metrics Generation)
- Built a client to interact with a data-extracting predictor through an API that handled permissions and authentication concurrently with safe, fast failure logic
- Implemented unit and integration testing to make sure the client was functioning correctly in the pipeline
- Created stack for AWS services to automatically create the required resources needed to handle the flow of weekly-generated report data for analysis
- Performed and presented data analysis through automagically updating visuals that displayed important metrics for our team's systems

UT Austin - Quantum Information Science FRI Fellowship **June - August 2021**

- Presented findings on the effect of laser power on state fidelities in the quantum low-light realm at TSAPS 2021
- Constructed and aligned quantum optics equipment while operating high-power lasers in an optics lab at the J.J. Pickle Research Campus
- Programmed applications (using Python and Qiskit) to handle the high-level collection of low-light photon counts and state fidelities using ThorLabs equipment
- Analyzed photon-count data to convert raw values to Bloch sphere state vectors and density matrices

SMU - Freshman Engineering Research Assistant **November 2019 - February 2020**

- Gleaned information and equations from academic papers necessary for developing sound source localization using a 3D microphone array

Startups

Stealth Startup **February 2023 - Present**

NanoVascular - Heart Monitoring Hardware and Software **March - August 2023**

- Full stack development lead for a startup that provides secure heart monitoring for doctors and patients using AI analysis and a wearable device

Revojam - Music Synchronization Tool **December 2021 - June 2023**

- Developed a full-stack web application that utilizes Spotify's API and streaming websites such as twitch.tv to create live, collaborative jukebox experiences capable of synchronizing thousands of people's music
- Self-taught HTML/CSS, Javascript, React, with other libraries and frameworks like Django REST to build out backend architecture and frontend functionality
- Integrated with Truffle (a web extension founded by the largest Twitch streamer, Ludwig)
- Used by streamers with millions of subscribers and thousands of concurrent viewers

Patents, Posters, and Presentations

Patents

- Mazzetti, Rodriguez Perez (2023) Quantum Clock Synchronization Utilizing One Spontaneous Parametric Down Conversion Source and Symmetric Paths from An Arbitrary Location **(Patent in Progress)**
- Mazzetti, Makovnik, Rodriguez Perez (2024) Algorithm for Non-Local, Temporal Correlation Identification of Entangled Photon Pairs **(Patent in Progress)**

Posters

- Ayres, Sebasco, Vetere, Panda, Mazzetti, Rodriguez-Perez, Shaw (October 10-11) Lunar Temperature Effects on SPDC Polarization Qubit Generation. Lunar Surface Innovation Consortium 2023 Fall Meeting, Pittsburgh, PA

Presentations

- Mazzetti, C. (October 21-23). The Effect of Laser Power on the Fidelity of a Polarized State. Joint Fall 2021 Meeting of the Texas Sections of APS, AAPT, and SPS. Houston, TX

Awards

Shining Star Intern Recognition

- One of five out of the ~1300 nationwide NASA interns from the 2024 cohort to receive this award for my technical ability, persistent dedication, and amiable leadership skills

Projects

Senior Design: Computer Architecture Explorer **August 2023 - May 2024**

- Constructed an intuitive web application for students studying computer architecture to familiarize themselves with how changing system parameters affects performance metrics by fetching pre-simulated results from Gem5

Quantum Projects: Quantum Chess, Simulator, and OpenQASM Parser **Throughout 2021**

- **Quantum Chess:** Developed a chess variant that allows players to split their pieces into superpositions and entangle them in order to teach the fundamental mechanics of quantum computing
- **Quantum Simulator:** Wrote a custom simulator that uses sparse state vector representations to simulate 192 minimally entangled qubits. Utilized in my chess project to reduce theoretical data load from 10^{57} bits to 12 KB
- **OpenQASM Parser:** Wrote code capable of parsing an OpenQASM file (quantum circuitry) and performing matrix gate operations to estimate the outcome of a quantum state

Hydrogen-Powered RC Car **January - May 2019**

- Constructed an RC car that used a 30-watt PEM hydrogen fuel cell to demonstrate the capabilities of hydrogen as an energy storage alternative.

Skills

Languages: **Advanced:** Python, JavaScript, Java, C++, HTML, CSS
Intermediate: C, C#, TypeScript, OpenQASM, SQL, Assembly

Frameworks: Qiskit, React, Django REST

Software: Git, Postman, IntelliJ, Eclipse, Visual Studio Code, Unity, Reaper DAW, Davinci Resolve