

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 - 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)

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

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

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

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