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EDUCATION

Columbia University B.A in Astrophysics

New York, NY

Relevant Coursework: Data Structures & Algorithms, Astrodynamics and Numerical Methods,
Monte Carlo Methods, RK4, LeapFrog, EOS PDEs, Machine Learning, K-means, N-body Simulations with CUDA
Languages: C++, Python, Java, Assembly, R
Back-End: Node, Express,Rest Api, Authentication and Authorization, sessions, NoSQL, SQL with python, PostgreSQL
Front-End: HTML, CSS, JavaScript, bootstrap, Ajax, Json,
Skills: Excel Analysis Toolpak & Power Query, Jupyter, Git Version Control, Kubernetes and Docker, Neural Networks; CNN, RNNs, Custom LLM Agentic solutions, prompt refinement, Hardware/Embedded systems, instrumentation

TECHNICAL PROJECTS

APEX (**A**ctive **P**icomotor optical **E**nhancement for fle**X**ure) - Github | Poster

- Designed and Implemented a lucky imaging-based star tracking algorithm to detect and counteract mechanical offsets in the Circumgalactic Hydrogen Alpha Spectrograph detector, caused by shifts in the 2.4m telescope.
- Developed a piezoelectric motor control system to counteract flexure-induced displacements, aimed at achieving corrections at a minimum rate of 4 microns per minute, using live python data analysis and multi-threaded code.
- Analyzed telescope slew movement data to track and determine pattern of offsets during observational periods.
- Testing confirmed system performance at 10x minimum correction rate, ensuring precision and stability to reduce noise in data and imaging.

Custom LLM

- Developed a custom LLM-based enterprise solution by optimizing Whisper AI for speed and portability and integrating it with LLaMA 3.4B in a secure Dockerized environment, enabling semantic search over meeting transcripts; reduced manual workload for legal staff and improved accuracy through automated cross-referencing.

EXPERIENCE

Schiminovich Astronomy & Instrumentation Lab New York, NY
Researcher and Developer May 2024 - Current

- Spearheaded development and documentation of proprietary comprehensive software to build APEX
- Worked with a cross-functional team of researchers and engineers to design, field-test, and iterate an advanced optical-mechanical compensation system for the 2.4m telescope at MDM Observatory, Kitt Peak, AZ.
- Achieved 500% increase in maximum exposure time and x2 spectral resolution via apex system.
- Initiated research and development of thermally manipulated optics using ultra-narrow bandpass filters to further enhance spectral resolution and exposure time for the 2.4m telescope.

Columbia University Astronomy Department September 2024- May 2025

- Grader for Professor Mary Putman's Astro1420 & Frederik Paerels Astro2002 Astrophysics 2

SARF, Cofounder & Programmer New York, NY
Programmed for a fintech startup made by Columbia students/alumni May 2023- September 2024

- Launched desktop based app, coordinating with ui/ux designers for demo app where users can securely register, search for contacts, and make automated p2p/b2b financial transactions between users on the blockchain using crypto (XLM Lumens). Coded backend databases using MongoDB and Atlas.
- Won Columbia University Fu Foundation Engineering School NSF startup competition.
- Secured $50K in NSF startup funding to advance blockchain-based financial solutions.

Northampton Community College Learning Center Bethlehem, PA
STEM Tutor August 2020 - June 2022

- Tutored students in Calculus (I-III), Physics (I-II), Statics for Engineers, Statistics, RCloud, Business Excel Stats, Organic and General Chemistry, and Discrete Mathematics. Provided code review and debugging support.

National Science Fund Cybersecurity Grant Bethlehem, PA
Peer Mentor August 2020 - May 2021

- Mentored computer science students through the online transition during the pandemic, assisting with academic planning, coding resources, and technical guidance.

Liberty Science Center Jersey City, NJ
Intern August 2016 - May 2017

- Facilitated interactive educational exhibits, guiding large visitor groups and enhancing engagement through informative demonstrations. Nominated for the Patrice Connelly Memorial Award for outstanding service.