

Charles Zhou

🌐 DOD Secret Clearance

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🌐 zhoucharles

EDUCATION

Harvard University

Cambridge, MA | May 2027

A.B. in Computer Science and Economics

GPA: 4.0/4.0

- **Relevant Coursework:** Vector Calculus and Linear Algebra, Abstraction and Design in Computation, Intro to Computer Science, Principles of Economics

SKILLS

Languages: Python (NumPy, Matplotlib, pandas), C, C++, Java, MATLAB, R, OCaml, SQL, Flask, JavaScript, Node.js, HTML, CSS, Bootstrap, \LaTeX

Technologies: Excel (data analysis), Stable32, Windows Server, Adobe Creative Suite, Microsoft Office

EXPERIENCE

Air Force Research Laboratory

May 2023 - July 2023

Philips Space Scholar

Kirtland AFB, NM

- Generated parity matrices and signal channels using **MATLAB** for efficient error correction codes (LDPC, Turbo, Polar)
- Worked on implementing experimental signal processing and modulation to replicate realistic transmission and noise
- Modeled Global Navigation Satellite System constellations to protect against narrowband jamming and spoofing threats
- Applied novel Chips-Message Robust Authentication spreading code system with **C++** for robust asymmetric key encryption

University of New Mexico

Aug 2022 - May 2023

Computational Chemistry Researcher

Albuquerque, NM

- Collaborated with advanced computing centers to model molecular structures, streamlining the testing of new compounds
- Created organic chemicals to investigate novel spectroscopic properties using Avogadro, Gaussian, and NWChem
- Conducted analyses on HOMO-LUMO energy gaps to find photophysics trends for biomaterial and biosensing applications
- Applied quantum electronic wave function and density descriptions to develop molecular force field simulations

Air Force Research Laboratory

June 2022 - Aug 2022

Philips Space Scholar

Kirtland AFB, NM

- Developed tools using **Python** to improve ground-based clock metrology for GPS satellites and the NTS-3
- Calculated statistical variance of time-keeping systems with **MATLAB** from navigation phase and precise ephemeris data
- Processed data to remove eliminate orbital, multipath, and atmospheric perturbation using **polynomial regression**
- Analyzed the stability of crystal oscillators and atomic clocks by determining the Allan deviation of their frequency drifts

PUBLICATIONS

Shu, N., **Zhou, C.**, Martin, K., Elgin, J., & Hinks, J. (2023). Analysis of NTS-3 Satellite Clock Stability Using Ground-Based Measurements. *Proceedings of the ION 2023 Joint Navigation Conference* [🔗](#)

PROJECTS

PollPass, TreeHacks 2024 [🔗](#) [🌳](#)

- Built a zero-knowledge proof authentication system to verify voter credential validity and eligibility, Node.js, Javascript, GPT

Fridgemates [🌳](#)

- Developed a website to collaboratively manage a fridge and record transaction history, JavaScript, Python, SQL, and Flask

Profile Picture Effects on First Impressions

- Conducted a quantitative comparative analysis on the behavioral impacts of profile pictures on first impressions online

Leidenfrost Effect as an Impurity Detection Method

- Developed a linear regression model between film boiling lifetimes and water impurities by observing Leidenfrost points

Properties of Sugar Structures on Health Results

- Studied impact of colligative properties of sugar solutions on boiling-point elevation, blood sugar absorption, and solubility

AWARDS

Daniels Fund Scholar

2023

U.S. Presidential Scholar Nominee

2023

National Merit Scholarship Finalist

2023

U.S. Chemistry Olympiad National Finalist

2021, 2022