Cao Xizhen

What's bigger than a tuna? A threena.

caoxizhencaoxizhen@gmail.com ❖ ******** ❖ https://github.com/burner972021

ABOUT ME

Hello! I am a JC1 student from Hwa Chong Institution, currently a member of Hwa Chong Infocomm & Robotics Society, and President of Project Small Bytes(HCI branch). I have also been enrolled in the MOE Art Elective Programme since 2021. I love Mathematics, science research(especially quantum), and gamedev; I'm also deeply passionate about cybersecurity, computer science, and art.

ACHIEVEMENTS

2025

- 1st Place AI CTF 2025 Qualifiers, 4th Place Finals
- 5th Place GreyCTF Finalist
- Finalist at DSTA Brainhack CDDC 2025
- 3rd Place SSM CTF 2025
- 8th Place Lag and Crash CTF 2025
- 3rd Place NES Connect 2025
- 3rd Place Articulation Prize 2025

2024

- Winner of JP Morgan GenerationTech 2024
- Awarded Bronze at Singapore Maths Project Festival 2024
- Finalist at National Olympiad in Informatics 2024
- Awarded Lively Places Fund (up to 20,000$) under Urban Redevelopment Authority (URA)
- Honourable Mention at SMO Open 2024
- 4th runner up in Sentinel Challenge 2024
- Recipient of Nanyang Honour Roll
- Top 5% in cohort for Mathematics & Physics

2023

- Honourable Mention at SMO Open & Senior 2023
- Distinction for Mathematics research project in Number Theory & Cryptography
- Participated in UOB Painting of The Year
- Participated in Sentinel Challenge 2023

2022

- Distinction for Mathematics Research Project on probability & combinatorics
- Awarded Bronze at SMO Junior 2022

EXPERIENCES/PROJECTS/EVENTS

- **Science Research**
  - Research Intern @ A*STAR IMRE

- ■ Project title: Implementation of quantum logic gates with solid-state qubits interfaced with an optical metasurface
  - ○ Student researcher under Centre for Quantum Technologies (CQT) and the HCI CenTaD research Programme
    - ■ Research scope: Finite key analysis on CVQKD (continuous variable quantum key distribution) under noisy conditions with imperfect detectors. We are trying to find possible backdoor attacks on CVQKD via side-channel leakage.
    - ■ My role in the project is to set up simulations using Python tools such as Netsquid, Qiskit, and Matplotlib, as well as analysing and parsing results.
- **Mathematics research**
  - ○ List III: Project on cryptoanalysis techniques & number theory in 2023 & 2024
  - ○ Project on probability & combinatorics, developed an algorithm to solve Wordle in 2022
- **SieberrsecCTF 2025 (SCTF 6.0)**
  - ○ Core organising team for SCTF 6.0
  - ○ Publicity Head, Ceremony IC, challenge setter and planner.
- **Community service/volunteering**
  - ○ Project Small Bytes
    - ■ Teaching primary 5 level schoolchildren Python programming and Pygame
  - ○ Singapore Red Cross
    - ■ SRC MarComms ad-hoc volunteering, between Oct 2022 to Sept 2023
- **Conferences/events**
  - ○ Student Coordinator for Future Re:Wired, held as part of SWITCH 2025
  - ○ Off-By-One Conference 2025
  - ○ SuperAI 2025
- **Sentinel Programme**
  - ○ Enrolled in the Sentinel Pilot Programme from 2022 - 2023
  - ○ Awarded Certificate of Achievement for 2 years
- **Art Elective Programme (AEP)**
  - ○ Went on overseas immersion trip to Japan in June 2025
  - ○ Previously enrolled in NYGH Art Elective Programme, since 2021
    - ■ Went on overseas immersion trip to Taiwan in May 2024
  - ○ Awarded MOE Art Elective Programme Scholarship (Secondary 1-4)

SKILLS & INTERESTS

- **Game Development**
  - ○ Proficient in Unity
  - ○ Proficient in Blender & 3D Modelling
- **Programming languages**
  - ○ C#
  - ○ C++
  - ○ Python
  - ○ Javascript/HTML/CSS
- **Cybersecurity**
  - ○ Cryptography
    - ■ Advanced modular arithmetic, group theory
    - ■ Familiar with cryptosystems such as Lattices, RSA, ECC and AES

- - Open-source Intelligence
  - Binary Exploitation (Pwn)
    - Familiar with tools such as pwndbg and Ghidra
    - Familiar with stack-based binary exploitation
- **Competitive Programming**
  - Familiar with various medium-level algorithms & competitive programming skills
- **Quantum Computing**
  - Familiar with various Quantum Key Distribution protocol implementations such as BB84, E91, CVQKD, etc.
  - Proficiency in software and Python libraries such as Qiskit, Netquid, matplotlib, and QuTiP.
  - Attended QCamp 2025, which was organised by CQT
- **Interests**
  - I like to read and hike in my free time
  - I am also very fascinated by fine arts & sculpture/3D media
  - I am passionate about spreading awareness on cybersecurity and computer science. Despite the fact that many people may think that Art is a subject that would never intersect with CS/Cybersecurity, I would like to show people that both can, indeed, co-exist, and they can work together to form new and amazing things, such as in gamedev!