Cao Xizhen

What's bigger than a tuna? A threena.

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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

- 5th Place GreyCTF Finallist
- CDDC Finalist
- 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 (NOI 2024)
- Awarded Lively Places Fund (up to 20,000$) under Urban Redevelopment Authority (URA)
- SMO Open Honourable Mention
- 4th place in Sentinel Challenge 2024
- Recipient of Nanyang Honour Roll
- Top 5% in cohort for Mathematics & Physics

2023

- Honourable Mention at SMO Open & Senior categories
- 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

EXPERIENCES/PROJECTS

- **Science Research**
  - 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**
    - 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 for the competition.
- **Service Learning Project**
    - Project Small Bytes
        - Teaching primary 5 level schoolchildren Python programming and Pygame
- **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 & Unreal Engine
    - 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.
- **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!