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 previously a member of Nanyang Infocomm Club. 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 fine art.

ACHIEVEMENTS

2025

- 5th Place GreyCTF Finalist
- 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
- Singapore Maths Project Festival 2024, Bronze
- 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
- Climate Fresk 2024, Green Award

2023

- SMO Open & Senior Honourable Mention
- 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
- SMO Junior Bronze

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/optimise 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.
- **HCI CTF 2025**
  - ○ 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
- **HCI Art Elective Programme (HCAEP)**
  - ○ 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
    - ■ Familiar with tools such as Maltego & Sherlock
- **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 passionate about 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!