Yizhuo Tan

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EXPERIENCE

Research Assistant - Computer Architecture and Security (Northwestern University) 09/2023 – Present
- Quantum Systems Lab (Yale University) 09/2024 – Present

- Administered pioneering research in Quantum Computing Security, mostly using Python
- Designed oblivious quantum random access memory to protect user privacy
- Analyzed readout-crosstalk induced error and information leakage
- Investigated novel methods to attack and protect quantum algorithms and quantum hardware, focusing on higher energy attacks and long-range crosstalk for quantum computers

Teaching Assistant – Yale University 09/2024 - 05/2025

- Taught Introduction to Computer Engineering course in Spring 2025 at Yale
- Taught Introduction to Electronics course in Fall 2024 at Yale

Undergrad Research Assistant - Microscale Nanoscience Laboratory, USTC (Hefei, China) 09/2021 - 03/2022

- Aimed to perform Gaussian boson sampling to demonstrate the quantum computational advantage
- Built high-quality light path for the entangled photon source: obtained optimal coincidence rate, reaching coincidence rate of 0.57 after adding a long focus concave reflector
- Helped design a method of determining coherent light using retarders and achieved optimal deployment of the retarders with improved performance

Undergrad Research Assistant - USTC (Hefei, China) 09/2021 - 12/2021

- Designing controlled droplet suspension equipment based on standing waves theory
- Designed and welded planar phased array circuits to independently adjust phase and voltage of each ultrasonic sensor, realizing stable suspension and movement of multiple rows of objects
- Simulated dynamic distribution of potential field in MATLAB based on the approximate solution of GOVCOV potential
- Used finite element method (FEM) and particle tracking module in COMSOL to gain the static distribution of the suspended objects, proving feasibility and validity of dynamic approximate solution gained with MATLAB
- **Awarded:** First Prize in the 17th Physical Innovation Research Experimental Paper Competition, USTC

Teaching Assistant - USTC (Hefei, China) 09/2022 - 12/2022

- Taught Mechanics B course in Fall 2022 at USTC

EDUCATION

PhD in Computer Science 09/2023 - Present

- Yale University, Connecticut, United States
  - Advisor: Jakub Szefer, Yongshan Ding
  - Area: Quantum Computing Security & Architecture

Bachelor of Science in Physics 09/2019 – 07/2023

- University of Science and Technology of China (USTC), Hefei, China
  - Major: Physics (Atomic and Molecular Physics track)
  - Dual Major/Minor: Computer Science and Technology

SKILLS

- **Programming** Python, C, C++, Verilog

HONORS & AWARDS

- Best Poster Award – 1st Place, New England Hardware Security Day 2025
- Silver Award of Excellent Student Scholarship, USTC (Top 2%) 2022, 2021
- First Prize in 17th Physical Innovation Research Experimental Paper Competition, USTC 2021
- Scholarship of Yan Jici Talent Program in Physics, USTC (Top 10%) 2021, 2020
- Second Prize in 6th China Undergraduate Physics Experiment Competition 2020
- Chen Linyi Scholarship, USTC (Top 1%) 2020
- Provincial First Prize in 35th Chinese Physics Olympiad 2018

UPCOMING & PAST TALKS

- **Joint March Meeting and April Meeting - Global Physics Summit**, Anaheim, CA 2025
- **IEEE Workshop on Quantum IntelLigence, Learning & Security (QUILLS)**, Washington, DC 2024
- **ACM/IEEE International Conference on Computer-Aided Design (ICCAD)**, Newark, NJ 2024
- 2nd **Quantum Computer Cybersecurity Symposium**, New Haven, CT 2024

PEER-REVIEWED PUBLICATIONS

• **Yizhuo Tan,** Jakub Szefer. "I Know What You Are Reading: Evaluating Readout Crosstalk in Cloud-based Quantum Computers" in Proceedings of ACM QSec: Quantum Security and Privacy Workshop @ ACM Conference on Computer and Communications Security, **QSec@CCS,** 2025.

• **Yizhuo Tan,** Hrvoje Kukina, Jakub Szefer. "Securing HHL Quantum Algorithm against Quantum Computer Attacks" in Proceedings of Hardware and Architectural Support for Security and Privacy @ IEEE/ACM International Symposium on Microarchitecture, **HASP@MICRO,** 2025.

• Pranet Sharma, **Yizhuo Tan,** Konstantinos-Nikolaos Papadopoulos, Jakub Szefer. "Evaluation of Noise and Crosstalk in Neutral Atom Quantum Computers" in Proceedings of IEEE International Conference on Quantum Computing and Engineering, **QCE,** 2025.

• **Yizhuo Tan,** Hrvoje Kukina, Jakub Szefer. "Study of Attacks on the HHL Quantum Algorithm" in Proceedings of IEEE Workshop on Quantum IntelLigence, Learning & Security@ IEEE International Conference on Trust, Privacy and Security in Intelligent Systems, and Applications, **QUILLS@TPS-ISA,** 2024.

• **Yizhuo Tan,** Chuanqi Xu, Jakub Szefer. "Exploration of Timing and Higher-Energy Attacks on Quantum Random Access Memory" in Proceedings of the International Conference on Computer-Aided Design, **ICCAD,** 2024.

PAPERS IN PRAPERATION

• **Yizhuo Tan,** Navnil Choudhury, Kanad Basu, Jakub Szefer. "QubitHammer: Remotely Inducing Qubit State Change on Superconducting Quantum Computers"

• Theodoros Trochatos, Sanjay Deshpande, Chuanqi Xu, **Yizhuo Tan,** Jakub Szefer. "Security of Quantum Computing Systems -- Proposal for Foundations and Trends in Privacy and Security Tutorial Paper"