

# Tianyun Zhang

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## EDUCATION

### Carnegie Mellon University

*Ph.D. Electrical and Computer Engineering*

**Aug 2023 - Expected 2028**

### University of Illinois at Urbana-Champaign

*B.S. Computer Science + Economics, minors in Applied Statistics, Mathematics*

**Aug 2020 - May 2023**

*GPA: 3.95/4.00*

**Relevant Coursework:** Computer Architecture, Computer System Organization, System Programming, Numerical Optimization, Data Structures, Software Design, Machine Learning for Signal Processing, Natural Language Processing

## PUBLICATIONS

**T. Zhang**, E. Tang, F. Siddique, K. Skadron, F. Franchetti, “Towards an End-to-End Processing-in-DRAM Acceleration of Spectral Library Search”, IEEE High Performance Extreme Computing Conference (HPEC), 2024, Extended abstract with poster presentation

## RESEARCH INTERESTS

**Investigations into hardware-software co-design for novel computer architectures and making data-centric hardware systems more accessible to programmers.**

## RESEARCH EXPERIENCE

### Carnegie Mellon University

Advisor: Prof. Franz Franchetti

*Graduate Research Assistant*

**Aug 2023 - Present**

- Exploring efficient filtering and computation with low-precision representations for in-memory computing, focusing on applications in bioinformatics (mass spectrometry) and numerical algorithms (gradient descent)
- Research supported in part by SRC JUMP 2.0 PRISM and Oak Ridge National Laboratory (ORNL) MAGNET

### ARCANA Research Group at University of Illinois

Advisor: Prof. Saugata Ghose

*Undergraduate Researcher*

**Jan 2022 - May 2023**

- Researched programming models for processing-in-memory (PIM) applications, i.e. MapReduce algorithm on ReRAM

### Gies College of Business at University of Illinois

Advisor: Prof. June-Young Kim

*Research Assistant*

**June 2021 - May 2022**

- Automated financial transcript data collection and cleaning in Python, and analyzed sentiment to assess its impact on company performance

## PROFESSIONAL EXPERIENCE

### KQ Capital

*Venture Capital Intern*

**June 2023 - Aug 2023**

- Performed market research and analysis to assess potential investments within the computer hardware industry
- Evaluated startup pitches, providing specialized insights into their technical innovations and market potential

### Amazon

*Software Development Engineer Intern*

**May 2022 - Aug 2022**

- Processed data and built interface of seller product applications for internal customers
- Accomplished technical stack migration to centralize rendering logic and decrease build time from minutes to seconds

### BP

*Digital Security AI Developer Intern*

**June 2021 - Dec 2021**

- Developed virtual assistant to monitor automation system remote access, improving service efficiency via usage stats
- Worked with Process Control Network (PCN) architecture using Azure DevOps CI/CD pipeline

## LEADERSHIP AND TEACHING

### Engineering Community Outreach

*Instructor*

**Jan 2024 - May 2024**

- Fostered connections between Carnegie Mellon and the Pittsburgh community by delivering STEM curriculum to K-12 students, e.g. introduction to microcontrollers
- Applied pedagogy and classroom management practices to create an engaging learning environment for students from mixed socioeconomic backgrounds and experiences with math, science, and coding

## **Women in CyberSecurity (WiCyS) at Illinois**

**Sept 2020 - May 2023**

### *President*

*Jul 2022 - May 2023*

- Led university chapter; bridged campus and national WiCyS to increase professional development and mentorship

### *Vice President*

*Aug 2021 - Jul 2022*

- Established communication with 10+ companies and obtained WiCyS's first sponsorship funding from industry
- Organized technical workshop collaborations with corporate sponsors drawing over 60 members in attendance

### *Technical Chair*

*Sept 2020 - Aug 2021*

- Planned and presented bi-monthly technical workshops for members, e.g. workshops introducing command line security challenges, cryptography, steganography
- Managed team creating top-down 2D game with JavaScript to teach K-12 students security

## **CS 433 Computer System Organization Staff**

**Jan 2023 - May 2023**

### *Course Grader*

- Aided development of homework and exam questions testing conceptual understanding of computer architecture
- Designed grading rubrics and prepared personalized feedback on assignments

## **CS 196 Freshman Honors Staff**

**Jan 2021 - Dec 2021**

### *Project Manager*

- Led 3 teams of 5 students on stock trend analysis, scheduling, and music preference web apps
- Created coding tutorials and weekly workstreams for team under scrum-based agile framework

## **CS 125 Introduction to Computer Science Staff**

**Jan 2021 - May 2021**

### *Course Assistant*

- Mentored students on Java coding homework and projects; led discussion-style tutorials

## **Illinois Business Consulting**

**Sept 2020 - May 2021**

### *Consultant*

- Advised insurance agency with a team of 9, improving risk aggregation and data models
- Identified advantageous statistical and machine learning models to guide future risk analysis, delivering insights through weekly PowerPoint presentations
- Created innovative Blender animations to symbolically visualize risk

## **PROJECTS**

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### **Pittsburgh RAG**

**March 2025**

- Developed retrieval-augmented generation (RAG) for domain-specific QA with LangChain, comparing Llama, Qwen, and Gemma LLMs with Nomic and GTE embeddings; built custom web scraping tools (BeautifulSoup, Hyperbrowser)

### **Aural Trainer**

**April 2021**

- Interactive ear trainer in C++ with a randomly generated sequence of melodic/harmonic intervals aimed to help students practice for music performance aural exams

## **SKILLS**

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**Technical Skills:** architectural simulation, performance modeling, memory systems

**Programming Languages:** C, C++, Python (PyTorch), R, Java, Bash, C#, Kotlin, TypeScript

**Languages:** English (Native), Chinese (Native), French (Intermediate), German (Beginner)

## **HONORS**

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**Carnegie Institute of Technology Dean's Fellow (CMU)**

**2023**

**Procter & Gamble Excellence in Leadership Award**

**2023**

**Women in CyberSecurity Conference Scholarship**

**2021, 2022**

**JP Morgan Chase Women in Computer Science Scholarship**

**2021**

**Gold Medalist, The National French Contest**

**2020**

**Violin Distinction, Associated Board of the Royal Schools of Music**

**2018**

## **AFFILIATED ORGANIZATIONS**

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*Associate Concertmaster, CMU All University Orchestra (AUO)*

*Member (Former Student Chapter President), Women in CyberSecurity (WiCyS)*

*Member, Association for Computing Machinery (ACM) SIGARCH*

*Member, Society of Women Engineers (SWE)*

*Member, Phi Beta Kappa Society*