

# Ashley J. Chen

+1 (425) 922-7551 | [ajchen8@illinois.edu](mailto:ajchen8@illinois.edu) | [linkedin.com/in/ashleyjychen](https://linkedin.com/in/ashleyjychen) | [github.com/ash-jyc](https://github.com/ash-jyc)

## RESEARCH OBJECTIVE

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My research focuses on **security frameworks** for **composable systems**, focusing on **end-to-end guarantees** that ensure security persists across complex, dynamic pipelines. Works include security analysis for vibe coding, jailbreaking online RL coding assistants, securing authentic media provenance to combat deepfakes, and prototyping technology for smart contract verification.

## EDUCATION

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### University of Illinois Urbana-Champaign

Incoming Fall 2026

*Ph.D. in Computer Science – Advisor: Prof. Luyi Xing*

### New York University Shanghai

Sep 2022 – May 2026

*B.S. in Computer Science, Minors in Cybersecurity and Data Science*

*GPA: 3.79/4.00*

- **Capstone:** Security of Vibe Coding. Advisor: Prof. Muhammad Shafique
- **Relevant Coursework:**
  - Data Structures, Algorithms, Discrete Math, Probability and Statistics, Computer Architecture
  - Machine Learning, Operating Systems, Software Engineering, Computer Networking, Databases
  - Penetration Testing, Application Security, Computer Security, Network Security, Human-AI Alignment

## RESEARCH EXPERIENCE

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### Undergraduate Research Assistant (Capstone)

Sep 2025 – Present

*NYU Abu Dhabi (eBrain Lab) – Advisor: Prof. Muhammad Shafique*

*Shanghai, China*

- Analyzed the relationship between security vulnerabilities and prompting in “vibe coding” for senior thesis
- Constructed two datasets of vibe coding applications by organizing a global hackathon with receiving 40 submissions and creating a pipeline for automatic generation of 54 ideas across 3 agents and 4 models
- Designed an agentic LLM pipeline to identify CWEs and perform penetration tests on the generated apps

### Undergraduate Research Assistant (Independent Study)

Oct 2025 – May 2026

*NYU Shanghai (BiAlign Lab) – Advisors: Prof. Hua Shen and Xufang Luo*

*Shanghai, China*

- Formulated an independent study project regarding for online reinforcement learning in coding LLM assistants
- Trained Qwen model using Code-R1 with LeetCode and TACO data using RL techniques from Deepseek-R1 paper
- Designed a reward model from code generated using 1.7k vulnerable prompts and quantitatively measured vulnerabilities with CodeQL, Semgrep, and Bandit

### Cybersecurity Research Assistant

May 2025 – Aug 2025

*Columbia University (MobileX Lab) – Advisor: Prof. Xia Zhou*

*New York, NY*

- Built a framework to secure speech audio at the point of capture for deepfake prevention, embedding robust physical signatures via echo hiding of real-time transcriptions
- Created a hash chain by echo hiding the previous 3-second window’s hashed transcription in the next 3 seconds
- Refactored WhisperFlow (MobiSys ’25) for voice activity detection and piped to Python, eliminating silence transcriptions and decreasing word error rate by 13%

### Undergraduate Research Assistant

Jun 2023 – Aug 2023

*Collaborative Project with Microsoft Research – Advisor: Shuo Chen*

*Redmond, WA*

- Prototyped a runtime concolic technology to faithfully verify safety properties of smart contract transactions at scale, demonstrated on Uniswap V2 – one of the most complex smart contract systems
- Created Python symbolic execution engine to translate concrete EVM traces into Boogie verification language
- Enhanced verification efficiency and accuracy with minimal overhead (0.20% on ERC20 and 0.57% on Uniswap V2)
- Conducted in-depth analysis of Solidity compiler files, cutting approx. 25% of nonessential bytecode per trace

## PUBLICATIONS (IN PREPARATION)

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1. **Code for All: Educational Applications of the “Vibe Coding” Hackathon in Programming Education across All Skill Levels**  
Ashley Chen, Yijia Cao, Minghao Shao Ramesh Karri, Muhammad Shafique. [arXiv:2604.22747v1].
2. **Theorem-Carrying Transactions: Runtime Verification to Ensure Interface Specifications for Smart Contract Safety**  
Thomas Ball, Nikolaj Bjørner, **Ashley Chen\***, Shuo Chen, Yang Chen, Zhongxin Guo, Tzu-Han Hsu, Peng Liu, Nanqing Luo. [arXiv:2408.06478].

\* In alphabetical order

## INDUSTRY EXPERIENCE

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- Software Engineer** Oct 2024 – May 2025  
*NYU Blockchain & Fintech – zkSync Research Team* New York, NY
- Optimized Reclaim Protocol SDK smart contracts for zkSync by utilizing zkEVM, reducing gas costs by 10%
  - Researched differences between zkTLS providers (MPC, Proxy, and TEE) in terms of protocol and encryption
  - Engaged in weekly meetings with zkSync and suggested possible protocol enhancements to support Groth16 ZKP
- Developer Success Engineering Intern** Jan 2024 – May 2024  
*Mantle Network* Shanghai, China
- Assisted in resolving 100+ developer support tickets, addressing issues with Ethereum Layer 2 protocols using Jira
  - Resolved tickets faster by improving cross-function communication, enhancing overall support efficiency
  - Collaborated with cross-functional teams to debug Solidity and Go contracts, documenting performance metrics

## RESEARCH PROJECTS

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- Paillier ZK for Supply Chain Management** (Course Project) | *Rust* Nov 2024 – Dec 2024
- Applied Paillier encryption and zero-knowledge proofs to enhance data privacy and security in SCM systems
  - Collaborated in a team to implement and test encryption models in Rust, using Git for version control
  - Co-authored a comprehensive report analyzing common attack vectors and solutions, highlighting the role of ZKPs
- Verbal Reasoning Evaluation for LLMs** (Personal Project) | *Whisper, SQL, JavaScript* Jul 2024 – Aug 2024
- Devised a research proposal to evaluate LLM verbal reasoning capability using policy debates and judge feedback
  - Automated YouTube audio retrieval and processing to Whisper speech-to-text AI to LLM judge prompt
  - Cleaned data for 1,000+ debates, integrating YouTube links for 7 recorded rounds to enhance debater experience
  - Scraped and displayed data using FastAPI, Azure SQL Database, and deployed the application on Azure Web App
- Network Summarizer Replication** (Course Project) | *Python, SQL* Oct 2023 – Dec 2023
- Recreated path optimization from Net2Text (NSDI '18) pseudocode to translate low-level forwarding commands into high-level actionable items for network operators for 250k possible network paths
  - Proposed replacing context-free grammar with natural language to allow for increased variability in queries
  - Coordinated with three other members to divide and integrate tasks, host weekly meetings, establish workflow
- Albert+** (NYUSHDIC Hackathon Project) | *Python, JavaScript, Flask, Next.js* Oct 2023 – Dec 2023
- Revamped NYU course registration platform (Albert) with AI suggestions for future course planning
  - Integrated GPT-4 with data from 60 NYU courses to provide recommendations, using Flask and Next.js
  - Prototyped a dynamic course scheduler, enabling users to add/drop courses and ensuring conflict-free scheduling

## HONORS AND AWARDS

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- Founder’s Day Award (Top 40%)**, NYU Shanghai May 2026
- SURGE Fellowship**, UIUC Grainger School of Engineering Mar 2026
- Best Research Project in STEM**, NYU Shanghai Undergraduate Research Symposium Nov 2025
- Dean’s List for Academic Year**, NYU Shanghai May 2025
- 2nd Place & Best Technology Award**, NYU Shanghai Digital Innovation Challenge Dec 2023
- Conference Attendee**, IEEE Women in Engineering China Leadership Summit Oct 2023
- Dean’s List for Academic Year**, NYU Shanghai May 2023

## ORGANIZATIONS

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<b>Learning Committee Lead</b> , NYU Shanghai Cybersecurity Club	Oct 2025 – May 2026
<b>Member</b> , Rewriting the Code	Aug 2024 – May 2026
<b>Team Co-Captain</b> , NYU Shanghai Table Tennis	Jan 2023 – May 2026
<b>Lab Member</b> , NYU OSIRIS Lab	Nov 2024 – May 2025
<b>zkSync Research &amp; Microsoft Dev Teams</b> , NYU Blockchain & Fintech	Oct 2024 – May 2025

## REFERENCES

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**Nasir Memon, Dean of Engineering**

NYU Shanghai  
(646) 997-3970, memon@nyu.edu

**Muhammad Shafique, Professor of Computer Engineering**

NYU Abu Dhabi  
+971 (0)2 628 7972, muhammad.shafique@nyu.edu

**Xia Zhou, Associate Professor of Computer Science**

Columbia University  
(212) 853-8488, xia@cs.columbia.edu