

# Qiuchen Yan

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## EDUCATION

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### University of Minnesota, Twin Cities

*Ph.D. in Computer Science; GPA: 3.60*

*Master of Science in Computer Science; GPA: 3.625*

Minneapolis, MN

*May 2014 – 2020 (anticipated)*

*Sep. 2012 – May 2014*

### Shandong University of Science and Technology

*Bachelor of Engineering in Computer Science; GPA: 3.65*

Qingdao, China

*Sep. 2008 – July 2012*

## SKILLS

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**Programming Languages:** C/C++, Python, OCaml, X86 assembly, Javascript, PHP, SQL

**Systems & Tools:** Linux, Xed (Intel Pin), DWARF, Vine, FuzzBALL

## EXPERIENCE

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### Graduate Research Asistant, University of Minnesota

2014 – present

Work with Stephen McCamant on several research projects. Collaborate with Pen-Chung Yew's dynamic binary translation group on projects related to emulator testing.

### DARPA Cyber Grand Challenge

2014 – 2015

Contribute bug checking code for the FuzzBOMB group in CGC Qualification Event.

## PROJECTS

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### Fast & Automatic Emulator Testing System

2015 – 2018

- Speed up an automatic emulator testing tool by 200 times by designing and implementing a novel approach to generate test cases.
- Implement an x86 assembly test case generator in Python based on the previous work. Also modified other components of the testing system written in C++.

### Loop Summarization for Symbolic Execution

2014 – 2015, 2018 – present

- As a countermeasure of the path explosion problem, design an extended version of a trace-based loop summarization algorithm[1] and implement it on FuzzBALL, a symbolic execution platform.
- Currently consists of approximately 1300 lines of OCaml code.

### Binary Level Type Inference

2013 – 2014

- Design a static type inference tool that can infer the signedness of variables in binaries with 96% true positive.
- Build this tool on top of Vine and libdwarf using C++.

### Reproduce the Lucky Thirteen attack

2014

- Implement a timing side channel attack [2] to the TLS protocol. (Course project)

### Sybil attack study

2014

- Survey about the Sybil attack in online social network and its state-of-art defence approach and collected data from real world sybil communities in sina weibo. (Course project)

### Encrypted address book

2012

- Design and implement an Android address book app that can send encrypted contact info via text message. (Bachelor final project)

## PUBLICATION

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**Qiuchen Yan**, Stephen McCamant, “Fast PokeEMU: Scaling Generated Instruction Tests Using Aggregation and State Chaining,” The 14th ACM SIGPLAN/SIGOPS International Conference on Virtual Execution Environments (VEE’18)

**Qiuchen Yan**, Stephen McCamant, “Fast PokeEMU: Scaling Generated Instruction Tests Using Aggregation and State Chaining,” Poster

**Qiuchen Yan**, Stephen McCamant, “Conservative Signed/Unsigned Type Inference for Binaries using Minimum Cut,” Technical report

## SERVICE

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- Contribute code to FuzzBALL, an open source symbolic execution tool.
- Present my work on The 14th ACM SIGPLAN/SIGOPS International Conference on Virtual Execution Environments (VEE’18)
- Give guest lectures on security related courses at the University of Minnesota.

## COURSEWORK

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**Introduction to Computer Security:** A breadth of knowledge about software security and network security

**Modern Cryptography:** Introduction to widely used cryptography theories and algorithms

**Machine Learning:** Introduction to machine learning

**Security and Privacy in Computing:** A seminar discussing recent papers about security, privacy and cryptography

## REFERENCES

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- [1] Patrice Godefroid and Daniel Luchaup. Automatic partial loop summarization in dynamic test generation. In *Proceedings of the 2011 International Symposium on Software Testing and Analysis*, ISSTA ’11, pages 23–33, New York, NY, USA, 2011. ACM.
- [2] Nadhem J. Al Fardan and Kenneth G. Paterson. Lucky thirteen: Breaking the tls and dtls record protocols. In *Proceedings of the 2013 IEEE Symposium on Security and Privacy*, SP ’13, pages 526–540, Washington, DC, USA, 2013. IEEE Computer Society.