

QIAOYI LIU

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EDUCATION

Tsinghua University, Beijing, China

B.E. in Department of Electronic Engineering
Overall GPA: 90.5/100

Aug 2013–July 2017 (expected)

NC State University, Raleigh, USA

Semester Exchange in Department of Electrical Computer Engineering
GPA: 4.0/4.0

Aug 2015–Dec 2015

Carnegie Mellon University, Pittsburgh, USA

Summer Research Intern in the Department of Electrical Computer Engineering

June 2016–Sept 2016

Relevant Courses:

Tsinghua: Computer Program Design(C++) (98), Media and Cognition (92), Digital Image Processing (90), Fundamental of Digital Logic and Processor (94), Modern Computer Architecture (93), Computational Biology and Machine Learning (96), Advanced Matlab Programming (96)

NC State: Multimedia Technology (4.0), Communication Engineering (4.0), Digital Signal Processing (4.0), Introduction to Computer Network (4.0), Computer Architecture and Parallel Computing (4.0)

PUBLICATIONS, MANUSCRIPTS & PATENTS

1. X.Chen, **Q. Liu**, et al. Hardware Trojan Detection in Third-Party Intellectual Property Cores by Multi-Level Feature Analysis, submitted to *Transactions on Computer-Aided Design of Integrated Circuits and Systems*(TCAD), Sept 2016.
2. X. Chen, **Q. Liu**, Y. Wang, Q. Xu and H. Yang, Low-Overhead Implementation of Logic Encryption Using Gate Replacement Techniques, accepted for publication in *International Symposium on Quality Electronic Design*(ISQED 2017), Oct 2016.
3. S. Yao, X. Chen, J. Zhang, **Q. Liu(Presenter)**, J. Wang, Q. Xu, Y. Wang, and H. Yang, FASTrust: Feature Analysis for Third-Party IP Trust Verification, accepted for publication in *Proc. IEEE International Test Conference*(ITC 2015) and invited to deliver oral presentation, Sept 2015.
4. **Q. Liu**, “Magnetic-absorbing type blackboard cleaning wall-climbing robot” Patent CN202481175U, international Classification B43L21/00, B62D57/024.

RESEARCH EXPERIENCE

Carnegie Mellon University

ECE Dept. Computer Architecture Lab

Jun. 2016 - Present

Advised by **Prof. James Hoe**

Stereo Vision System Design on FPGA, High Level Synthesis Design Space Exploration

- Conducted survey on state-of-art stereo vision algorithm and the corresponding hardware architecture.
- Used Vivado HLS to design a high throughput stereo vision IP with flexible architecture.
- Testing the scalability of the stereo vision IP.
- Implemented this IP into a hardware platform in the Smart Headlight System.
- **Currently extending this IP to a stereo vision system with data-driven algorithmic flow.**

Tsinghua University

Dept. of EE, NICS. Lab

Oct, 2014 - Sept. 2016
Advised by **Prof. Yu Wang**

Hardware Security, HT(Hardware Trojan) Detection, IP verification

- Conducted literature survey on IP verification, HT detection methods.
- Worked on HT classification and conducted series of simulations and experiments on HT detection.
- Implemented an effective and efficient feature analysis methodology for HT Detection and contributed to a 3PIP verification frame work FASTrust that was accepted by *ITC 2015*.
- Presented work *FASTrust: Feature Analysis for Third-Party IP Trust Verification* in *ITC 2015*.

Worked on a multi-level architecture framework of 3PIP verification

- Extended the feature analysis to the level of combinational logic
- Proposed a factor that judge the stealthy based on signal possibility
- Developed tool chain for the multi-level feature analysis; extremely lowered down the false positive rate.
- Submitted paper *Hardware Trojan Detection in Third-Party Intellectual Property Cores by Multi-Level Feature Analysis* to the *Transactions on Computer-Aided Design of Integrated Circuits and Systems(TCAD)*.

Tsinghua University

ISSS, Machine Learning and Computational Biology Group

Feb. 2016 - Jun. 2016
Advised by **Prof. Jianyang Zeng**

Computational Biology, Stochastic Optimization, Computer Vision

- Proposed a robust CNN-based Cryo-EM particle picking pipeline.
- Performed MAP estimation to rebuild 3D structure on a new Cryo-EM dataset.
- Minimized the γ -divergence of feature distribution to cluster 2D particle mini-graph.

NC State University

VISSTA group, ECE Dept.

Oct. 2015 - Dec. 2015
Advised by **Prof. Hamid Krim**

Image Segmentation, Data Fusion

- Implemented the super pixel algorithm to segment satellite pictures.
- Processed the over-segmented image by leveraging graph theory.

FELLOWSHIP, SCHOLARSHIP & AWARD

2015-16	Fellowship of Spark Talents Program (50/3500)
2016	“Top Open Program” <u>Summer Research Funding</u> (200/3500)
2016	<u>Meng Zhaoying Scholarship</u> , award for Excellent Academic Performance(Top 5%)
2015	<u>China Scholarship Council Excellent Undergraduate Visiting Student Scholarship</u>
2014	<u>Zheng Geru Scholarship</u> , award for Excellent Academic Performance(Top 10%)
2014	<u>1st prize</u> of Chinese Undergraduate Physics Competition

TECHNICAL SKILL

Programming	C++/C(>20k lines), MATLAB(>10k lines), Verilog(>10k lines), OpenCV, OpenMP
Hardware	Vivado, Vivado HLS, Altera Quartus, Design Compiler, Modelsim, Arduino
Basic	L ^A T _E X, Linux, Microsoft Office, Solidworks

LANGUAGE SKILL

GRE	Verbal - 161/170, Quantitative - 168/170, Analytical Writing - 3.5/6.0
TOEFL iBT	104/120 (Reading 30, Listening 27, Speaking 22, Writing 25)