

Yan Long

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RESEARCH SUMMARY

My research aims to protect the security and privacy of sensing-based information and embedded systems, with an emphasis on the software-hardware interfaces. My research has applications to securing emerging technology in cyber-physical systems, wearable and medical devices, and the greater frontier of ubiquitous computing. I work towards the next generation of sensing systems that have science-based security and privacy protections as a fundamental building block.

EDUCATION

University of Michigan, Ann Arbor, MI

Sep 2019 - Present

- Ph.D. in Electrical and Computer Engineering
- Thesis: Modeling and Mitigating Side Channels in Optical & Embedded Sensing Systems
- Dissertation committee: Kevin Fu (chair), Mingyan Liu (co-chair), Alanson Sample, Pei Zhang, Jean-Baptiste Jeannin

Zhejiang University, Hangzhou, China

Sep 2015 - June 2019

- B.Eng in Electronic and Information Engineering
- Thesis: Sound Field-based Liveness Detection in Voice Authentication
- Advisors: Wenyan Xu, Xiaoyu Ji

WORK EXPERIENCE

University of Michigan, Ann Arbor, MI

Sep 2019 - Present

Lead Graduate Research Assistant, Security and Privacy Research Group

Zhejiang University, Hangzhou, China

Sep 2017 - June 2019

Undergraduate Research Assistant, Ubiquitous System Security Lab

UCLA, Los Angeles, CA

July 2018 - Sep 2018

Summer Visiting Researcher, Biomimetic Research Lab

Thundercomm, Chongqing, China

June 2017 - Sep 2017

Embedded Development Intern

AWARDS & HONORS

Rackham Predoctoral Fellowship (top 6 PhD candidates of UM ECE&CS)	2023
NSF/NSPW Student Travel Support Grant	2022
ACM SIGMOBILE Research Highlight on GetMobile	2022
SenSys Best Poster Runner-up Award (top 8%)	2020
Outstanding Undergraduate Thesis of Zhejiang University	2019
UCLA Cross-disciplinary Scholarship in Science and Technology	2018
Zhejiang Provincial Government Scholarship (top 3% of school)	2018
Samsung Scholarship (top 5% of school)	2018
Zhejiang University Outstanding Volunteer Service Award	2017

* denotes equal contribution

Refereed Conference & Workshop Publications

- C9 **GhostType: The Limits of Using Contactless Electromagnetic Interference to Inject Phantom Keys into Analog Circuits of Keyboards**
Qinhong Jiang, Yanze Ren, Yan Long, Chen Yan, Yumai Sun, Xiaoyu Ji, Kevin Fu, Wenyan Xu
Network and Distributed System Security Symposium (NDSS) 2024
- C8 **Characterizing and Mitigating Touchtone Eavesdropping in Smartphone Motion Sensors**
Connor Bolton*, Yan Long*, Jun Han, Josiah Hester, Kevin Fu
26th International Symposium on Research in Attacks, Intrusions, and Defenses (RAID) 2023
[acceptance rate = 50/213 = 23.5%]
- C7 **Side Eye: Characterizing the Limits of POV Acoustic Eavesdropping from Smartphone Cameras with Rolling Shutters and Movable Lenses**
Yan Long, Pirouz Naghavi, Blas Kojusner, Kevin Butler, Sara Rampazzi, Kevin Fu
44th Annual IEEE Symposium on Security and Privacy (IEEE S&P) 2023
[acceptance rate = 195/1147 = 17%]
- C6 **Private Eye: On the Limits of Textual Screen Peeking via Eyeglass Reflections in Video Conferencing**
Yan Long, Chen Yan, Shilin Xiao, Shivan Prasad, Wenyan Xu, Kevin Fu
44th Annual IEEE Symposium on Security and Privacy (IEEE S&P) 2023
[acceptance rate = 195/1147 = 17%]
- C5 **Position Paper: Space System Threat Models Must Account for Satellite Sensor Spoofing**
Benjamin Cyr, Yan Long, Takeshi Sugawara, Kevin Fu
Workshop on Security of Space and Satellite Systems (SpaceSec) 2023
- C4 **Side Auth: Sensor Side Channels Considered Beneficial by Synthesizing Virtual Sensors for Authentication**
Yan Long, Kevin Fu
ACM/ACSA New Security Paradigms Workshop (NSPW) 2022
[acceptance rate = 38%]
- C3 **VeriMask: Facilitating Decontamination of N95 Masks in the COVID-19 Pandemic: Challenges, Lessons Learned, and Safeguarding the Future**
Yan Long, Alexander Curtiss, Sara Rampazzi, Josiah Hester, Kevin Fu
ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp/IMWUT) 2021
[acceptance rate = 22%, impact factor = 4.96]
- C2 **The Catcher in the Field: A Fieldprint based Spoofing Detection for Text-Independent Speaker Verification**
Chen Yan*, Yan Long*, Xiaoyu Ji, Wenyan Xu
26th ACM Conference on Computer and Communications Security (ACM CCS) 2019
[acceptance rate = 149/934 = 16%]
- C1 **A Novel Biomimetic Stimulator System for Neural Implant**

Refereed Journal & Magazine Publications

- J2 **VeriMask: Sensor Platform for Decontamination of N95 Masks**
Yan Long, Alexander Curtiss, Sara Rampazzi, Josiah Hester, Kevin Fu
GetMobile: Mobile Computing and Communications. June 2022, Vol. 26 Iss. 2. pp 25-28
- J1 **Protecting COVID-19 Vaccine Transportation and Storage from Analog Cybersecurity Threats**
Yan Long, Sara Rampazzi, Takeshi Sugawara, Kevin Fu
Biomedical Instrumentation & Technology (BI&T) 55, no. 3, Oct 2021

Posters & Demos

- P2 **Limiting the Optical-Electromagnetic Side Channel Leakage of Smartphone Cameras**
Yan Long, Kevin Fu
NSF CHEST Meeting 2023
- P1 **Automating Decontamination of N95 Masks for Frontline Workers in COVID-19 Pandemic**
Yan Long, Alexander Curtiss, Sara Rampazzi, Josiah Hester, Kevin Fu
18th ACM Conference on Embedded Networked Sensor Systems (SenSys) 2020
[Best Poster Award Runner Up – COVID-19 Response Research (Top 8%)]

Submissions in Review

- S2 **EM Eye: Characterizing Electromagnetic Side-channel Eavesdropping on Embedded Cameras**
Yan Long*, Qinzhong Jiang*, Chen Yan, Tobias Alam, Xiaoyu Ji, Wenyuan Xu, Kevin Fu
Network and Distributed System Security Symposium (NDSS) 2024
- S1 **SampleGuard: Enabling Lightweight Runtime Monitoring and Characterization of Android Zero-permission Sensor Usage from User Space**
Yan Long*, Tobias Alam*, Kevin Fu

PATENTS

Speaker Detection from Muted Terrorist Propaganda Videos
US Patent, application filed, 2023

A Method for Detecting Voice Replay Attacks
Xiaoyu Ji, Yan Long, Wenyuan Xu, Chen Yan
China Invention Patent, ZL 2019 1 0303649.3

TEACHING EXPERIENCE

EECS 498/598 Special Topics in Embedded Security (Undergraduate + Graduate)	Fall 2022
EECS 505 Computational Data Science & Machine Learning (Graduate)	Fall 2021
EECS 298 Applied Computational ML for Scientists and Engineers (Undergraduate)	Fall 2021
EECS 501 Probability & Random Process (Graduate)	Winter 2021

SERVICE

Professional Activities

Technical program committee: IEEE MSN 2023, Sensors S&P 2023
Organizer and panelist: Annual Embedded Security Workshop 2020
Reviewer: IEEE TIFS, IEEE IoTJ, ACM TOPS, ACM IMWUT
Sub-reviewer: IEEE TIE, ACM MobiCom, USENIX Security, ACM CCS

Student Advising

Sarah Bargfrede	B.S. Computer Science	2023-Present
Jiaming Yao	M.S. Data Science	2023-Present
Emiko Sano	High-school student	2023-Present
Tobias Alam	B.S. Computer Science (two papers under review)	2022-Present
Yumai Sun	M.S. Electrical and Computer Engineering (paper at NDSS'24)	2022-2023
Haoliang Cheng	B.S. Computer Engineering (next: ECE master's at CMU)	2022-2023
Shivan Prasad	B.S. Computer Science (paper at SP'23)	2021-2022
Mia Li	B.S. Computer Science (now: Salesforce)	2020
Weikun Lyu	B.S. Computer Science (now: Meta)	2020

Volunteering

Vice president of Zhejiang University Alumni Association of Michigan	2023-Present
Vice president of Red Cross student center of Zhejiang University	2015-2017