刘寅

Ph.D.

北京工业大学软件工程系讲师、硕士研究生导师 (含本地/国际学生)

博士毕业于弗吉尼亚理工大学 (Virginia Tech) 计算机系

研究方向以软件工程为主体, 涵盖可信/移动计算, 软件安全与隐私

攻读博士之前, 在Sony移动公司作为软件工程师工作逾3年

联系方式

yinliu[AT]bjut.edu.cn

ignorer001.github.io

教育背景

2016–2021 **弗吉尼亚理工大学 (Virginia Tech), 美国**
博士, 计算机科学与应用; **导师:** Dr. Eli Tilevich

2008–2011 **北京林业大学 (BJFU)**
硕士, 计算机软件与理论

2004–2008 **北京林业大学 (BJFU)**
本科, 计算机科学与技术

研究方向/兴趣

软件工程: 软件测试, 程序分析/理解, 代码重构

可信&移动计算: 基于TEE的可信软件, Android系统/软件

安全&隐私: 软件缺陷/漏洞分析, 程序关键信息的安全/隐私保护

❑ ***具体研究课题/成果***

- ❑ **面向安卓平台可信执行环境的性能缺陷测试技术研究**(TrustCom'24)
- ❑ **基于可信计算的关键程序保护:** 通过研发编译器模块及程序语言, 实现自动化隔离关键程序代码和数据 (ManLang'17, GPCE'18, COLA'20, TrustCom'20, JSS'22)
- ❑ **移动计算中的安全与隐私:** 通过设计安全中间件, 实现组件间通信的安全与隐私保护机制 (SecureComm'21, MobiCASE'21, JSS'22, TrustCom'24)
- ❑ **程序理解:** 通过设计和开发程序分析和语言层面的支持, 实现程序变量的语义推测 (GPCE'20)
- ❑ **代码搜索引擎:** 通过对程序员的调研和对现有代码搜索引擎的分析, 多角度定义代码搜索引擎的概念、明确其特点、总结其不足 (APSEC'22)

答辩委员会成员:

Dr. Eli Tilevich. *Professor, Virginia Tech*

Dr. Shigeru Chiba. *Professor, The University of Tokyo*

Dr. Na Meng. Associate Professor, Virginia Tech

Dr. Francisco Servant. Assistant Professor, Universidad de Málaga

Dr. Muhammad Ali Gulzar. *Assistant Professor, Virginia Tech*

工作经历

2021至今 **讲师**, *北京工业大学*

2016-2021 **研究助理**, *弗吉尼亚理工大学*

2011-2014 **软件工程师**, *核心软件/平台研发部, Sony移动通信公司*

- 开发/维护Android平台多媒体传输协议(MTP) 和 Android系统级应用
- 与Aricent公司印度研发部合作开发、维护MTP协议
- 与美国Verizon公司合作Android手机网络设置软件开发
- 与东京/隆德开发部合作进行新功能开发和代码审核

论文发表情况

[TrustCom'24] Xianghui Dong, *Yin Liu*, and Xuejun Yu, "Three-Body Problem: An Empirical Study on Smartphone-based TEEs, TEE-based Apps, and their Interactions," Proceedings of the 23rd IEEE International Conference on Trust, Security and Privacy in Computing and Communications, December 2024 **[EI-会议, CCF-C]**.

[TrustCom'24] *Yin Liu*, "A Quiet Place: An In-Depth Study of Mobile Public-to-Private Attacks," Proceedings of the 23rd IEEE International Conference on Trust, Security and Privacy in Computing and Communications, December 2024 **[EI-会议, CCF-C]**.

[CC'23] *Yin Liu*, Breno Dantas Cruz, and Eli Tilevich, "Trusted and Privacy-Preserving Sensor Data Onloading," Computer Communications, 2023 **[SCI-期刊, SCI-1区, CCF-C]**.

[APSEC'22] *Yin Liu*, Shuangyi li, and Eli Tilevich, "Toward a Better Alignment Between the Research and Practice of Code Search Engines," Proceedings of the 29th Asia-Pacific Software Engineering Conference, December, 2022 **[EI-会议, CCF-C]**.

[JSS'22] *Yin Liu*, Breno Dantas Cruz, and Eli Tilevich, "Secure and Flexible Message-Based Communication for Mobile Apps Within and Across Devices," Journal of Systems & Software, In Print, July 2022 **[SCI-期刊, SCI-2区, CCF-B]**.

[JSS'22] *Yin Liu*, Siddharth Dhar, and Eli Tilevich, "Only Pay for What You Need: Detecting and Removing Unnecessary TEE-Based Code," Journal of Systems & Software, In Print, February 2022 **[SCI-期刊, SCI-2区, CCF-B]**.

[SecureComm'21] *Yin Liu*, Breno Dantas Cruz, and Eli Tilevich, "HTPD: Secure and Flexible Message-Based Communication for Mobile Apps," Proceedings of the 17th EAI International Conference on Security and Privacy in Communication Networks, September 2021 **[EI-会议, CCF-C]**.

[TrustCom'20] *Yin Liu*, and Eli Tilevich, "Reducing the Price of Protection: Identifying and Migrating Non-Sensitive Code in TEE," Proceedings of the 19th IEEE International Conference on Trust, Security and Privacy in Computing and Communications, December 2020 **[EI-会议, CCF-C]**.

[GPCE'20] *Yin Liu*, and Eli Tilevich, "VarSem: Declarative Expression and Automated Inference of Variable Usage Semantics," Proceedings of the 19th International Conference on Generative Programming: Concepts & Experience (GPCE 2020), November 2020 **[EI-会议, CORE-B]**.

[COLA'20] *Yin Liu*, Kijin An, and Eli Tilevich, "Automated Refactoring for Different Trusted Execution Environments under Real-Time Constraints," Journal of Computer Languages (COLA) **[SCI-期刊, SCI-3区] 年度最佳 论文提名 奖**.

[GPCE'18] *Yin Liu*, Kijin An, and Eli Tilevich, "RT-Trust: Automated Refactoring for Trusted Execution Under Real-Time Constraints," Proceedings of the 17th International Conference on Generative Programming: Concepts & Experience (GPCE 2018), November 2018 **[EI-会议, CORE-B]**.

[ManLang'17] *Yin Liu*, Zheng Song, and Eli Tilevich, "Querying Invisible Objects: Supporting Data-Driven, Privacy-Preserving Distributed Applications," Proceedings of the 14th International Conference on Managed Languages & Runtimes (ManLang 2017, formerly PPPJ), September 2017 **[EI-会议, CORE-C]**.

科研项目经验

[主持] 北京市自然科学基金, 面向安卓平台可信执行环境的性能缺陷测试技术研究, 2023-2025
[核心参与人] 美国国家自然科学基金 (NSF), 项目名称-Perpetuum Mobile: Orchestrating the Provisioning of Pervasive Resources for Emerging Mobile Applications, 2017~2021
[核心参与人] 美国国家自然科学基金 (NSF), 项目名称-Security and Software Engineering Research Center (S2ERC) at Virginia Tech, 2017~2020
[核心参与人] 思科公司 (Cisco, Inc.), 课题方向-移动/边缘计算中的隐私保护, 2018
[核心参与人] 安全与软件工程研究中心 (S2ERC), 课题方向-代码重构, 2017

指导经验

2021至今 指导3人 (硕士), 3人 (本科) 的毕业设计及论文, *北京工业大学,* (其中1人获评北京工业大学优秀毕业设计)

2020-2022 指导2人 (硕士) 的科研项目及毕业论文, *弗吉尼亚理工大学*

2016-2020 指导3人 (本科) 的科研项目, *弗吉尼亚理工大学*

获奖情况

BitShares 奖学金, 弗吉尼亚理工大学, 2019
知识产权发明奖(两次), Sony, 2014
最佳同事奖, Sony, 2012
学业奖学金, 北京林业大学, 2010 (一等), 2007 (二等), 2006/2005 (三等)
征文比赛奖, 中国青年报•中青在线, 2006

Yin Liu

yinliu[AT]bjut.edu.cn
https://ignorer001.github.io/

EDUCATION

Ph.D. Computer Science   2016-2021
Virginia Tech, USA

      Advisor: Dr. Eli Tilevich

      Dissertation: Methodologies, Techniques, and Tools for Understanding and Managing Sensitive Program Information

M.S. Computer Software and Theory   2008-2011
Beijing Forestry University, China

B.S. Computer Science and Technology   2004-2008
Beijing Forestry University, China

RESEARCH INTERESTS

My primary research focus is on *Software Engineering*, with additional interests in *Trusted&Mobile Computing* and *Software Security & Privacy*. I use innovative ideas and techniques in <u>programming languages</u>, <u>program analysis</u>, <u>trusted execution environment</u>, and <u>machine learning</u> to solve software engineering and security/privacy problems.

- **Software Engineering:** software testing; program comprehension; code refactoring (compiler-based solution)
- **Trusted & Mobile Computing:** trusted execution environment-based software; Android system/framework/app
- **Security & Privacy:** vulnerability detection; privacy-preserving techniques; critical program information protection

✧ **Detailed Topics**

- *Understanding and Testing Performance Issues for Trusted Execution Environment in Android Platform* (published on TrustCom'24)
- *TEE-based Critical Code Protection:* Developing powerful programming tools to automatically isolate critical code (published on ManLang'17, GPCE'18, COLA'20, TrustCom'20, JSS'22)
- *Security/Privacy in Mobile Computing:* Ensuring security for inter-component communications and privacy for data sharing (published on SecureComm'21, MobiCASE'21, JSS'22, TrustCom'24)
- *Program Comprehension:* Designing program analysis and programming support for inferring the usage semantics of program constructs (published on GPCE'20)
- *Code Search Engine:* drawing a comprehensive picture of code search engines, as reflected in developers' experiences and perspectives as well as the state of the art (published on APSEC'22)

PROFESSIONAL EXPERIENCES

Lecturer (tenure-track), **Master's Advisor** (for both local and international students)   **2021-present**
Beijing University of Technology

Software Engineer (full-time), **Sony Mobile Communications**   2011-2014
Core Software / Platform Department, Sony Mobile Communications

- Developed & Maintained Android's Media Transfer Protocol and system-level applications.
- Mentored new colleagues
- Cooperated with Lund/Tokyo sites on feature development and code review
- Delivered contributions to Google and Qualcomm, drafted technique articles

TEACHING EXPERIENCES

Programming in Python, Instructor   Spring 2024
Beijing University of Technology

- 32 class hours, ~50 students

Freshman Seminar - Privacy Computing and Software Engineering, Instructor   Fall 2022/2023/2024
Beijing University of Technology

- 2 class hours, ~30 students

CS 1054: Introduction to Programming in Java, Teaching Assistant   Fall 2016
Virginia Tech

- Taught and administered two lab sections (~50 students), held three hours of office hours per week

RESEARCH MENTORING

Mentored three graduate students (MSc), two undergraduate at Beijing University of Technology	2021-present

- one student received the Excellent Graduation Project award from Beijing University of Technology

Mentored two graduate students (MSc) at Virginia Tech	2020-2022
Mentored three undergraduate students at Virginia Tech	2016-2021
Mentored an undergraduate at Beijing Forestry University	2010-2011

PUBLICATIONS

[TrustCom'24] Xianghui Dong, _Yin Liu_, and Xuejun Yu, "Three-Body Problem: An Empirical Study on Smartphone-based TEEs, TEE-based Apps, and their Interactions," Proceedings of the 23rd IEEE International Conference on Trust, Security and Privacy in Computing and Communications, December 2024 **[EI-Conference, CCF-C].**

[TrustCom'24] _Yin Liu_, "A Quiet Place: An In-Depth Study of Mobile Public-to-Private Attacks," Proceedings of the 23rd IEEE International Conference on Trust, Security and Privacy in Computing and Communications, December 2024 **[EI-Conference, CCF-C].**

[CC'23] _Yin Liu_, Breno Dantas Cruz, and Eli Tilevich, "Trusted and Privacy-Preserving Sensor Data Onloading," Computer Communications, Accepted, 2023 **[SCI-Journal, SCI-Q1, CCF-C]**.

[APSEC'22] _Yin Liu_, Shuangyi li, and Eli Tilevich, "Toward a Better Alignment Between the Research and Practice of Code Search Engines," Proceedings of the 29th Asia-Pacific Software Engineering Conference, December, 2022 **[EI-Conference, CCF-C]**.

[JSS'22] _Yin Liu_, Breno Dantas Cruz, and Eli Tilevich, "Secure and Flexible Message-Based Communication for Mobile Apps Within and Across Devices," Journal of Systems & Software, In Print, July 2022 **[SCI-Journal, SCI-Q2, CCF-B]**.

[JSS'22] _Yin Liu_, Siddharth Dhar, and Eli Tilevich, "Only Pay for What You Need: Detecting and Removing Unnecessary TEE-Based Code," Journal of Systems & Software, In Print, February 2022 **[SCI-Journal, SCI-Q2, CCF-B]**.

[MobiCASE'21] _Yin Liu_, Breno Dantas Cruz, and Eli Tilevich, "Privacy-Preserving Sharing of Mobile Sensor Data," Proceedings of EAI MobiCASE 2021 - 12th EAI International Conference on Mobile Computing, Applications and Services 2021, November 2021 **[EI-Conference]**.

[SecureComm'21] _Yin Liu_, Breno Dantas Cruz, and Eli Tilevich, "HTPD: Secure and Flexible Message-Based Communication for Mobile Apps," Proceedings of the 17th EAI International Conference on Security and Privacy in Communication Networks, September 2021 **[EI-Conference, CCF-C]**.

[TrustCom'20] _Yin Liu_, and Eli Tilevich, "Reducing the Price of Protection: Identifying and Migrating Non-Sensitive Code in TEE", Proceedings of the 19th IEEE International Conference on Trust, Security and Privacy in Computing and Communications (TrustCom), December 2020 **[EI-Conference, CCF-C]**.

[GPCE'20] _Yin Liu_, and Eli Tilevich, "VarSem: Declarative Expression and Automated Inference of Variable Usage Semantics", Proceedings of the 19th International Conference on Generative Programming: Concepts & Experience (GPCE), November 2020 **[EI-Conference, CORE-B]**.

[COLA'20] _Yin Liu_, Kijin An, and Eli Tilevich, "Automated Refactoring for Different Trusted Execution Environments under Real-Time Constraints", Journal of Computer Languages (COLA), February 2020 **[SCI-Journal, SCI-Q3] Best Paper Runner-up**.

[GPCE'18] _Yin Liu_, Kijin An, and Eli Tilevich, "RT-Trust: Automated Refactoring for Trusted Execution Under Real-Time Constraints", Proceedings of the 17th International Conference on Generative Programming: Concepts & Experience (GPCE), November 2018 **[EI-Conference, CORE-B]**.

[ManLang'17] _Yin Liu_, Zheng Song, and Eli Tilevich, "Querying Invisible Objects: Supporting Data-Driven, Privacy-Preserving Distributed Applications", Proceedings of the 14th International Conference on Managed Languages & Runtimes (ManLang, formerly PPPJ, now called MPLR), September 2017 **[EI-Conference, CORE-C]**.

POSTERS

Yin Liu, and Eli Tilevich, A Programming Framework for Data-Intensive, Privacy-Preserving Applications, 16th Semiannual Security & Software Engineering Research Center (S2ERC) showcase, November 8-9, 2017.

Yin Liu, and Eli Tilevich, Compiler Tools for Critical Program Information Protection, 15th Semiannual Security & Software Engineering Research Center (S2ERC) showcase, May 24-25, 2017.

FUNDING

RESEARCH SERVICES

Youth Mentor of Student International Development, Beijing University of Technology	2024-present
Proceedings Chair, the 15th International Conference on Managed Languages & Runtimes (ManLang'18)	2018

INVITED TALKS

Research Method of Computer Science (focus on Software Engineering) 2020
School of Information Science and Technology, Beijing Forestry University

CERTIFICATION

Mobile Development Engineer, *Ministry of Industry and Information Technology of PRC*

HONORS & AWARDS

Second Prize, Young Faculties Teaching Skills Competition, *College of Computer Science at Beijing University of Technology*	2024
Outstanding Trainee, Teaching Ability Training for Young Faculties, *Beijing University of Technology*	2022
Best Paper Runners Up, *Journal of Computer Languages*	2020
BitShares Graduate Fellowship, *Virginia Tech*	2019
Intellectual Property Rights Inventor Award (Twice), *Sony Mobile Communication*	2014
The Best Colleague and Most Friendly Developer, *Sony Mobile Communication*	2012
College Academic Scholarship, First-Class, *Beijing Forestry University*	2010
College Academic Scholarship, Second-Class, *Beijing Forestry University*	2007
College Academic Scholarship, Third-Class, *Beijing Forestry University*	2005, 2006
Essay Competition Prize, *China Youth Online*	2006

COPYRIGHTS

<u>*Yin Liu*</u>, Lock or wake up the phone by shaking, Computer Software Copyright, *National Copyright Administration of PRC*
<u>*Yin Liu*</u>, Desktop management system based on Policy, Computer Software Copyright, *National Copyright Administration of PRC*
<u>*Yin Liu*</u>, Map building system in unknown environment, Computer Software Copyright, *National Copyright Administration of PRC*

OTHER EDUCATION

English Presentation Trainee	2016
Virginia Tech, USA	
Academic Writing Trainee	2016
Virginia Tech, USA	
English Writing Trainee	2014-2015
University of California, USA	
Language Trainee (English as a Second Language)	2014-2015
Davis Adult and Community Education, USA	

MEMBERSHIPS

Member, Association for Computing Machinery (ACM)
Member, China Computer Federation (CCF)

MISC.

- **I am also proficient in Classical Chinese Poetry**
  One of my Poems：
  > [西江月] 长畏荆棘满路，安能笑傲江湖。一书一剑展雄图，燕然一鞭直度。虽千万人吾往，董道不负心初。浩气不与世沉浮，枕戈静待箫鼓。

- **Besides Chinese (native) and English (professional level), I can speak French and Japanese (beginner's level)**

REFERENCES

Dr. Eli Tilevich. *Professor, Virginia Tech*

Dr. Shigeru Chiba. *Professor, The University of Tokyo*

Dr. Na Meng. *Associate Professor, Virginia Tech*

Dr. Francisco Servant. *Assistant Professor, Universidad de Málaga*

Dr. Muhammad Ali Gulzar. *Assistant Professor, Virginia Tech*

Dr. Zheng Song. *Assistant Professor, University of Michigan--Dearborn*

Dr. Peeratham Techapalokul. *Lecturer (tenure-track), Rajamangala University of Technology Lanna*