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工作经历

中国科学院信息工程研究所，副研究员 　　　　　　　　　　2018 年 11 月 至今

- 信息安全国家重点实验室
- 主要研究方向为隐私计算、可信执行环境、侧信道攻击、硬件辅助系统安全、密码学
- 开设中国科学院大学研究生课程《安全芯片技术》(40 学时)

美国印第安纳大学，访问学者 　　　　　　　　　　2016 年 4 月 至 2018 年 8 月

- 合作导师：王晓峰教授，ACM SIGSAC 主席，IEEE 会士
- 由 NIH 项目资助，主要工作之一是协助组织隐私计算顶级赛事 iDASH 安全基因组分析竞赛，负责讨论和制定赛题、提供基线解决方案以及对参赛队伍提交方案的安全性、性能等各方面的评测

中国科学院信息工程研究所，助理研究员 　　　　　　　　　　2015 年 1 月 至 2018 年 10 月

- 信息安全国家重点实验室
- 主要研究方向为隐私计算、可信执行环境、侧信道攻击、硬件辅助系统安全、密码学

教育背景

中国科学院大学，信息安全，博士 　　　　　　　　　　2009 年 9 月 至 2015 年 1 月

- 导师：林东岱研究员

中国海洋大学，计算机科学与技术，本科 　　　　　　　　　　2005 年 9 月 至 2009 年 7 月

部分发表论文 (⊠ 通信作者，＿ 由我指导，[ ] 排名不分先后)

- *CryptPEFT: Parameter-Efficient Fine-Tuning for Privacy-Preserving Neural Network Inference*
  <u>Saisai Xia</u>, **Wenhao Wang**$^{⊠}$, Zihao Wang$^{⊠}$, Yuhui Zhang, Yier Jin, Dan Meng, Rui Hou
  Network and Distributed System Security Symposium (NDSS) 2026 (CCF-A)

- *Multivariate Template Attack against NTT based Polynomial Multiplication of Dilithium*
  <u>Haopeng Fan</u>, Hailong Zhang$^{⊠}$, Yongjuan Wang$^{⊠}$, **Wenhao Wang**, Yanbei Zhu, Haojin Zhang, Qingjun Yuan
  IEEE Transactions on Information Forensics and Security (TIFS) (CCF-A)

- *Comet: Accelerating Private Inference for Large Language Model by Predicting Activation Sparsity*
  Guang Yan, Yuhui Zhang$^{⊠}$, Zimu Guo, Lutan Zhao, Xiaojun Chen, Chen Wang, **Wenhao Wang**, Dan Meng, Rui Hou$^{⊠}$
  2025 IEEE Symposium on Security and Privacy (S&P) (CCF-A)

- *The Road to Trust: Building Enclaves within Confidential VMs*
  Wenhao Wang, Linke Song, Benshan Mei, Shuang Liu, Shijun Zhao, Shoumeng Yan⊠, XiaoFeng Wang, Dan Meng, Rui Hou⊠
  Network and Distributed System Security Symposium (NDSS) 2025 (CCF-A)

- *Screening Least Square Technique assisted Multivariate Template Attack against the Random Polynomial Generation of Dilithium*
  Haopeng Fan, Hailong Zhang⊠, Yongjuan Wang⊠, **Wenhao Wang**, Yanbei Zhu, Haojin Zhang, Qingjun Yuan
  IEEE Transactions on Information Forensics and Security (TIFS) (CCF-A)

- *ThermalScope: A Practical Interrupt Side Channel Attack Based On Thermal Event Interrupts*
  Xin Zhang, Zhi Zhang, Qingni Shen, **Wenhao Wang**, Yansong Gao, Zhuoxi Yang, Zhonghai Wu
  The 61st Design Automation Conference (DAC 2024) (CCF-A)

- *Cache attacks on subkey calculation of Blowfish*
  Haopeng Fan,**Wenhao Wang**⊠, Yongjuan Wang, Xiangbin Wang, Yang Gao
  Journal of Computer Security (JCS) (CCF-B)

- *PP-Stream: A Privacy-Preserving Neural Network Inference Service with Stream Processing*
  Qingxiu Liu, Qun Huang, Xiang Chen, Sa Wang, **Wenhao Wang**, Shujie Han, Patrick P. C. Lee
  40th IEEE International Conference on Data Engineering (ICDE 2024) (CCF-A)

- *Verifying Rust Implementation of Page Tables in a Software Enclave Hypervisor*
  Zhenyang Dai, Shoumeng Yan, Vilhelm Sjoberg, Yu Chen, **Wenhao Wang**, Hongbo Chen, XiaoFeng Wang, Shubham Sondhi, Laila Elbeheiry, Sean Noble Anderson, Xinyuan Sun, Zhaozhong Ni, Kinnary Dave, Xupeng Li, Yuekai Jia, Yu Zhang, Shuang Liu, Zhengyu He
  International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2024) (CCF-A)

- *SegScope: Probing Fine-grained Interrupts via Architectural Footprints*
  Xin Zhang, Zhi Zhang, Qingni Shen, **Wenhao Wang**, Yansong Gao, Zhuoxi Yang, Jiliang Zhang
  30th IEEE International Symposium on High-Performance Computer Architecture (HPCA 2024) (CCF-A)

- *The Danger of Minimum Exposures: Understanding Cross-App Information Leaks on iOS through Multi-Side-Channel Learning*
  [Zihao Wang, Jiale Guan], XiaoFeng Wang, **Wenhao Wang**, Luyi Xing, Fares Alharbi
  ACM Conference on Computer and Communications Security (ACM CCS 2023) (CCF-A)

- *Tossing in the Dark: Practical Bit-Flipping on Gray-box Deep Neural Networks for Runtime Trojan Injection*
  Zihao Wang, Di Tang⊠, XiaoFeng Wang, Wei He, Zhaoyang Geng, **Wenhao Wang**⊠
  USENIX Security 2024 (CCF-A)

- *WhistleBlower: A System-level Empirical Study on RowHammer*
  [Wei He, Zhi Zhang], Yueqiang Cheng, **Wenhao Wang**⊠, Wei Song, Yansong Gao, Qifei Zhang, Kang Li, Dongxi Liu, Surya Nepal
  IEEE Transactions on Computers (TC) (CCF-A)

- *Implicit Hammer: Cross-Privilege-Boundary Rowhammer through Implicit Accesses*

[Zhi Zhang, <u>Wei He</u>], Yueqiang Cheng, **Wenhao Wang**, Yansong Gao✉, Dongxi Liu, Kang Li, Surya Nepal, Anmin Fu, Yi Zou

IEEE Transactions on Dependable and Secure Computing (TDSC) (CCF-A)

- *HyperEnclave: An Open and Cross-platform Trusted Execution Environment*
  Yuekai Jia, Shuang Liu, **Wenhao Wang**✉, Yu Chen, Zhengde Zhai, Shoumeng Yan, Zhengyu He
  2022 USENIX Annual Technical Conference (USENIX ATC) (CCF-A)

- *SoftTRR: Protect Page Tables Against RowHammer Attacks using Software-only Target Row Refresh*
  [Zhi Zhang, Yueqiang Cheng], Minghua Wang, <u>Wei He</u>, **Wenhao Wang**✉, Nepal Surya, Yansong Gao, Kang Li, Zhe Wang, Chenggang Wu
  2022 USENIX Annual Technical Conference (USENIX ATC) (CCF-A)

- *Trust Beyond Border: Lightweight, Verifiable User Isolation for Protecting In-Enclave Services*
  Wenhao Wang, Weijie Liu, Hongbo Chen, XiaoFeng Wang, Hongliang Tian, Dongdai Lin
  IEEE Transactions on Dependable and Secure Computing (TDSC) (CCF-A)

- *BitMine: An End-to-End Tool for Detecting Rowhammer Vulnerability*
  [Zhi Zhang, <u>Wei He</u>], Yueqiang Cheng, **Wenhao Wang**, Yansong Gao✉, Minghua Wang, Kang Li, Surya Nepal, Yang Xiang
  IEEE Transactions on Information Forensics & Security (TIFS) (CCF-A)

- *Practical and Efficient in-Enclave Verification of Privacy Compliance*
  Weijie Liu, **Wenhao Wang**✉, Hongbo Chen, XiaoFeng Wang✉, Xiaozhu Meng, Yaosong Lu, Hongbo Chen, Xinyu Wang, Qingtao Shen, Kai Chen, Haixu Tang, Yi Chen, Luyi Xing
  51st IEEE/IFIP International Conference on Dependable Systems and Networks (DSN 2021) (CCF-B)

- *Randomized Last-Level Caches Are Still Vulnerable to Cache Side-Channel Attacks! But We Can Fix It*
  Wei Song, Boya Li, Zihan Xue, Zhenzhen Li, **Wenhao Wang**, Peng Liu
  2021 IEEE Symposium on Security and Privacy (S&P 2021) (CCF-A)

- *Enabling Rack-scale Confidential Computing using Heterogeneous Trusted Execution Environment*
  Jianping Zhu, Rui Hou✉, XiaoFeng Wang✉, **Wenhao Wang**, Jiangfeng Cao, Boyan Zhao, Zhongpu Wang, Yuhui Zhang, Jiameng Ying, Lixin Zhang, Dan Meng
  2020 IEEE Symposium on Security and Privacy (S&P 2020) (CCF-A)

- *Bluethunder: A 2-level Directional Predictor Based Side-Channel Attack against SGX*
  Tianlin Huo, Xiaoni Meng, **Wenhao Wang**✉, Chunliang Hao, Pei Zhao, Jian Zhai, Mingshu Li✉
  IACR Transactions on Cryptographic Hardware and Embedded Systems (CHES 2020) (CCF-B)

- *Beware of Your Screen: Anonymous Fingerprinting of Device Screens for Off-line Payment Protection*
  Zhe Zhou, Di Tang, **Wenhao Wang**, XiaoFeng Wang, Zhou Li, Kehuan Zhang Annual Computer Security Applications Conference (ACSAC 2018) (CCF-B)

- *Correlation Cube Attacks: From Weak-Key Distinguisher to Key Recovery*
  Meicheng Liu, Jingchun Yang, **Wenhao Wang**, Dongdai Lin
  37th Annual International Conference on the Theory and Applications of Cryptographic Techniques (Eurocrypt 2018) (CCF-A)

- Racing in Hyperspace: Closing Hyper-Threading Side Channels on SGX with Contrived Data Races
  [Guoxing Chen, **Wenhao Wang**✉], Tianyu Chen, Sanchuan Chen, Yinqian Zhang, XiaoFeng Wang, Ten-Hwang Lai, Dongdai Lin
  2018 IEEE Symposium on Security and Privacy (S&P 2018) (CCF-A)

- *A community effort to protect genomic data sharing, collaboration and outsourcing*
  Shuang Wang, Xiaoqian Jiang, Haixu Tang, Xiaofeng Wang, Diyue Bu, Knox Carey, Stephanie OM Dyke, Dov Fox, Chao Jiang, Kristin Lauter, Bradley Malin, Heidi Sofia, Amalio Telenti, Lei Wang, **Wenhao Wang**, Lucila Ohno-Machado
  NPJ genomic medicine

- *iDASH secure genome analysis competition 2017*
  XiaoFeng Wang, Haixu Tang, Shuang Wang, Xiaoqian Jiang, **Wenhao Wang**, Diyue Bu, Lei Wang, Yicheng Jiang, Chenghong Wang
  BMC Medical Genomics 2018

- *Leaky Cauldron on the Dark Land: Understanding Memory Side-Channel Hazards in SGX*
  Wenhao Wang, Guoxing Chen, Xiaorui Pan, Yinqian Zhang, XiaoFeng Wang, Vincent Bindschaedler, Haixu Tang, Carl A. Gunter
  2017 ACM Conference on Computer and Communications Security (CCS 2017) (CCF-A)

其它论文 (✉ 通信作者，＿ 由我指导，［ ］排名不分先后)

- *Learning from Proof-of-Concepts: Hybrid Fuzzing of Deep Learning Compilers and Libraries*
  Zizhuang Deng, Sanchuan Chen, Guozhu Meng, **Wenhao Wang**, Tong Liu, Xueqing Zhang, Yidi Kao, Kai Chen
  In submission

- *The Early Bird Catches the Leak: Unveiling Timing Side Channels in LLM Serving Systems*
  [Linke Song, Zixuan Pang], **Wenhao Wang**✉, Zihao Wang, XiaoFeng Wang, Hongbo Chen, Wei Song, Yier Jin, Dan Meng, Rui Hou
  In submission

- *virtCCA: Virtualized Arm Confidential Compute Architecture with TrustZone*
  Xiangyi Xu, **Wenhao Wang**✉, Yongzheng Wu, Zhennan Min, Zixuan Pang, Yier Jin✉
  In submission

- *Understanding TEE Containers, Easy to Use? Hard to Trust*
  [Weijie Liu, Hongbo Chen], XiaoFeng Wang, Zhi Li, Danfeng Zhang, **Wenhao Wang**, Haixu Tang
  In submission

- *Toward Scalable Fully Homomorphic Encryption Through Light Trusted Computing Assistance*
  Wenhao Wang, Yichen Jiang, Qintao Shen, Weihao Huang, Hao Chen, Shuang Wang, XiaoFeng Wang, Haixu Tang, Kai Chen, Kristin Lauter, Dongdai Lin

专利

- *System for decentralized ownership and secure sharing of personalized health data*
  Shuang Wang, XiaoFeng Wang, Haixu Tang, **Wenhao Wang**, Ali Farahanchi, Hao Zheng
  US Patent 11,003,791

学术服务

- 会议大会主席：Inscrypt 2022
- 会议程序委员会委员：CCS (2019)，GenoPri (2020, 2021)，ACNS (2023) 等
- 期刊论文评阅专家：IEEE TDSC，IEEE Security & Privacy，IEEE TC，ACM Transactions on Privacy and Security，CyberSecurity，SCN，JNCA，信息安全学报等
- 会议论文评阅专家: CCS (2018, 2020), NDSS (2017, 2018, 2021), S&P (2017, 2020, 2021), Usenix Security (2017, 2018, 2021), HPCA (2019), ESORICS (2018, 2020), Asiacrypt (2020), AsiaCCS (2017, 2018, 2019), RECOMB (2019) 等

学术奖励

- 2018 年度 ACM 中国新星奖提名（全国范围内共 3 名）
- 2018 年度 ACM 中国 SIGSAC 分会新星奖（分会范围内共 2 名）
- 2017 年度中国科学院信息工程研究所"青年之星"

项目资助

- 中国科学院战略性先导科技专项课题,机密计算基础理论,课题负责人,2038.1 万元(2023.12–2028.11)
- 华为公司产学研合作项目，基于下一代异构计算的机密容器与设备直通技术研究，负责人，153.7 万元（2023.12 – 2025.12）
- 国家自然科学基金面上项目，基于虚拟机级可信执行环境的安全容器架构研究，负责人，54 万元（2023.1 – 2026.12）
- 国家自然科学基金重大研究计划重点支持项目，深度学习隐私保护计算新型体系框架与模型，课题负责人（项目下设 4 个课题），约 300 万元（2023.1 – 2026.12）
- CCF-华为胡杨林基金可信计算专项，面向虚拟机级可信执行环境的安全容器架构研究，负责人，30 万元（2022.9 – 2023.8）
- 蚂蚁产学研合作项目，可信执行环境技术融合统一架构，负责人，30 万元（2022.9 – 2023.8）
- 科技部重点研发计划，基于 mRNA 免疫的可信任网络寻址与路由控制技术，课题骨干，428 万元（2020.11 – 2024.10）
- 信息工程研究所攀登计划，后量子密码算法实现中的安全问题研究，负责人，30 万元（2021.1 – 2022.12）
- 国家自然科学基金青年基金项目，英特尔软件防护扩展抗侧信道泄漏安全性研究，负责人，30 万元（2019.1 – 2021.12）
- 信息工程研究所青年之星，负责人，10 万元（2018.1 – 2020.12）

部分学术报告

- "看懂可信执行环境硬件设计-浅析 TEE 的内存加密和完整性保护机制"，隐私计算联盟安全研讨会，2022 年 3 月，线上

- "从软件角度防范侧信道攻击"，2020 年国际测试委员会智能计算机与芯片联合大会，2020 年，线上

- "英特尔 SGX 侧信道安全研究"，南京航空航天大学线上报告，2020 年 3 月，线上

- "英特尔 SGX 侧信道安全研究"，BenchCouncil2019 国际芯片大会，2019 年 12 月，北京

- "基于硬件可信执行环境技术的隐私计算"，第四届中国数据安全与隐私保护大会，2019 年 10 月，广西桂林

- "可信执行环境技术前沿"，中国科学院大学科学前沿讲座，2019 年 10 月，北京

- "基于二级方向预测器的侧信道攻击"，2019 年，河南郑州

- "机密计算"，南开大学，2019 年 7 月，天津

- "可信执行环境中的侧信道风险"，中国图灵大会，2019 年 4 月，四川成都