

Nan Yan

Curriculum Vitae

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Education

- 2023–Now **M.Eng. in Cyber Science and Engineering**,
Wuhan University, (WHU), Wuhan, China,
Advisor: Prof. [Li Yuqing](#), GPA: 90.07/100
Research Interests: Trustworthy AI, Federated Learning
- 2019–2023 **B.Eng. in Cyber Science and Engineering**,
Shandong University, (SDU), Qingdao, China
GPA: 3.85/5 (88.51/100), Graduated with Outstanding Honor

Selected Projects

Federated Learning

- 2023–2024 **Efficient and Straggler-Resistant Homomorphic Encryption for Heterogeneous Federated Learning**
- A contribution-aware encrypted weighted aggregation and sketching-based client selection algorithm for optimizing FL training efficiency with CKKS-based HE.
 - Achieving a training speedup of 1.85–4.44×, cut the communication overhead by 1.24–22.62×, and reduce the straggler effect by up to 1.71–2.39×.
 - 4.5 kloc, [codebase](#) released and work accepted in the Proc. of [IEEE INFOCOM 2024](#).
- 2022–2023 **Federated Learning with Knowledge Distillation**
- A fundamental and versatile federated learning framework, rigorously tested across diverse datasets and models, designed to facilitate efficient framework construction for federated learning tasks.
 - Conducted a reproduction of federated learning incorporating knowledge distillation, alongside the implementation of [five baseline methods](#) for comprehensive comparison.

Open Source Software Release

- 2022–2024 **Pioneer: a low-cost Bluetooth-based virus tracking system**
- A cost-effective virus tracking system leveraging Bluetooth technology, secured with the national cryptographic algorithm SM3 for encryption and certification.
 - Designed and implemented a comprehensive system encompassing backend database server development, Android application development, and iOS application development.
 - 19.6 kloc, [codebase](#) released and work earned 152 stars, 91 forks.

Academic Experience

Conference and Journal Publications

- 2025 **Nan Yan**, Yuqing Li, Xiong Wang, Jing Chen, Kun He, Bo Li, “[EmbedX: Embedding-Based Cross-Trigger Backdoor Attack Against Large Language Models](#),” in *Proc. USENIX Security 2025*.
- 2025 Yuqing Li, **Nan Yan**, Jing Chen, Xiong Wang, Jianan Hong, Kun He, Wei Wang, Bo Li, “[FedPHE: A Secure and Efficient Federated Learning via Packed Homomorphic Encryption](#),” in *IEEE TDSC (The first author is the advisor)*.
- 2024 **Nan Yan**, Yuqing Li, Jing Chen, Xiong Wang, Jianan Hong, Kun He, Wei Wang, “[Efficient and straggler-resistant homomorphic encryption for heterogeneous federated learning](#),” in *Proc. IEEE INFOCOM, 2024 (acceptance rate: 19.6%)*.

Manuscripts

- 2025 **Nan Yan**, Yuqing Li, Jing Chen, Xiong Wang, Wei Wang, Shuhua Li, “[Towards Improved Differentially Private Federated Fine-tuning of Language Models on Heterogeneous Clients](#),” *Under Review*.
- 2025 Haoran Wang, Xiong Wang, Yuqing Li, Jing Chen, Junyi Zhang, **Nan Yan**, Kun He, “[Improved Federated LoRA via Error-Free Aggregation and Matrix-Wise Freezing](#),” *Under Review*.
- 2025 Haoran Wang, Xiong Wang, Yuqing Li, Jing Chen, Yuntao Nie, **Nan Yan**, Meng Jin, Bo Li, Can Mao, “[FedP2P: Towards Accelerated Federated Learning with Peer-to-Peer Communication](#),” *Under Review*.

Scholarships and Honors

- 2024 National Scholarship (Top 0.2% nationwide), Ministry of Education, China
- 2024 Merit Student, WHU
- 2024 First Class Scholarship (Award Rate: 5% school-wide), WHU
- 2023 Outstanding Graduate Award, SDU
- 2023 Alumni Council Representative (Dept. CSE, 6/101), SDU
- 2023 The Power of Role Models Academy Person of the Year (Dept. CSE, Top 1), SDU
- 2022 Excellent Student Cadre, SDU
- 2020, 2022 Second Class Scholarship (Award Rate: 10% school-wide), SDU
- 2020, 2022×3 Merit-Based Scholarship, SDU

Competition Awards

- 2022 Second Prize of The 7-th National College Cryptography Mathematics Contest, Chinese Association for Cryptologic Research, China
- 2022 Second Prize of The 15-th National College Student Information Security Competition, Cyber Security Association, China
- 2022 First Prize of The 7-th National College Cryptography Mathematics Contest, Chinese Association for Cryptologic Research, North China Division
- 2021 First Prize of China Undergraduate Mathematical Contest in Modeling, Shandong Province

Patents and Software Copyrights

- Feb 2025 “Large language model training method and system based on elastic federated low-rank adaptive fine-tuning”, China Patent Application CN119443311A, PatentPending
- Jan 2025 “Method for constructing a vertical federated learning system based on participant selection and parameter freezing”, China Patent Application CN202411465068.7, PatentPending
- Dec 2024 “Differential privacy-based heterogeneous federal fine tuning language model construction method and system”, China Patent Application CN119150357A, PatentPending
- Oct 2024 “Cross-silo heterogeneous federated learning system based on homomorphic encryption V1.0”, China Software Copyrights 2024SR1516588
- Apr 2024 “Method and device for constructing cross-silo heterogeneous federated learning system based on homomorphic encryption”, China Patent Application CN117892322A, PatentPending
- Mar 2024 “Network traffic obfuscation method, device, equipment and medium”, China Patent Application CN117749402A, PatentPending