

Nan Yan | CS Ph.D. Applicant

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Education

Wuhan University

GPA: 90.07/100, National Scholarship (Top 0.2%), Advisor: Prof. [Li Yuqing](#)

School of CSE

M.Eng. 2023–Now

Shandong University

GPA: 88.51/100, Graduated with Outstanding Honor

School of CST

B.Eng. 2019–2023

Research Interests

Trustworthy AI (LLMs and Agent Security), Privacy-Preserving Machine Learning (FL, HE, DP)

Selected Projects

LLM and Agent Security

TurboMINJA: Bidirectional Set Evolution for Agent Memory Injection Attack 2025–Now

- Built a bidirectional evolutionary attack that injects cooperative benign queries into LLM-agent memory, optimizing retrievability and reasoning bias to achieve highly stealthy and effective agent manipulation. (*Ongoing Project*)
- Rice University, working with Prof. [Jiarong Xing](#).

EmbedX: Efficient and Stealthy Cross-Trigger Backdoor Attack on LLMs 2024–2025

- Designed an embedding-level soft-trigger mechanism with latent frequency–gradient constraints, enabling multi-trigger activation with high stealthiness and robustness against fine-tuning.
- Delivered 100% ASR while reducing trigger-switching overhead from 4000s to 0.5s and lowering false-trigger rate to 1%, outperforming SOTA backdoor baselines on 5 datasets & 4 LLMs.
- 4.6 kloc in [codebase](#), and accepted in the Proc. of [USENIX Security 2025](#).

Federated Learning

FedPHE: Efficient Homomorphic Encryption for Heterogeneous Federated Learning 2023–2024

- Proposed a contribution-aware encrypted weighted aggregation and sketching-based client selection algorithm for optimizing FL training efficiency with CKKS-based HE.
- Achieved 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×, outperforming 6 baselines on 4 datasets.
- 4.5 kloc in [codebase](#), work earned 37 stars and accepted in the Proc. of [IEEE INFOCOM 2024](#).

Federated Learning with Knowledge Distillation 2022–2023

- Designed a fundamental and versatile federated learning framework, rigorously tested across diverse datasets and models, facilitating 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 and earned 26 stars.

Open Source Software

Pioneer: a low-cost Bluetooth-based virus tracking system 2022–2024

- Built a cost-effective virus tracking system leveraging Bluetooth technology, secured with the national cryptographic algorithm SM3 for encryption and certification. 19.6 kloc, [codebase](#) released and work earned 153 stars, 86 forks.

Academic Experience

Conference and Journal Publications

EmbedX: Embedding-Based Cross-Trigger Backdoor Attack Against Large Language Models

USENIX Security Symposium (acceptance rate: 17.1%) 2025

Nan Yan, Yuqing Li, Xiong Wang, Jing Chen, Kun He, Bo Li

FedPHE: A Secure and Efficient Federated Learning via Packed Homomorphic Encryption

IEEE Transactions on Dependable and Secure Computing (TDSC) 2025

Yuqing Li (*advisor*), Nan Yan, Jing Chen, Xiong Wang, Jianan Hong, Kun He, Wei Wang, Bo Li

Efficient and straggler-resistant homomorphic encryption for heterogeneous federated learning

IEEE International Conference on Computer Communications (INFOCOM, acceptance rate: 19.6%) 2024

Nan Yan, Yuqing Li, Jing Chen, Xiong Wang, Jianan Hong, Kun He, Wei Wang

Manuscripts (Under Review)

Towards Improved Differentially Private Federated Fine-tuning of Language Models on Heterogeneous Clients

Nan Yan, Yuqing Li, Jing Chen, Xiong Wang, Wei Wang, Shuhua Li 2025

CoMoMark: Cross-Modal Collaborative Backdoor Watermarking for Vision-Language Models

Huiyi Tang, Yuqing Li, Yushi Yang, Xiong Wang, Haoran Wang, Nan Yan, Ruiying Du 2025

Federated LoRA via Error-Free Aggregation and Matrix-Wise Freezing

Haoran Wang, Xiong Wang, Yuqing Li, Jing Chen, Junyi Zhang, Nan Yan, Kun He 2025

FedP2P: Towards Accelerated Federated Learning with Peer-to-Peer Communication

Haoran Wang, Xiong Wang, Yuqing Li, Jing Chen, Yuntao Nie, Nan Yan, Meng Jin, Bo Li 2025

Awards

Research Fundings

Travel Support: USENIX Security'25 Student Grant 2025

Cyberspace Security Innovation Grant: TOPSEC'23 & Huawei'25 2023, 2025

Scholarship

National Scholarship (Top 0.2%): Ministry of Education, China 2024, 2025

BYD Scholarship (Top 3): Dept. CSE, Wuhan University 2025

First Class Scholarship (Top 5%): Wuhan University 2024, 2025

Second Class Scholarship (Top 10%): Shandong University 2020, 2022

Merit-Based Scholarship: Shandong University 2020, 2022×4

Honors

Metrit Student (Ranking: Top 1%): Wuhan University 2024, 2025

Excellent Student Cadre: Shandong University'22 & Wuhan University'25 2022, 2025

Outstanding Graduate Award (Top 15%): Shandong University 2023

Alumni Council Representative (Top 6/101): Dept. CST, Shandong University 2023

The Power of Role Models (Top 1): Dept. CST, Shandong University 2023

Competitions

Second Prize: National Open Source Award Program, China 2025

Second Prize: National College Cryptography Mathematics Contest, China 2022

Second Prize: National College Student Information Security Competition, China 2022

First Prize: National College Cryptography Mathematics Contest, North China Division 2022

First Prize: China Undergraduate Mathematical Contest in Modeling, Shandong Province 2021

Patents and Software Copyrights

Differential privacy-based heterogeneous federal fine tuning language model method and system

China Patent Application ZL 2024 1 1379992.3, PatentGrant Sep 2025

Cross-silo heterogeneous federated learning system based on homomorphic encryption V1.0

Software Copyrights License 2024SR1516588 Oct 2024

Technical Skills

Languages: Mandarin Chinese(native) and English (proficiency, IELTS: 7.0)

Programming Languages: Python, C++, Java, SQL, LaTeX