Nuocheng Yang

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Profile

Ph.D. candidate in Information and Communication Engineering at BUPT, focusing on **communication large models, network agents, and cloud–edge–device collaborative intelligence**. Long-term research on distributed LLM fine-tuning, federated learning, digital twins, semantic communication, and wireless resource optimization under communication constraints, with multiple first-author papers in IEEE TMC, TIFS, TNSE, ICC, and GLOBECOM. Experienced in communication-network modeling, GNN/RL optimization, PyTorch large-model training/inference, and LoRA/PEFT fine-tuning, with a focus on applying large models to **network self-management, fault detection, network optimization, and intelligent orchestration**.

Core Directions

- **Communication LLMs & distributed fine-tuning:** LoRA/PEFT, federated learning, dynamic device learning–unlearning correction, privacy-preserving collaborative training.
- **Network agents & cloud–network autonomy:** multi-agent-driven fault detection, root-cause analysis, configuration generation, resource orchestration, and network optimization.
- **Cloud–edge–device intelligence:** lightweight multimodal VLMs, long-context efficient inference, on-device deployment, joint communication/compute resource optimization.
- **Digital twins & semantic communication:** proactive state synchronization, query-driven communication compression, closed-loop AI-native wireless network optimization.

Education

Beijing University of Posts and Telecommunications (BUPT) — Ph.D., Information and Communication Engineering 2023 – Exp. 2027

Advisor: Prof. Changchuan Yin (Beijing Key Lab of Wireless Communication Systems and Networks). GPA 3.6/4.0, rank 15/144.

Singapore University of Technology and Design (SUTD) — Visiting Ph.D. (Joint Training) 2026 – 2027

With Prof. Tony Q. S. Quek, funded by the China Scholarship Council (CSC).

BUPT — M.Eng., Information and Communication Engineering 2021 – 2023

BUPT — B.Eng., Information and Communication Engineering 2017 – 2021

Project Experience

Core-Network Fault Detection & Self-Healing — BUPT–China Telecom Joint Project 2026 – 2027

Built a multi-agent- and LLM-based "detection–root-cause localization–auto-optimization" pipeline for core networks; responsible for algorithm engineering design and validation, exploring LLM agents for network O&M automation.

AI + 5G Private-Network Intelligent Solution Platform — BUPT–China Mobile Joint Project 2024 – 2025

LLM-based methods for 5G private-network requirement understanding, solution design, and configuration-assisted decisions, enabling automated private-network planning.

6G Cloud-Native Architecture & Key Technologies — National Key R&D Program of China 2024 – 2027

Computing-power measurement in heterogeneous compute-networks; large-model-enabled cloud–edge–device resource orchestration and compute-network scheduling.

Lightweight Multimodal VLMs for Fast Long-Context Inference on Mobile — Beijing NSF 2026 – 2028

Lightweight multimodal VLMs with efficient long-context inference, model compression, and on-device deployment.

Digital-Twin-Enabled Future Cellular Networks — National Natural Science Foundation of China 2025 – 2028

Digital-twin state modeling, proactive synchronization, and optimization for wireless networks; channel knowledge maps and twin synchronization.

Intelligent Transmission for Broadband Interactive Services on 6G Terminals — Beijing NSF 2023 – 2025

Semantic-communication-based adaptive transmission and green/lightweight on-device algorithms.

Selected First-Author Publications

[1] **N. Yang**, S. Wang, O. Huan, M. Chen, T. Q. S. Quek, C. Yin, "Wireless Federated Multi-Task LLM Fine-Tuning via Sparse-and-Orthogonal LoRA," *IEEE Trans. Mobile Computing*, major revision, 2026. arXiv:2602.20492.

[2] **N. Yang**, S. Wang, O. Huan, M. Chen, C. Yin, "Collaborative LLM Fine-Tuning over Mobile Networks via Sparse-and-Orthogonal LoRA," *IEEE ICC*, 2026.

[3] **N. Yang**, Y. He, S. Wang, M. Chen, Z. Chen, T. Q. S. Quek, C. Yin, "Priority-Aware Learning-Unlearning Correction for Dynamic Decentralized LoRA Fine-Tuning," *IEEE Trans. Network Science and Engineering*, under review, 2026. arXiv:2606.22878.

[4] **N. Yang**, L. Zhou, S. Wang, C. Yin, T. Q. S. Quek, "A Query-Driven Communication-Efficient Digital Twins Design for Autonomous Driving," *IEEE Trans. Mobile Computing*, under review, 2026. arXiv:2606.28384.

[5] **N. Yang**, S. Wang, Z. Yang, M. Chen, C. Yin, K. Huang, "A Secure and Private Distributed Bayesian Federated Learning Design," *IEEE Trans. Information Forensics and Security*, major revision, 2026. arXiv:2602.20003.

[6] **N. Yang**, S. Wang, M. Chen, C. Yin, C. G. Brinton, "Graph Neural Networks for the Optimization of Collaborative Federated Learning Energy Efficiency," *IEEE Trans. Mobile Computing*, vol. 24(11), pp. 12049–12060, 2025.

[7] **N. Yang**, S. Wang, M. Chen, C. Yin, C. G. Brinton, "A Privacy Preserving and Byzantine Robust Collaborative Federated Learning Method Design," *IEEE ICC*, 2024.

[8] **N. Yang**, S. Wang, M. Chen, C. Shen, C. Yin, C. G. Brinton, "MIMO Beamforming and Signal Modulation Design for Federated Learning Optimization," *IEEE GLOBECOM*, 2023.

[9] **N. Yang**, S. Wang, M. Chen, C. G. Brinton, C. Yin, "Energy Efficient Collaborative Federated Learning Design: A Graph Neural Network Based Approach," *IEEE GLOBECOM*, 2023.

[10] **N. Yang**, S. Wang, M. Chen, C. G. Brinton, C. Yin, W. Saad, S. Cui, "Model-Based Reinforcement Learning for Quantized Federated Learning Performance Optimization," *IEEE GLOBECOM*, 2022.

Patents

- **First inventor**, China Invention Patent **CN117291226B**: A Graph-Neural-Network-Based Collaborative Federated Learning Optimization Method and Related Equipment.
- **First inventor**, China Invention Patent (under examination): A Query-Driven Active State Synchronization and Cross-Slot Query Scheduling Method for Autonomous-Driving Digital Twins.

Honors & Awards

IEEE Wireless Communications Letters Exemplary Reviewer (two consecutive years) 2024, 2025
"Digital Intelligence Pioneer" Award, Digital China Innovation Competition (AI Track) 2025
First-Class Academic Scholarship, BUPT (multiple times) 2019 – 2025
Huawei DIGIX Campus AI Innovation Competition Special Award 2019
China Undergraduate Mathematical Contest in Modeling — Beijing First Prize, National Second Prize 2019

Technical Skills & Academic Service

- **LLM training & inference:** HuggingFace Transformers, PEFT/LoRA, DeepSpeed, Megatron, vLLM, efficient-attention mechanisms.
- **Programming & systems:** Python, PyTorch, MATLAB, NumPy, CVXPY, LaTeX; Linux, Git, Docker, Kubernetes, SLURM, basic CUDA environment setup.
- **Communication & optimization:** wireless resource allocation, federated learning, GNN/RL, digital twins, semantic communication, cloud–edge–device optimization.
- **Academic service:** Track Chair, IEEE VTC2025-Fall; TPC member, IEEE ICC 2026 & DySPAN 2026; reviewer for IEEE TCOM/TGCN/WCL/CL, ICC/GLOBECOM; mentored 5 junior students (each to a co-authored publication).
- **Talks:** IEEE GLOBECOM 2023, IEEE ICC 2024, IEEE ICC 2026.