Jianan Chen

chen3873@purdue.edu | +1 317 777 0889 | DrJonaC | Google Scholar | Jianan Chen | Personal Website

EDUCATION

Purdue University, Department of Computer Science — Sep 2020 – Dec 2025 (Expected)
Ph.D. (Candidate) of Computer Science (**Supervisor: Dr. Qin Hu, Dr. Snehasis Mukhopadhyay**)
Research area: Federated learning, Game theory, Privacy protection

Beijing Normal University, College of Information Science and Technology — Sep 2015 – Jun 2019
Bachelor of Science in Computer Science and Technology (**GPA: 3.88/4.00, Rank: 6/55**)

SELECTED HONORS

Recipient of University Fellowship — Apr 2022
First Prize in Beijing Undergraduate Mathematical Contest in Modeling — Sep 2017
Outstanding Individual in Work-study — Sep 2017

SELECTED PROJECTS

Utility-Enhanced Personalized Privacy Preservation in Applied Federated Learning — *Published in IEEE TMC, 2025*

- Designed the *Group Local Differential Privacy (GLDP)* framework with the *Sampling-Randomizing-Shuffling (SRS)* mechanism to personalize privacy settings at the edge level in Hierarchical Federated Learning (HFL).
- Benchmarked accuracy under privacy constraints, achieving 2–12% higher accuracy than existing baselines.
- Theoretical proofs guarantee GLDP and convergence; experiments demonstrate improvement in accuracy vs. SOTA.

Upcycling Noise for Privacy Protection in Distributed Machine Learning — *Proceeding in IEEE TMC, 2025*

- Proposed the *Federated Unlearning with Indistinguishability (FUI)* framework to guarantee the removal of clients' data contributions while preserving model utility.
- Designed experimental protocols for model performance, loss, efficiency, and unlearning success (MIA precision/recall). Delivered comparative evaluations and presentations vs. SOTA, and validated tradeoffs under varying privacy budgets.

Maximizing Social Welfare in Practical Machine Learning Scenarios — *Published in IEEE TVT, 2024*

- Modeled organizational collaboration in cross-silo FL as a public goods game, and proposed *Multi-player Multi-action Zero-Determinant (MMZD)* and alliances version *MMZDA* strategies to maximize collective utility.
- Trained centralized and federated models over real-world datasets, comparing convergence speed and utility under different strategic profiles. Designed and conducted simulation experiments on combinations of strategies, revealing that MMZDA strategies boost system-wide welfare up to 30% under selfish client behavior.

Lung Cancer Risk Stratification via Hybrid-CNN and CT Feature Decoupling — *IU Health Collaboration Project, 2021*

- Developed a computer vision pipeline for lung cancer risk stratification using CT scans, aiming to predict both short-term and long-term malignancy risks through ML-based modeling and imaging feature enhancement.
- Enhanced a Hybrid-CNN architecture via risk-decoupled feature learning.
- Achieved AUC and C-index improvement, validated on 1,200+ CT scans from LIDC-IDRI and NLST datasets.

PROFESSIONAL EXPERIENCE

Research Assistant, Purdue University — Jan 2021 – Present, IN, USA

- Primarily assisted supervisor with all stages of research, including setting up environment, defining problem statements, identifying gaps in literature, structuring papers, providing insights on writing and publication.

Lecturer, AIS 20000 - Introduction to Data Science — Aug 2024 – Dec 2024, IN, USA

- Redesigned the entire course, incorporating the latest developments in DS, ML, data visualization and big data technologies to ensure up-to-date and engaging content.
- **Innovatively integrated magic tricks and variety show elements** into lectures to enhance student engagement and make complex concepts more accessible. Received **positive student feedback** for delivering an engaging and unconventional teaching approach, fostering curiosity and deeper understanding of data science principles.

Data Operation Assistant, Beijing Didi Infinity Tech & Dev Co., Ltd — Mar 2018 – Jun 2018, Beijing, China

- Designed experimental strategies to evaluate the impact of coupon on user growth, engagement, and retention.
- Developed coupon allocation strategies based on user segmentation, enhancing user experience while driving revenue growth.

SELECTED PUBLICATIONS

- Chen, Jianan, Honglu Jiang, and Qin Hu. **"Utility-Enhanced Personalized Privacy Preservation in Hierarchical Federated Learning."** *IEEE Transactions on Mobile Computing,* 2025. **(JCR Q1, IF: 7.7, H-Index: 157)**
- Chen, Jianan, Qin Hu, Fangtian Zhong, Yan Zhuang, and Minghui Xu. **"Upcycling Noise for Federated Unlearning."** *IEEE Transactions on Mobile Computing,* 2025. *(Proceeding)* **(JCR Q1, IF: 7.7, H-Index: 157)**
- Chen, Jianan, Qin Hu, and Honglu Jiang. **"Alliance Makes Difference? Maximizing Social Welfare in Cross-Silo Federated Learning."** *IEEE Transactions on Vehicular Technology* (2023). **(JCR Q1, IF: 6.7, H-Index: 222)**
- Chen, Jianan, Qin Hu, and Honglu Jiang. **"Social welfare maximization in cross-silo federated learning."** *ICASSP 2022-2022 IEEE International Conference on Acoustics, Speech and Signal Processing*. IEEE, 2022.
- Chakrabarti, Subir K., Jianan Chen, and Qin Hu. **"Stationary Markov Equilibrium Strategies in Asynchronous Stochastic Games: Existence and Computation."** Algorithms 17.11 (2024): 490.
- Chen, Jianan, Qin Hu, and Honglu Jiang. **"Strategic signaling for utility control in audit games."** Computers & Security 118 (2022): 102721.
- Peng, Cheng, Qin Hu, Jianan Chen, Kyubyung Kang, Feng Li, Xukai Zou. **"Energy-efficient device selection in federated edge learning."** 2021 International Conference on Computer Communications and Networks (ICCCN). IEEE, 2021.

SERVICES

- Reviewer of journals: IEEE Transactions on Mobile Computing (IEEE TMC), IEEE Transactions on Vehicular Technology (IEEE TVT), Journal of Network and Computer Applications (JNCA), Journal of Systems Architecture (JSA), High-Confidence Computing (HCC)
- Reviewer of conferences: INFOCOM (2023,2024), GLOBALCOM (2022,2023), BIBM (2024)