Xiaohu **Wu**

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Current Position

Beijing University of Posts and Telecommunications — *Beijing, China*

Associate Professor & PhD Supervisor at the School of Cyberspace Security & National Engineering Research Center of Mobile Network Technologies — *June 2022 - Present*

Research Summary

- Machine learning:
  - Collaboration and competition in federated learning: game and economic theories [J7,C3,C4,C6,S1]
  - Personalization in federated learning under data heterogeneity [C1,C5,C7,S3-S5]
  - Vision language models for healthcare [C2,S2,S6]
  - Neural networks design (e.g., GNNs, Diffusion models) [J2,J6,S7]; Evolutionary computation for multi-task learning [C3]
  - Reinforcement learning for decision-making and optimization to realize edge-cloud collaboration and edge intelligence [J1,J8,C9,C10,C12]
- Scheduling & optimization in AI infrastructure & parallel computing: approximation algorithms [J3,J4,C14]
- Network economics, e.g., cloud computing service design & pricing [J5,J9]:
  - Queueing theory [J10], algorithmic game theory/auctions [C8], service differentiation, analytical modeling

Notes: Bi, Ji, Ci, Pi, and Si denote the ith book chapter, journal paper, conference paper, patent, and submitted/working paper in the sections below, respectively.

Education

Telecom Paris, a School of Institut Polytechnique de Paris (IP-Paris) — *Paris, France*

PhD Degree in Computer Science, supported by a French scholarship, supervised by Prof. Patrick Loiseau — *Feb. 2016*

- IP-Paris is ranked 41th globally by QS 2026: `https://www.ip-paris.fr/en/about/facts-and-figures/rankings`

University of California at Berkeley — *Berkeley, U.S.A*

Visiting Student at the EECS Department, supervised by Prof. Jean Walrand — *Jun. 2015 - Sept. 2015*

- Supported by the France-Berkeley Fund: "Multi-armed bandit games and applications".

University of Science and Technology of China — *Hefei, China*

Master's Degree in Computer Science, supervised by Prof. Yinlong Xu — *Jun. 2012*

- Affiliated lab: National High Performance Computing Center at Hefei

Singapore University of Technology and Design — *Singapore*

Visiting Student at SUTD-MIT International Design Center, supervised by Prof. Chau Yuen — *Oct. 2011 - Sept. 2012*

- Financially supported by SUTD.

Northeast Forest University — *Harbin, China*

Bachelor's Degree in Mathematics and Applied Mathematics — *July 2009*

- A national key university affiliated with the Ministry of Education of China

Experiences

Nanyang Technological University (NTU) — *Singapore*

Research Fellow at the School of Computer Science and Engineering, supervised by Prof. Han Yu — *May 2019 - April 2022*

- NTU is ranked 12th globally by QS 2026: `https://www.ntu.edu.sg/about-us/facts-figures/university-rankings`

Bruno Kessler Foundation (FBK) — *Trento, Italy*

Expert Researcher (≈ Assistant Professor in a university), in collaboration with Prof. Francesco De Pellegrini — *May 2017 - April 2019*

- FBK is a top research institute in Italy: `https://www.fbk.eu/en/about-fbk/`

Aalto University (formerly Helsinki University of Technology) *Espoo, Finland*
PostDoc at the Department of Communication and Networking, supervised by Prof. Esa Hyttia *June 2016 - May 2017*

Refereed Journal Papers

[J1] Xiaohu Wu, Han Yu, Giuliano Casale, and Guanyu Gao. "Towards Designing Cost-Optimal Policies for DAGs to Utilize IaaS Clouds with Online Learning." IEEE Transactions on Services Computing, pages 1-15, 2025. DOI: 10.1109/TSC.2025.3536305 (**CCF A**; CORE A*)

[J2] T. He, Y. Liu, Y. S. Ong, X. Wu, X. Luo. "Polarized Message-Passing in Graph Neural Networks." Artificial Intelligence Journal, Volume 331, 2024. (**CCF A**; CORE A*)

[J3] X. Wu, P. Loiseau. "Algorithms for Scheduling Deadline-Sensitive Malleable Tasks." SN Operations Research Forum 5, 30 (2024), Springer-Nature, pages 1-38.

- ◇ An extension of the conference paper [14]; compared with [C14], a later paper from IEEE TPDS (CCF A) in 2017 uses another algorithm analysis technique to prove our core theory and provide an improved algorithm, as well as two similar algorithmic results to ours.

[J4] X. Wu, P. Loiseau. "Efficient Approximation Algorithms for Scheduling Moldable Tasks." European Journal of Operational Research, Vol. 310, Issue 1, 2023, Pages 71-83. （ABDC A*; CABC 4; 三个国家一级学会联合认定的最高等级期刊（`http://www.fms-journal.net/`））

- ◇ According to benchmark studies, we propose a new speedup model to study moldable tasks and give an improved approximation algorithm for a long-standing open problem for 32 years.

[J5] X. Wu, F. De Pellegrini, G. Casale. "Delay and Price Differentiation in Cloud Computing: A Service Model, Supporting Architectures, and Performance." ACM Transactions on Modeling and Performance Evaluation of Computing Systems (TOMPECS) 8, 3, Article 6 (September 2023), 40 pages. (IF 1.6) (A major journal of ACM on mathematical modeling and performance analysis, accepting about 20 papers annually)

- ◇ TOMPECS is a major journal of ACM on mathematical modeling and performance analysis, accepting about 20 papers annually: `https://www.sigmetrics.org/`.

[J6] J. Gao, Q. Lao, P. Liu, H. Yi, Q. Kang, Z. Jiang, X. Wu, K. Li, Y. Chen, L. Zhang. "Anatomically Guided Cross-Domain Repair and Screening for Ultrasound Fetal Biometry." IEEE Journal of Biomedical and Health Informatics, vol. 27, no. 10, pp. 4914-4925, Oct. 2023. (**CCF C**; CORE A*; **中科院一区 TOP 期刊**)

[J7] X. Wu, Han Yu. "MarS-FL: Enabling Competitors to Collaborate in Federated Learning," IEEE Transactions on Big Data, vol. 10, no. 6, pp. 801-811, Dec. 2024. (CCF C; IF 7.5)

[J8] X. Wu, P. Loiseau, E. Hyytiä. "Towards Designing Cost-Optimal Policies to Utilize IaaS Clouds with Online Learning." IEEE Transactions on Parallel and Distributed Systems, vol. 31, no. 3, pp. 501-514, March 2020. (**CCF A**; CORE A*)

- ◇ Improved a U.S. patent of Microsoft.

[J9] X. Wu, F. De Pellegrini, G. Gao, G. Casale. "A Framework for Allocating Server Time between On-demand and Spot Services in Cloud Computing." ACM Transactions on Modeling and Performance Evaluation of Computing Systems, 4, 4, Article 20 (December 2019), 31 pages. (IF 1.6)

- ◇ Proposed a theoretical framework to operate and price the differentiated services of Amazon EC2. Inspired researchers from UBC and Huawei Tronto to prototype a system, published at ACM SoCC 2022.

[J10] E. Hyytiä, R. Righter, O. Bilenne, X. Wu. "Dispatching Fixed-Sized Jobs with Multiple Deadlines to Parallel Heterogeneous Servers." Performance Evaluation, 114 (2017): 32-44, Elsevier. (**CCF B**; CORE B; IF: 0.8)

[J11] X. Wu, Y. Xu, C. Yuen, L. Xiang. "A Tag Encoding Scheme against Pollution Attack to Linear Network Coding." IEEE Transactions on Parallel and Distributed Systems, 25, no. 1 (2014): 33-42. (**CCF A**; CORE A*)

Notes: *CABC* is a well-known journal ranking system of United Kingdom for business schools. *ABDC* is a popular journal ranking system used by the Australian university business schools. *CORE* is a popular journal and conference ranking system in the computing disciplines that is made by Australia where a leading venue in a discipline area is ranked as A* and a good to very good venue is ranked as B.

Refereed Conference Papers

Notes: # indicates students under my supervision, † indicates corresponding authors

[C1] Qiqi Liu, Jiaqiang Li, Yuchen Liu, Yaochu Jin, Lingjuan Lyu, Xiaohu Wu, Han Yu. "Personalized Federated Learning under Local Supervision." The 2025 International Conference on Computer Vision (ICCV-2025). (**CCF A**; CORE A*)

[C2] Huahui Yi, Wei Xu, Ziyuan Qin, Xi Chen, Xiaohu Wu, Kang Li, Qicheng Lao. "iDPA: Instance Decoupled Prompt Attention for Continual Medical Object Detection." The 42nd International Conference on Machine Learning (ICML-2025). (**CCF A**; CORE A*)

- ◇ Code is available at `https://github.com/HarveyYi/iDPA.git`

[C3] Mengmeng Chen[#], Xiaohu Wu[†], Qiqi Liu, Tiantian He, Yew-Soon Ong, Yaochu Jin, Qicheng Lao, Han Yu. "Voronoi-grid-based Pareto Front Learning and Its Application to Collaborative Federated Learning." The 42nd International Conference on Machine Learning (ICML-2025). (**CCF A**; CORE A*)

- ◇ Code is available at `https://github.com/buptcmm/phnhvvs`

[C4] Mengmeng Chen[#], Xiaohu Wu, X. Tang, T. He, Y. S. Ong, Q. Liu, Q. Lao, Han Yu. "Free-Rider and Conflict Aware Collaboration Formation for Cross-Silo Federated Learning." The 38th International Conference on Neural Information Processing Syste (NeurIPS-2024). (**CCF A**; CORE A*)

[C5] Z. Li[#], Xiaohu Wu[†], X. Tang, T. He, Y. S. Ong, M. Chen[#], Q. Liu, Q. Lao, X. Li, Han Yu. "Benchmarking Data Heterogeneity Evaluation Approaches for Personalized Federated Learning." International Workshop on Federated Foundation Models in Conjunction with NeurIPS 2024 (FL@FM-NeurIPS'24).

- ◇ Selected to be included in a book [B2].
- ◇ Code is available at `https://github.com/Xiaoni-61/DH-Benchmark`

[C6] S. Tan[*#], H. Cheng[*], Xiaohu Wu[*†], Han Yu[*], T. He, Y. S. Ong, C. Wang, X. Tao. "FedCompetitors: Harmonious Collaboration in Federated Learning with Competing Participants." The 38th AAAI Conference on Artificial Intelligence (AAAI-24), pages 1-9. (**CCF A**; CORE A*; Acceptance Rate: 23.75%)

[C7] Xianjie Guo, Liping Yi, Xiaohu Wu, Kui Yu, Gang Wang. "Enhancing Causal Discovery in Federated Settings with Limited Local Samples." International Workshop on Federated Foundation Models in Conjunction with NeurIPS 2024 (FL@FM-NeurIPS'24). **Outstanding Student Paper Award**

- ◇ Selected to be included in a book [B1].

[C8] H. Cheng, S. Kong, Y. Deng, C. Liu, X. Wu, B. An, C. Wang. "Exploring Leximin Principle for Fair Core-Selecting Combinatorial Auctions: Payment Rule Design and Implementation." The 32nd International Joint Conference on Artificial Intelligence (IJCAI-2023), pages 1-8, 2023. (**CCF A**; CORE A*; Acceptance Rate: 15%)

[C9] K. Li, Guanyu Gao, Zhe Wang, Xiaohu Wu. "Edge-Assisted Joint Rate Adaptation and Quality Enhancement for 360-Degree Video Streaming." The 25th IEEE International Workshop on MultiMedia Signal Processing (MMSP-2023), pages 1-6. (CORE: B)

[C10] X. Wang, Guanyu Gao,X. Wu, Yan Lyu, Weiwei Wu. "Dynamic DNN model selection and inference off loading for video analytics with edge-cloud collaboration," The 32nd Workshop on Network and Operating Systems Support for Digital Audio and Video (ACM NOSSDAV-2022), pages 64-70, 2022. (**CCF B**; CORE B; Acceptance Rate: 31.6%)

[C11] X. Wu, Y. Liu, X. Tang, W. Cai, F. Bai, G. Khonstantine. "Multi-Agent Pickup and Delivery with Task Deadlines." The 2021 IEEE/WIC/ACM International Joint Conference on Web Intelligence and Intelligent Agent Technology (WI-IAT-2021), pp. 1-8 (long paper), ACM, 2021. (CORE B; Acceptance Rate: 27.6%; In the Top 10% AI conferences list approved by the National Research Foundation, Singapore)

- ◇ Recognized and cited in works directed by leading researchers (e.g., Prof. Sven Koenig, USC) and institutions (e.g., Amazon Robotics) in the field.

[C12] X. Wu, P. Loiseau, E. Hyytiä. "Towards Designing Cost-Optimal Policies to Utilize IaaS Clouds with Online Learning." The 2017 IEEE International Conference on Cloud and Autonomic Computing, pp. 160-171, Tucson, Arizona, USA, 2017. (Acceptance Rate: 33%)

- ◇ The conference version of [J7].

[C13] E. Hyytiä, R. Righter, O. Bilenne, X. Wu. "Dispatching Fixed-Sized Jobs with Multiple Deadlines to Parallel Heterogeneous Servers." The 10th EAI International Conference on Performance Evaluation Methodologies and Tools, Taormina, Italy, 2017.

- ◇ The conference version of [J9].

[C14] X. Wu, P. Loiseau. "Algorithms for Scheduling Deadline-Sensitive Malleable Tasks." The 53rd IEEE Annual Allerton Conference on Communication, Control, and Computing, pp. 530-537, Urbana-Champaign, Illinois, IL, USA, 2015. (Attendees mainly from top universities, e.g., in the year 2017, 307 papers are accepted: Berkeley: 10, MIT: 6, Stanford: 6, Harvard: 4; `https://allerton.csl.illinois.edu/`)

[C15] X. Wu, Y. Xu, L. Xiang, W. Xu. "A Hybrid Scheme against Pollution Attack to Network Coding." The 2011 IEEE International Symposium on Network Coding. Beijing, China, 2011.

[C16] W. Xu, Y. Xu, X. Wu, K. Ou. Modeling TCP Sack Steady State Performance in Lossy Networks. The 2011 International Conference on Information Networking. IEEE, 2011.

[C17] W. Xu, Y. Xu, X. Wu. "Modeling TCP Performance in Reordering and Lossy Networks." The 6th International ICST Conference on Communications and Networking in China. IEEE, 2011.

Book Chapters

[B1] X. Guo, L. Yi, X. Wu, K. Yu, G. Wang. "Enhancing Causal Discovery in Federated Settings with Limited Local Samples," in Federated Learning in the Age of Foundation Models, Han Yu, Xiaoxiao Li, Zenglin Xu, Randy Goebel & Irwin King Eds., Lecture Notes in Computer Science, vol 15501, 2025, Springer, Cham.

[B2] Z. Li[#], X. Wu, X. Tang, T. He, Y. S. Ong, M. Chen[#], Q. Liu, Q. Lao, X. Li, H. Yu. "Benchmarking Data Heterogeneity Evaluation Approaches for Personalized Federated Learning," in Federated Learning in the Age of Foundation Models, Han Yu, Xiaoxiao Li, Zenglin Xu, Randy Goebel & Irwin King Eds., Lecture Notes in Computer Science, vol 15501, 2025, Springer, Cham.

[B3] Esa Hyytiä, Rhonda Righter, Olivier Bilenne, Xiaohu Wu. "Dispatching discrete-size jobs with multiple deadlines to parallel heterogeneous servers," in Systems modeling: methodologies and tools, Antonio Puliafito & Kishor S. Trivedi Eds., Springer, EAI/Springer Innovations in Communications and Computing, 2019, Pages 29-46.

Patent

[P1] Chau Yuen, Tam Van Vo, Xiaohu Wu, Xiumin Wang, Wentu Song, Son H. Dau, and Jaume Pernas. "System and Methods for Distributed Data Storage." U.S. Patent, US20150142863A1, current status: abandoned.

Submitted/Working Papers

Notes: [#] indicates students under my supervision, [†] indicates corresponding authors

[S1] Xiaohu Wu, Han Yu, Mengmeng Chen[#], Tiantian He, Yew-Soon Ong, and Giuliano Casale. "FedCompetitors: Harmonious Collaboration with Minimal Self-Sacrifice in Federated Learning with Competing Participants." Submitted to Management Science. (CABC: 4*; ABDC: A*)

- ◇ An extension of [C1].

[S2] Junjie Wang, Guangjing Yang, Wentao Chen, Huahui Yi, Xiaohu Wu, Zhouchen Lin, Qicheng Lao. "MLAE: Masked LoRA Experts for Parameter-Efficient Fine-Tuning." Submitted to IEEE Transactions on Image Processing.

[S3] Y. Lin, Qiqi Liu, J. Gu, Yaochu Jin, and Xiaohu Wu. "Federated Gradient-Based Bayesian Optimization." To be Submitted.

[S4] Liangyu Sun, Guanyu Gao, Yan Lyu, Xiaohu Wu. "Bridging Model and Data Heterogeneity in Federated Learning through Personalized Collaborative Generation." To be submitted to AAAI-2026.

[S5] Ziran Zhou, Guanyu Gao, Xiaohu Wu, Yan Lyu. "pFedGAT:Personalized Federated Learning with Graph Attention Network." To be submitted to AAAI-2026.

[S6] Zhu He, Haoran Zhang, Wentao Zhang, Shen Zhao, Qiqi Liu, Xiaohu Wu[†], Qicheng Lao. "Learning conceptual text prompts from visual regions of interest for medical image segmentation." Submitted to Engineering for the second round of review (A flagship journal of the Chinese Academy of Engineering).

[S7] Xueqi Bao, Ke Li, Xiaohu Wu, Ping Ma, Qicheng Lao. "Relation-Augmented Diffusion for Layout-to-Image Generation." Submitted to NeurIPS-2025.

Awards & Honors

- Outstanding Student Paper Award, NeurIPS Workshop 2024.
  - ◇ See the paper [C4].
  - ◇ The workshop accepts papers coauthored by researchers including Turing Award winner *Yoshua Bengio*.
- Honored Speaker in Wireless 6G Panel Speech Award, IEEE Technical Community on Computer Communications.
  - ◇ Awarded through the 16th IEEE International Conference on Cyber-enabled Distributed Computing and Knowledge Discovery and IEEE Technical Community on Computer Communications with the theme of Revolutionizing Computing and Communication in the AI Era, October 24–25, 2024, IEEE Computer Society.

National Projects

[N1] Principal Investigator (PI), "Energy-Efficient AI Algorithms for 6G Networks (No.: 2024YFE0200503)", National Key Research & Development Program, Ministry of Science and Technology of China, ¥2.2 million, 2024-2027.

- ◇ This project is part of a larger project titled "Research on renewable-energy-driven green 6G network and technology (No.: 2024YFE0200500)" that is divided four parts and coordinated by HKUST(GZ). The other two PIs come from Tsinghua and HUST.

Workshop Co-Chair

[W1] International Workshop on Federated Learning with Generative AI, in conjunction with IJCAI-2025.

- ◇ `https://federated-learning.org/FedGenAI-ijcai-2025/`
- ◇ Other co-chairs: Prof. Jindong Wang (College of William & Mary); Dr. Lingjuan Lyu (Sony AI); Dr. Dimitrios Dimitriadis (Amazon); Prof. Han Yu (Nanyang Technological University).

Academic Services

- National Doctoral Thesis Review Expert, China Academic Degrees and Graduate Education Development Center, Ministry of Education, P.R. China.
  - Already reviewed for National University of Defense Technology, Beihang University, Shandong University, Sichuan University.

Journal Reviewer

- Journal of the Operational Research Society
- Computers & Operations Research
- Information Processing and Management
- Expert Systems with Applications
- IEEE Transactions on Neural Networks and Learning Systems
- IEEE Transactions on Evolutionary Computation
- IEEE Transactions on Artificial Intelligence
- Knowledge and Information Systems
- Artificial Intelligence in Medicine
- Performance Evaluation
- IEEE/ACM Transactions on Networking
- IEEE Transactions on Computers
- IEEE Transactions on Network Science and Engineering

Supervision

Undergraduate Student for Final Year Project:

- Shanli Tan (Class 2019)
  - Output: publish one AAAI'24 paper as the first author [C3]
  - Next placement: pursue a master degree at National University of Singapore

Master's Student:

- Mengmeng Chen (Class 2023)
  - Output: publish a NeurIPS'24 paper as the first author [C1]
- Zhilong Li (Class 2023)
  - Output: publish a NeurIPS Workshop paper as the first author [C2]
- Jiayu Huang (Class 2024)

PhD Student:

- Wenshuo Wang (Class 2024)

References

Han Yu	Associate Professor, Nanyang Technological University, Singapore Email: han.yu@ntu.edu.sg Bio: A leading researcher in federated learning Homepage: `https://federated-learning.org/han.yu/`
Giuliano Casale	Professor, Imperial College London, United Kingdom Email: g.casale@imperial.ac.uk Bio: The past chair of ACM Sigmetrics, the EiC of Performance Evaluation Homepage: `https://wp.doc.ic.ac.uk/gcasale/`
Jindong Wang	Assistant Professor, College of William & Mary, United States Email: jwang80@wm.edu Bio: A leading researcher in large language models; an EX Senior Researcher in Microsoft Homepage: `https://jd92.wang/`
Yew-Soon Ong	President's Chair Professor, Nanyang Technological University, Singapore Email: asysong@ntu.edu.sg Bio: A leading researcher in computational intelligence Homepage: `https://www3.ntu.edu.sg/home/asysong/home.html`