Shuoyao Wang

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EMPLOYMENT

- **Assistant Professor** — **Shenzhen University**, Shenzhen, China
  College of Electronics and Information Engineering — *2020.05 - Now*

- **Researcher** — **Tencent**, Shenzhen, China
  Department of Risk Management — *2018.12 - 2020.04*

- **Research Associate** — **The Chinese University of Hong Kong**, Hong Kong, China
  Department of Information Engineering — *2018.08 - 2018.11*

EDUCATION

- **Ph.D. in Information Engineering** — **The Chinese University of Hong Kong**, Hong Kong, China
  Advisor: Prof. Yingjun Angela Zhang — *2013.08 - 2018.07*

- **B.Eng. in Information Engineering** — **The Chinese University of Hong Kong**, Hong Kong, China
  With First Honor — *2009.09 - 2013.07*

RESEARCH INTERESTS

- **Multimedia Processing and Communication, Edge Video Analytics, and Smart Grid Communication**: My research adopts integrated machine learning and optimization techniques to drastically improve the performance of networked systems, such as video streaming and smart grid.

PUBLICATIONS

(† indicates the students I advised or co-advised, ∗ indicates the corresponding author)

Journal Papers ....

1. [TMC23] **S. Wang**, J. Yang, and S. Bi, "Adaptive Video Streaming in Multi-Tier Computing Networks: Joint Edge Transcoding and Client Enhancement," accepted by *IEEE Transactions on Mobile Computing.*

2. [TWC23] **S. Wang**, S. Bi, and Y. J. Zhang, "Edge Video Analytics with Adaptive Information Gathering: A Deep Reinforcement Learning Approach," in *IEEE Transactions on Wireless Communications* , vol. 22, no. 9, pp. 5800-5813, Sept. 2023.

3. [SPL23] **S. Wang** and S. Bi, "Multi-Task Learning for Fast Beam Alignment in mmWave Communication Systems," in *IEEE Signal Processing Letters*, vol. 30, pp. 992-996, 2023.

4. [IOTJ23] L. Zheng, S. Bi, **S. Wang**, Z. Quan, X. Li, X. Lin, and H. Wang, "ResMon: Domain-adaptive wireless respiration state monitoring via few-shot Bayesian deep learning," accepted by *IEEE Internet of Things Journal.*

5. [SPL22] B.Zhou†, H.Yan†, and **S. Wang**∗, "Structure and Texture Preserving Network for Real-World Image Super-Resolution," in *IEEE Signal Processing Letters*, vol. 29, pp. 2173-2177, 2022.

6. [TWC22] **S. Wang**, S. Bi, and Y. J. Zhang, "Adaptive Wireless Video Streaming: Joint Transcoding and Transmission Resource Allocation," in *IEEE Transactions on Wireless Communications*, vol. 21, no. 5, pp. 3208-3221, May 2022.

7. [JSAC22] **S. Wang**, S. Bi, and Y. J. A. Zhang, "Deep Reinforcement Learning With Communication Transformer for Adaptive Live Streaming in Wireless Edge Networks," in *IEEE Journal on Selected Areas in Communications*, vol. 40, no. 1, pp. 308-322, Jan. 2022. [Recommended by Prof. Petar Popovski, the Editor-in-Chief of IEEE JSAC, to the ever first issue of Blog on Selected Ideas in Communications]

8. [TSNE22] T.Wu, Y. J. Zhang, and **S. Wang**∗, "Deep Learning to Optimize: Security-Constrained Unit Commitment with Uncertain Wind Power Generation and BESSs," in *IEEE Transactions on Sustainable Energy*, vol. 13, no. 1, pp. 231-240, Jan. 2022.

9. [SPL21] H.Yan† and **S. Wang**∗, "FCGP: Infrared and Visible Image Fusion via Joint Contrast and Gradient Preservation," in *IEEE Signal Processing Letters*, vol. 28, pp. 2038-2042, 2021.

10. [EIR21] X. Tang, C. Sun, S. Bi, **S. Wang**, and Y. J. Zhang, "A Holistic Review on Advanced Bi-directional EV Charging Control Algorithms," in *ACM SIGEnergy Energy Informatics Review*, vol. 1, no. 1, pp 78–88, Nov. 2021.

11. [TII21] **S. Wang**, S. Bi, and Y. J. Zhang, "Reinforcement Learning for Real-time Pricing and Scheduling Control in EV Charging Stations," *IEEE Transactions on Industrial Informatics*, vol. 17, no. 2, pp. 849-859, Feb. 2021. [ESI Highlight Cited]

12. [IOTJ20] **S. Wang**, S. Bi, and Y. J. Zhang, "Locational Detection of False Data Injection Attack in Smart Grid: a Multi-label Classification Approach," *IEEE Internet of Things Journal*, vol. 7, no. 9, pp. 8218-8227, Sept. 2020.

13. [TPWS18] **S. Wang**, S. Bi, and Y. J. Zhang, "Demand response management for profit maximizing energy loads in real-time electricity market," *IEEE Transactions on Power Systems*, vol. 33, no. 6, pp. 6387-6396, Nov. 2018.

14. [TSNE18] **S. Wang**, S. Bi, Y. J. Zhang, and J. W. Huang, "Electrical vehicle charging station profit maximization: admission, pricing, and online Scheduling," *IEEE Transactions on Sustainable Energy*, vol. 9, no. 4, pp. 1722-1731, Oct. 2018.

Conference Papers ....

1. [GLOBECOM'23] M. Gong[†], **S. Wang**[*], and S. Bi, "A Scalable Multi-Device Semantic Communication System for Multi-Task Execution," *IEEE Global Communications Conference (GLOBECOM)*, Kuala Lumpur, Malaysia, Dec. 2023.

2. [GLOBECOM'23] J. Lu[†], and **S. Wang**[*],"Network-Friendly Sequential Recommendation with Quality Constraints: A Safe Deep Reinforcement Learning approach," *IEEE Global Communications Conference (GLOBECOM)*, Kuala Lumpur, Malaysia, Dec. 2023.

3. [VTC2023-Fall] J. Hou[†], J. Lin[†], and **S. Wang**[*], "Maximizing Ranking-Aware Recommendation Quality for Low-Complexity Network-Friendly Recommendation," *IEEE Vehicular Technology Conference*, Hong Kong, China, Oct. 2023.

4. [MM'23] P. Zhang[†], H. Yan[†], W. Wu, and **S. Wang**[*], "Improving Federated Person Re-Identification through Feature-Aware Proximity and Aggregation," *ACM International Conference on Multimedia (MM)*, Ottawa, CAnada, Oct. 2023. [CCF-A, Accpetance rate 902/3669=24.6%]

5. [ICME'23] J. Lin[†], and **S. Wang**[*],"Improving robustness of learning-based adaptive video streaming in wildly fluctuating networks," *IEEE International Conference on Multimedia and Expo (ICME)*, Brisbane, Australia, July 2023. [CCF-B, Oral, Acceptance rate 294/1415=20.7%]

6. [SmartGridComm'22] J.Liu[†], **S. Wang**, and X. Tang, "Pricing and Charging Scheduling for Cooperative Electric Vehicle Charging Stations via Deep Reinforcement Learning," *IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm)*, Singapore, Singapore, 2022, pp. 212-217.

7. [ICC'22] J. Yang[†], Y. Jiang, and **S. Wang**[*], "Enhancement or Super-Resolution: Learning-based Adaptive Video Streaming with Client-Side Video Processing," *IEEE International Conference on Communications (ICC)*, Seoul, Korea, Republic of, 2022, pp. 739-744.

8. [ICME'21] H. Yan[†] and **S. Wang**, "L2 norm is all your need: infrared-visible image fusion via guided transformation minimization," *IEEE International Conference on Multimedia and Expo (ICME)*, Shenzhen, China, Jul. 2021.[CCF-B]

9. [IJCAI'20] **S. Wang**[*] and D. Zhu, "Interpretable multimodal learning for intelligent regulation in online payment systems," *International Joint Conference on Artificial Intelligence (IJCAI)*, Yokohama, Japan, July 2020.[CCF-A, Acceptance rate 12.6%]

10. [PESGM'18] **S. Wang**, S. Bi, and Y. J. Zhang, "A reinforcement learning approach for EV charging station dynamic pricing and scheduling control," *IEEE Power & Energy Society General Meeting (PESGM)*, Portland, OR, USA, Aug 2018.

11. [ICC'18] **S. Wang**, S. Bi, and Y. J. Zhang, "The impacts of energy customers demand response on real-time electricity market participants," *IEEE International Conference on Communications (ICC)*, Kansas City, MO, May 2018.

Granted Patents ....

1. **S. Wang**, S. Bi, J. Yang[†]. A multi-device edge video analysis system based on deep reinforcement learning. ZL 2022 1 0116789.1, Chinese Patent. Granted: 2022.05.20.

2. B. Zhou[†], **S. Wang**, H. Yan[†]. Super-resolution image reconstruction methods, systems, devices, and media that maintain structure and texture. ZL 2022 1 1084696.1, Chinese Patent. Granted: 2022.12.06.

3. **S. Wang**, S. Bi. A fast beamalignment method based on multi-task learning. ZL 2022 1 1591391.X, Chinese Patent. Granted: 2023.04.18.

4. **S. Wang**. Artificial intelligence-based vocabulary mining methods, devices, servers and storage media. ZL 2019 1 0760785.5, Chinese Patent. Granted: 2023.05.16.

5. J. Yang[†], **S. Wang**. An adaptive video streaming playback method, device, device and storage medium. ZL 2021 1 1421136.6, Chinese Patent. Granted: 2023.06.13.

6. P. Zhang[†], **S. Wang**, H. Yan[†]. Federal pedestrian re-identification methods, systems, electronic devices and storage media. ZL 2022 1 1244758.0, Chinese Patent. Granted: 2023.07.14.

Selected Grants

- **[PI] Charging Station Service Pricing and Charging Dispatch Optimization in a Multilayer Information System of Vehicle-Station-Grid**: Funded by the National Natural Science Foundation of China, Grant No.62101336, 2022.01-2024.12, 300K CNY.

- **[PI] Research on Mechanisms for Large-Scale Real-Time Video Distribution Networks Based on Edge-User Cooperative Computing**: Funded by the Guangdong Provincial Basic and Applied Basic Research Fund Committee, Grant No.2022A1515011301, 2022.01-2024.12, 100K CNY.

- **[PI] Defect Detection for Display Screens Based on Deep Learning Methods**: Sponsored by Shenzhen Business Giant Vision Technology Co., Ltd., 2020.06-2020.12, 100K CNY.

- **[PI] Research on Intelligent Charging and Discharging Techniques in the Internet of Vehicle Things**: Funded by Tencent Rhino Bird - Shenzhen University Young Teachers' Research Fund, 2021.01-2022.12, 50K CNY.

- **[PI] Research on Key Technologies for Intelligent Charging Networks and Information Security in Electric Vehicle IoT**: Start-up Fund from Shenzhen Government, Grant No. RC00358, 2021.01-2023.12, 2700K CNY.

- **[Co-I] Optimization of Unmanned Aerial Vehicle Emergency Deployment in Integrated Networks for Air-Ground Collaborative Communication and Localization**: Funded by the National Natural Science Foundation of China, Grant No., 2023.01-2026.12, 685K CNY.

- **[Co-I] Research on Semi-Reference Objective Quality Assessment Models for Perception Quality of Inverse Tone-Mapped Video**: Funded by the National Natural Science Foundation of China, Grant No.62271323, 2023.01-2026.12, 702K CNY.

- **[Co-I] Research and Development of 5G Ultra-Low Latency Ultra-High Definition Video Codec and Applications**: Funded by Guangdong Province Key Area R&D Program, Grant No.2022B0101010001, 2022.01-2024.12, 40000K CNY.

Honors and Awards

- **2023**: Supervisor for the Top 100 Outstanding Undergraduate Theses of Shenzhen University's Class of 2023
- **2022**: Guangdong Province Electronic Information Science and Technology Award
- **2021**: Award of Tencent "Rhinoceros Birds" - Scientific Research Foundation for Young Teachers
- **2019**: Shenzhen Peacock Plan Tale

Services

- **Conference Organization**: Symposium Chair: WOCC 2022; Session Chair: ICME 2023.

- **Technical Program Committee (TPC) Members**: SmartGridComm 2022, AAAI 2023/2024

- **Selected Technical Reviewers**: IEEE Transactions on Wireless Communications (TWC), IEEE Transactions on Mobile Computing (TMC), IEEE Transactions on Multiemedia (TMM), IEEE Wireless Communications Letters (WCL), IEEE Communications Letters (COML), IEEE Transactions on Image Processing (TIP), IEEE Transactions on Smart Grid (TSG), IEEE Transactions on Power Systems (TPWRS), IEEE Transactions on Sustainable Energy (TSNE), IEEE Transactions on Industrial Application (TIA), IEEE Transactions on Network Science and Engineering (TNSE)

- **Department Services**:

  - "Wenhua" Class Establishment Committee Member, responsible for curriculum design, educational program development, curriculum evaluation system reform, lecturer selection, and course scheduling.

  - Secretary of the Overseas Ph.D. Program in Information and Communication Engineering, responsible fo lecturer selection and course scheduling.

Teaching

- **2023 Fall/2022 Fall/2021 Fall**: Machine Learning
- **2022 Spring/2021 Spring**: Probability Theory and Statistics
- **2021 Spring**: Lectures on Cutting-Edge Technology