

Chao Wang 王超

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Department of Computer Science and Information Engineering
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Current position

2019–present Assistant Professor of Computer Science and Information Engineering,
National Taiwan Normal University

Areas of specialisation

Cyber-Physical Systems; Real-Time Systems; Internet of Things

Education

2019 Ph.D. in Computer Science
Washington University in St. Louis, USA
Dissertation titled “Real-Time Reliable Middleware for Industrial Internet-of-Things”

2010 M.S. in Computer and Communication Engineering
National Cheng Kung University, Taiwan (R.O.C.)
Master Thesis titled “Low-Latency Link Scheduling in Wireless Sensor Networks”

2009 B.S. in Electrical Engineering
National Cheng Kung University, Taiwan (R.O.C.)

Honours & awards

2023 Excellence in Teaching 教學優良獎
National Taiwan Normal University

2022 Teaching Award 教學優良教師
Dept. of Computer Science and Information Engineering, National Taiwan Normal University

2012–2016 Taiwan MOE Scholar 教育部世界百大留學獎學金
Washington University in St. Louis

Subjects taught

CSU0051 “Data Science and Communication in Smart Cities” (2023)
CSC9006 “Real-Time Systems” (2020, 2021, 2023)
CSU0032 “Engineering Mathematics” (2022–2023)
CSC0056 “Data Communication” (2019–2023)
CSU0049 “Analog and Digital Computing Elements” (2023)
CSU0050 “Analog and Digital Computing Elements Laboratory” (2023)
CSU0007 “Basic Electronics” (2020–2022)
CSU0008 “Basic Electronics Laboratory” (2020–2022)
00UB9L1 “English (III): English for Science” (2022)
OSUG528 “Education in Taiwan” (2021)
CSC0065 “Special Topic: Information Systems (1)” (2020)

Master theses supervised

2023 Shao-Qun Zhang 張劭群, Thesis titled “Battery-Less Periodic Imaging for LoRaWANs.”
2023 Yi-Hsuan Tseng 曾翊瑄, Thesis titled “Cloud MQTT Broker Design for Heterogeneous-Message-Flow Applications.”
2023 Guo-Hao Li 李國豪, Thesis titled “Traffic-Aware Reconfigurable Video Streaming Scheme for Smart City Applications.”
2023 Tim Leon Wywiol (Frank Binder advisor, Chao Wang co-advisor), Thesis titled “Condition Monitoring Of Machine Components From Drive Data Using Semi-supervised Anomaly Detection Methods.”
2023 Po-Hsuan Chou 周柏瑄 (Chao Wang advisor, Thiemo Voigt co-advisor), Thesis titled “Battery-Free Backscatter Communication Systems with Non-Persistent Carriers.”
2023 Yih Shuan Lee 李奕萱, Thesis titled “A Cyber-Physical Testbed for Microgrid Applications.”
2023 Han-Wen Liu 劉瀚文, Thesis titled “Smart-City Collaborative Collision Warning for Blocked-View Corners.”
2022 Cheng-Sheng Peng 彭成聖, Thesis titled “ATP: Adaptive Transmission Policy for Battery-Less IoT Devices.”
2022 Cheng-Hsun Chuang 莊承勳, Thesis titled “Enhancing LoRaWAN Network Energy Efficiency and Data Freshness in Smart Factories.”
2022 Chia-Chin Chung 鍾佳欽 (Ling-Jyh Chen advisor, Chao Wang co-advisor), Thesis titled “An IoT Security Enhancement using Post-Quantum Cryptography.”
2021 Cheng-En Yu 余承恩, Thesis titled “A Sustainable LoRaWAN IoT Ecosystem Architecture for Smart Campus.”
2021 Cheng-You Lin 林政佑, Thesis titled “Cyber-Physical Systems Integration for Data Reuse and Tasks Replacements.”
2021 Chih-Shuo Mei 梅志碩, Thesis titled “Energy Efficiency and Timeliness in Model Training for AIoT Applications.”
2021 Shang Chih Chung 鍾尚值, Thesis titled “A Real-Time Energy-Efficient End-to-End Messaging Architecture for Industrial Internet-of-Things Applications.”

Publications

REFEREED JOURNAL PAPERS

- 2023b J. -R. Sun, N. Josephine, C. Wang and K. -C. Wang, "Interactive Occlusion-Free System for Accessible Volume Exploration," in *IEEE Access*, vol. 11, pp. 86544-86560, 2023, doi: 10.1109/ACCESS.2023.3301567.
- 2023a Wu, J.-L.; Chang, P.-C.; Wang, C.; Wang, K.-C. ATICVis: A Visual Analytics System for Asymmetric Transformer Models Interpretation and Comparison. *Appl. Sci.* 2023, 13, 1595.
- 2019 Chao Wang, Christopher Gill, and Chenyang Lu. 2019. Real-Time Middleware for Cyber-Physical Event Processing. *ACM Trans. Cyber-Phys. Syst.* 3, 3, Article 29 (October 2019), 25 pages.
- 2018 Yang, C-H., Ssu, K-F. and Wang, C. (2018) "Effects of vertex insertion on local rescheduling in wireless sensor networks", *Int. J. Ad Hoc and Ubiquitous Computing*, Vol. 27, No. 3, pp.195–209.
- 2011 C. Chou, K. Ssu, H. C. Jiau, W. Wang and C. Wang, "A Dead-End Free Topology Maintenance Protocol for Geographic Forwarding in Wireless Sensor Networks," in *IEEE Transactions on Computers*, vol. 60, no. 11, pp. 1610-1621, Nov. 2011, doi: 10.1109/TC.2010.208.

REFERRED CONFERENCE PAPERS

- 2023b Po-Hsuan Chou, Weining Song, Thiemo Voigt, Christian Rohner, and Chao Wang. 2023. Poster: A Battery-free Backscatter Communication System for Non-persistent Carriers. Accepted for publication at The International Conference on Embedded Wireless Systems and Networks (EWSN), Rende, Italy, September 25–27, 2023.
- 2023a P. -H. Chou, C. -S Mei and C. Wang, "Applicability of Deep Learning Model Trainings on Embedded GPU Devices: An Empirical Study," accepted for publication at 2023 12th Mediterranean Conference on Embedded Computing (MECO), 2023.
- 2022b Chia-Chin Chung, Chu-Chi Pai, Fu-Shiang Ching, Chao Wang, and Ling-Jyh Chen. 2022. When post-quantum cryptography meets the internet of things: an empirical study. In *Proceedings of the 20th Annual International Conference on Mobile Systems, Applications and Services (MobiSys '22)*. Association for Computing Machinery, New York, NY, USA, 525–526.
- 2022a C. -E. Yu, C. Wang and S. -Q. Zhang, "Fault-Tolerant Energy-Efficient LoRaWAN Networking Architecture," 2022 11th Mediterranean Conference on Embedded Computing (MECO), 2022, pp. 1-4, doi: 10.1109/MECO55406.2022.9797098.
- 2021d Cheng-You Lin and Chao Wang. 2021. Benefits of GPU-CPU Task Replacement for Edge Device and Platform: Poster Abstract. In *Proceedings of the International Conference on Internet-of-Things Design and Implementation (IoTDI '21)*. Association for Computing Machinery, New York, NY, USA, 249–250.
- 2021c Cheng-En Yu and Chao Wang. 2021. Enabling a Flexible and Sustainable Smart Campus Networking Backbone Using LoRaWAN: Poster Abstract. In *Proceedings of the International Conference on Internet-of-Things Design and Implementation (IoTDI '21)*. Association for Computing Machinery, New York, NY, USA, 251–252.
- 2021b Chih-Shuo Mei and Chao Wang. 2021. Energy Efficiency and Timeliness in Model Training for Internet-of-Things Applications: Poster Abstract. In *Proceedings of the International Conference on Internet-of-Things Design and Implementation (IoTDI '21)*. Association for Computing Machinery, New York, NY, USA, 253–254.
- 2021a Shang Chih Chung and Chao Wang. 2021. Design of an Energy-Efficient End-to-End Messaging

- Protocol for Smart Cities: Poster Abstract. In Proceedings of the International Conference on Internet-of-Things Design and Implementation (IoTDI '21). Association for Computing Machinery, New York, NY, USA, 255–256.
- 2020 Wang, C., Gill, C., & Lu, C. (2020, April). Adaptive Data Replication in Real-Time Reliable Edge Computing for Internet of Things. In 2020 IEEE/ACM Fifth International Conference on Internet-of-Things Design and Implementation (IoTDI) (pp. 128-134). IEEE.
- 2019 Wang, C., Gill, C., & Lu, C. (2019, July). Frame: Fault tolerant and real-time messaging for edge computing. In 2019 IEEE 39th International Conference on Distributed Computing Systems (ICDCS) (pp. 976-985). IEEE.
- 2017 Wang, C., Gill, C., & Lu, C. (2017, June). Real-time middleware for cyber-physical event processing. In 2017 IEEE/ACM 25th International Symposium on Quality of Service (IWQoS) (pp. 1-6). IEEE.
- 2010 Wang, C., & Ssu, K-F. (2010, April). A distributed collision-free low-latency link scheduling scheme in wireless sensor networks. In 2010 IEEE Wireless Communication and Networking Conference (pp. 1-6). IEEE.

Presentations and invited talks

CONFERENCE PRESENTATIONS

- 2023b Jhong-Sian He, Chao Wang. 2023. Towards Indoor Illumination via Sunlight Reflectors Orchestration. The 8th International Conference on Cloud Computing and Internet of Things (CCIOT 2023), Okinawa, Japan, September 22–24, 2023.
- 2023a Amy B. M. Tsui, Chao Wang, Jun-Jie Tseng & Mei-Lan Lo. 2023. Language Related Episodes (LRE) Revisited: The Case of EMI in Computer Engineering. The International EMI Forum Language Issues in English-Medium Instruction, National Taiwan Normal University, Taipei, Taiwan, April 22–23, 2023.

INVITED TALK

- 2023 Chao Wang. 2023. In Search Of Meeting Conflicting Performance Demands: A Case From Real-Time Fault-Tolerant Data Communication. The 6th International Conference on Information Science and Systems (ICISS), Edinburgh, UK, August 11–13, 2023.

Professional service

ORGANIZER FOR INTERNATIONAL CONFERENCES

- 2022 Registration Chair, 28th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA'22)
- 2020 Workshop co-Chair, with Hung-Chang Hsiao and Chi-Yeh Chen (Parallel, Distributed, and Cloud/Edge Computing), International Computer Symposium (ICS)
- 2018 Web Chair, IEEE International Conference on Industrial Internet (ICII)
- 2018 Web Chair, 3rd ACM/IEEE International Conference on Internet of Things Design and Implementation (IoTDI'18)

REVIEWER FOR RESEARCH PANELS, CONFERENCE PROGRAM COMMITTEES, AND JOURNALS

ACM Transactions on Cyber-Physical Systems.
ACM Computing Surveys.
IEEE Transactions on Cloud Computing.
Real-Time Systems: The International Journal of Time-Critical Computing Systems.
IET Electronics Letters.
PeerJ Computer Science.
Journal of Systems Architecture: Embedded Software Design.
Journal of Information Science and Engineering (JISE).
IEEE Real-Time Systems Symposium (RTSS).
ACM/IEEE International Conference on Internet of Things Design and Implementation (IoTDI).
International Conference on Sensor Networks and Signal Processing (SNSP).
IEEE Vehicular Technology Conference (VTC).
中華民國經濟部水利署水災智慧防災計畫韌性服務團委員 (2020–2022).
中華民國交通部中央氣象局委託採購計畫評選會議評選委員 (2022–2023).

DEPARTMENT, SCHOOL, AND UNIVERSITY LEVEL SERVICE

Undergraduate Academic Advisor, CSIE Department (2019–2023)
Curriculum Committee Member, CSIE Department (2019, 2021–2023)
Recruiting Committee Member, CSIE Department (2020)
國立臺灣師範大學雙語增能培訓專班指導老師 (2022)

Research support

GRANTS AND CONTRACTS AWARDED AS PRINCIPAL INVESTIGATOR

2020–2022 “A Study on Energy-Efficient Internet-of-Things Edge Computing Architecture for Smart Cities”, MOST, 2020/01/01–2022/12/31, NTD2,318,950
2020 “A Study on Effective IoT Software Architecture Utilizing Heterogeneous Processing Resources”, NTNU, 2020/01/01–2020/12/31, NTD300,000

GRANTS AND CONTRACTS AWARDED AS CO-PRINCIPAL INVESTIGATOR

2020–2023 “Intelligent Low-Cost Air Quality Sensing with Agility on the Edge”, Ling-Jyh Chen PI, Chao Wang co-PI, MOST, 2020/08/01–2023/07/31, NTD2,991,000