

Yongjun SUN

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Biography

Dr. Sun obtained his bachelor and master degrees in thermal energy and power from Xi'an Jiaotong University (XJTU) and in refrigeration and cryogenics from Hua Zhong University of Science and Technology (HUST) in 2003 and 2006 respectively, and he received his PhD degree in building services engineering from the Hong Kong Polytechnic University in 2010. Before he joined in City University of Hong Kong in 2014, he was a postdoctoral research fellow at the Department of Building Services Engineering, the Hong Kong Polytechnic University. Dr. Sun's current research focuses on urban decarbonization, built environment, renewable energy smart applications, immersion cooling technologies for data centers, and zero carbon buildings.

Employment

Department of Architecture and Civil Engineering

City University of Hong Kong

1 Jul 2023 → present

Grants

Research output

Multi-objective design optimization of multiple energy systems in net/nearly zero energy buildings under uncertainty correlations

Lu, M., Sun, Y. & Ma, Z., 15 Sept 2024, In: Applied Energy. 370, 123620.Scopus citations: 4

Review on Advanced Storage Control Applied to Optimized Operation of Energy Systems for Buildings and Districts: Insights and Perspectives

Ferrara, M., Bilardo, M., Bogatu, D., Lee, D., Khatibi, M., Rahnama, S., Shinoda, J., & 7 othersSun, Y., Sun, Y., Afshari, A., Haghghat, F., Kazanci, O. B., Ooka, R. & Fabrizio, E., Jul 2024, In: Energies. 17, 14, 3371.

Generic load regulation strategy for enhancing energy efficiency of chiller plants

Wan, H., Gong, Y., Wang, S., Sun, Y., Xu, T. & Huang, G., 3 Jun 2024, (Online published) In: Building Simulation.

Community-to-vehicle-to-community (C2V2C) for inter-community electricity delivery and sharing via electric vehicle: Performance evaluation and robustness analysis

Board, A., Sun, Y., Huang, P. & Xu, T., 1 Jun 2024, In: Applied Energy. 363, 123054.

Towards net-zero energy/emission buildings for sustainable development

Ma, Z., Arici, M., Sun, Y., Singh, S. & Shahsavar, A., Jun 2024, In: Energy for Sustainable Development. 80, 101448. Scopus citations: 1

Stacked ensemble learning approach for PCM-based double-pipe latent heat thermal energy storage prediction towards flexible building energy

Liu, Y., Sun, Y., Gao, D., Tan, J. & Chen, Y., 1 May 2024, In: Energy. 294, 130955.Scopus citations: 3

Review of transpired solar collectors: Heat and mass transfer mechanisms and enhancement, system integration, and performance assessment and optimisation

Li, S., Gong, X., Lin, W., Sun, Y. & Ma, Z., 15 Apr 2024, In: Journal of Cleaner Production. 450, 141967.

Data-driven surrogate optimization for deploying heterogeneous multi-energy storage to improve demand response performance at building cluster level

Ren, H., Gao, D., Ma, Z., Zhang, S. & Sun, Y., 15 Feb 2024, In: Applied Energy. 356, 122312.Scopus citations: 5

A novel radiative sky cooler system with enhanced daytime cooling performance to reduce building roof heat gains in subtropical climate

Zhang, Y., Tso, C. Y., Tse, C. F. N., Fong, A. M., Lin, K. & Sun, Y., Jan 2024, In: Renewable Energy. 220, 119686. Scopus citations: 2

A thermodynamic-law-integrated deep learning method for high-dimensional sensor fault detection in diverse complex HVAC systems

Ren, H., Xu, C., Lyu, Y., Ma, Z. & Sun, Y., 1 Dec 2023, In: Applied Energy. 351, 121830.Scopus citations: 6

Quantile regression based probabilistic forecasting of renewable energy generation and building electrical load: A state of the art review

Xu, C., Sun, Y., Du, A. & Gao, D., 15 Nov 2023, In: Journal of Building Engineering. 79, 107772.Scopus citations: 10

A framework to formulate and aggregate performance indicators to quantify building energy flexibility

Awan, M. B., Sun, Y., Lin, W. & Ma, Z., 1 Nov 2023, In: Applied Energy. 349, 121590.Scopus citations: 4

Dual-objective optimization of large-scale solar heating systems integrated with water-to-water heat pumps for improved techno-economic performance

Zhang, R., Wang, D., Yu, Z., Sun, Y., Wan, H., Liu, Y., Jiao, Q., & 3 othersGao, M., Fan, J. & Lan, B., 1 Oct 2023, In: Energy and Buildings. 296, 113281.Scopus citations: 5

Robust enhancement of chiller sequencing control for tolerating sensor measurement uncertainties through controlling small-scale thermal energy storage

Zou, W., Sun, Y., Gao, D., Cui, Z., You, Z. & Ma, X., 1 Oct 2023, In: Energy. 280, 128152.Scopus citations: 3

Systematic analysis method of sensor and actuator faults propagation and impacts for optimally controlled complex building chilled water systems

Ji, J., Sun, Y., Gao, D. & Cui, Z., 1 Oct 2023, In: Journal of Building Engineering. 76, 107272.Scopus citations: 1

Corrugated transpired solar collectors: Mathematical modeling, experimental investigation, and performance analysis

Li, S., Lin, W., Gong, X., Sun, Y. & Ma, Z., 15 Sept 2023, In: Solar Energy. 262, 111839.Scopus citations: 3

Novel transformer-based self-supervised learning methods for improved HVAC fault diagnosis performance with limited labeled data

Fan, C., Lei, Y., Sun, Y. & Mo, L., 1 Sept 2023, In: Energy. 278, Part B, 127972.Scopus citations: 15

A GA-based NZEB-cluster coordinated control towards power grid overvoltage optimization

Zhang, Y., Ren, H. & Sun, Y., Sept 2023, *Proceedings of Building Simulation 2023: 18th Conference of IBPSA*. International Building Performance Simulation Association (IBPSA), p. 3840-3847 1734. (Building Simulation Conference Proceedings; vol. 18).

A novel 3D-geographic information system and deep learning integrated approach for high-accuracy building rooftop solar energy potential characterization of high-density cities

Ren, H., Sun, Y. & Zhang, Y., Sept 2023, *Proceedings of Building Simulation 2023: 18th Conference of IBPSA*. International Building Performance Association (IBPSA), p. 3880-3887 (Building Simulation Conference Proceedings; vol. 18).

Effects of climate change on long-term building heating performance of medium-deep borehole heat exchanger coupled heat pump

Zhang, S., Liu, J., Zhang, X., Niu, D., Wang, F., Chai, J., Lu, Y., & 2 othersSun, Y. & Lin, Z., 15 Aug 2023, In: Energy and Buildings. 293, 113208.Scopus citations: 7

A new framework integrating reinforcement learning, a rule-based expert system, and decision tree analysis to improve building energy flexibility

Zhou, X., Du, H., Sun, Y., Ren, H., Cui, P. & Ma, Z., 15 Jul 2023, In: Journal of Building Engineering. 71, 106536.Scopus citations: 21

Cooling effect of fanned parasol for mitigating outdoor heat stress

Zhang, S., Niu, D., Song, D., Sun, Y., Huan, C. & Lin, Z., 15 Jul 2023, In: Solar Energy. 259, p. 338-347Scopus citations: 1

Computer-vision-assisted subzone-level demand-controlled ventilation with fast occupancy adaptation for large open spaces towards balanced IAQ and energy performance

Cui, Z., Sun, Y., Gao, D., Ji, J. & Zou, W., 1 Jul 2023, In: Building and Environment. 239, 110427.Scopus citations: 10

Optimal packing and planning for large-scale distributed rooftop photovoltaic systems under complex shading effects and rooftop availabilities

Ren, H., Sun, Y., Norman Tse, C. F. & Fan, C., 1 Jul 2023, In: Energy. 274, 127280.Scopus citations: 6

Thermodynamic mechanism of high energy performance of air source heat pump with coupled liquid-storage to gas-liquid separator

Ma, L., Wang, F., Wang, Z., Wang, Z., Zhang, S. & Sun, Y., 1 May 2023, In: Solar Energy. 255, p. 497-506Scopus citations: 2

A hybrid multiple sensor fault detection, diagnosis and reconstruction algorithm for chiller plants

Fong, K. F., Lee, C. K., Leung, M. K. H., Sun, Y. J., Zhu, G., Baek, S. H., Luo, X. J., & 2 othersLo, T. K. K. & Leung, H. S. Y., 22 Mar 2023, (Online published) In: Journal of Building Performance Simulation.Scopus citations: 2

Multilevel design strategies of high-performance interfacial solar vapor generation: A state of the art review

Gu, X., Fan, C. & Sun, Y., 15 Mar 2023, In: Chemical Engineering Journal. 460, 141716.Scopus citations: 25

A review on integration of surging plug-in electric vehicles charging in energy-flexible buildings: Impacts analysis, collaborative management technologies, and future perspective

Zou, W., Sun, Y., Gao, D., Zhang, X. & Liu, J., 1 Feb 2023, In: Applied Energy. 331, 120393.Scopus citations: 41

Optimal planning of municipal-scale distributed rooftop photovoltaic systems with maximized solar energy generation under constraints in high-density cities

Ren, H., Ma, Z., Chan, A. B. & Sun, Y., 15 Jan 2023, In: Energy. 263, Part A, 125686.Scopus citations: 19

Globally optimal control of hybrid chilled water plants integrated with small-scale thermal energy storage for energy-efficient operation

Zou, W., Sun, Y., Gao, D. & Zhang, X., 1 Jan 2023, In: Energy. 262, Part A, 125469.Scopus citations: 7

Building energy flexibility: modeling and optimization

Ren, H. & Sun, Y., 2023, *Building Energy Flexibility and Demand Management*. Ma, Z., Arıcı, M. & Shahsavari, A. (eds.). Elsevier, p. 41-62

Clustering Nearly Zero Energy Buildings for Improved Performance

Huang, P. & Sun, Y., 2023, *Future Urban Energy System for Buildings: The Pathway Towards Flexibility, Resilience and Optimization*. Zhang, X., Huang, P. & Sun, Y. (eds.). Springer Singapore, p. 405-424 (Sustainable Development Goals Series).

Differential Evolution-based System for Net-zero Energy Buildings Under Climate Change

Chai, J. & Sun, Y., 2023, *Future Urban Energy System for Buildings: The Pathway Towards Flexibility, Resilience and Optimization*. Zhang, X., Huang, P. & Sun, Y. (eds.). Singapore: Springer, p. 231-254 (Sustainable Development Goals Series).Scopus citations: 1

Dynamic Pricing for Improving Bi-Directional Interactions with Reduced Power Imbalance

Sun, Y. & Huang, P., 2023, *Future Urban Energy System for Buildings: The Pathway Towards Flexibility, Resilience and Optimization*. Zhang, X., Huang, P. & Sun, Y. (eds.). 1 ed. Springer Singapore, p. 425-444 (Sustainable Development Goals Series; vol. Part F2770).Scopus citations: 1

Geographic Information System-Assisted Optimal Design of Renewable-Powered Electric Vehicle Charging Stations in High-Density Cities

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Optimization of Near-Zero Energy Buildings Cluster with Top-Down Control

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The Importance of Urban Energy System for Buildings

Zhang, X., Huang, P. & Sun, Y., 2023, *Future Urban Energy System for Buildings: The Pathway Towards Flexibility, Resilience and Optimization*. Zhang, X., Huang, P. & Sun, Y. (eds.). Singapore: Springer, p. 1-7 (Sustainable Development Goals Series).Scopus citations: 1

Three Fleet Smart Charging Categories of Electric Vehicles for the Grid Power Regulation

Huang, P. & Sun, Y., 2023, *Future Urban Energy System for Buildings: The Pathway Towards Flexibility, Resilience and Optimization*. Zhang, X., Huang, P. & Sun, Y. (eds.). Singapore: Springer, p. 187-207 (Sustainable Development Goals Series).

Uncertainty-Based Near-Zero Energy Buildings Life-Cycle Performance Analysis

Huang, P. & Sun, Y., 2023, *Future Urban Energy System for Buildings: The Pathway Towards Flexibility, Resilience and Optimization*. Zhang, X., Huang, P. & Sun, Y. (eds.). Springer Singapore, p. 289-312 (Sustainable Development Goals Series).

Investigation of electric vehicle smart charging characteristics on the power regulation performance in solar powered building communities and battery degradation in Sweden

Huang, P., Tu, R., Zhang, X., Han, M., Sun, Y., Hussain, S. A. & Zhang, L., 1 Dec 2022, In: *Journal of Energy Storage*. 56, Part A, 105907.Scopus citations: 15

Similarity-based grouping method for evaluation and optimization of dataset structure in machine-learning based short-term building cooling load prediction without measurable occupancy information

Zhang, X., Sun, Y., Gao, D., Zou, W., Fu, J. & Ma, X., 1 Dec 2022, In: *Applied Energy*. 327, 120144.Scopus citations: 12

Experimental Evaluation of the Effects of Passive Phase Change Material Walls on the Building Demand Response for Smart Grid Applications

You, Z., Sun, Y., Mo, S., Zou, W., Zhang, X. & Gao, D., Nov 2022, In: *Buildings*. 12, 11, 1830.Scopus citations: 4

Optimal control of solar-powered electric bus networks with improved renewable energy on-site consumption and reduced grid dependence

Ren, H., Ma, Z., Fai Norman Tse, C. & Sun, Y., 1 Oct 2022, In: Applied Energy. 323, 119643.Scopus citations: 14

A novel coordinated control for NZEB clusters to minimize their connected grid overvoltage risks

Zhang, Y., Tse, N. C. F., Ren, H. & Sun, Y., Oct 2022, In: Building Simulation. 15, 10, p. 1831–1848Scopus citations: 4

Comparative studies of EV fleet smart charging approaches for demand response in solar-powered building communities

Huang, P., Munkhammar, J., Fachrizal, R., Lovati, M., Zhang, X. & Sun, Y., Oct 2022, In: Sustainable Cities and Society. 85, 104094.Scopus citations: 24

A novel model of mixed-particle coating for accurate performance quantifications at varying composition percentages

Gao, D., Zhang, S., Sun, Y., Zhou, C., Bu, Y. & Chai, J., 1 Aug 2022, In: International Journal of Heat and Mass Transfer. 191, 122833.Scopus citations: 1

Optimal deployment of distributed rooftop photovoltaic systems and batteries for achieving net-zero energy of electric bus transportation in high-density cities

Ren, H., Ma, Z., Ming Lun Fong, A. & Sun, Y., 1 Aug 2022, In: Applied Energy. 319, 119274.Scopus citations: 29

Mineral-based form-stable phase change materials for thermal energy storage: A state-of-the art review

Gao, D., Sun, Y., Fong, A. M. & Gu, X., Apr 2022, In: Energy Storage Materials. 46, p. 100-128Scopus citations: 66

A GA-based NZEB-cluster planning and design optimization method for mitigating grid overvoltage risk

Gao, D., Sun, Y., Zhang, X., Huang, P. & Zhang, Y., 15 Mar 2022, In: Energy. 243, 123051.Scopus citations: 8

Preparation and thermal properties of a novel pseudo ionic liquid phase change material for solar water heating system

Tang, X., Xu, T., Wang, J., Zhang, H., Chen, J., Huang, G., Sun, Y., & 3 othersWang, D., Liu, Y. & Li, J., Mar 2022, In: Solar Energy Materials and Solar Cells. 236, 111507.Scopus citations: 10

Data-centric or algorithm-centric: Exploiting the performance of transfer learning for improving building energy predictions in data-scarce context

Fan, C., Lei, Y., Sun, Y., Piscitelli, M. S., Chiosa, R. & Capozzoli, A., 1 Feb 2022, In: Energy. 240, 122775.Scopus citations: 35

A novel 3D-geographic information system and deep learning integrated approach for high-accuracy building rooftop solar energy potential characterization of high-density cities

Ren, H., Xu, C., Ma, Z. & Sun, Y., 15 Jan 2022, In: Applied Energy. 306, Part A, 117985.Scopus citations: 50

Study on preparation and thermal performance improvements of composite phase change material for asphalt steel bridge deck

Hu, H., Chen, W., Cai, X., Xu, T., Cui, H., Zhou, X., Chen, J., & 2 othersHuang, G. & Sun, Y., 6 Dec 2021, In: Construction and Building Materials. 310, 125255.Scopus citations: 10

Super absorbent polymer as support for shape-stabilized composite phase change material containing $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O} - \text{K}_2\text{HPO}_4 \cdot 3\text{H}_2\text{O}$ eutectic hydrated salt

Zou, T., Xu, T., Cui, H., Tao, H., Xu, H., Zhou, X., Chen, Q., & 3 othersChen, J., Huang, G. & Sun, Y., Oct 2021, In: Solar Energy Materials and Solar Cells. 231, 111334.Scopus citations: 30

A study on semi-supervised learning in enhancing performance of AHU unseen fault detection with limited labeled data

Fan, C., Liu, Y., Liu, X., Sun, Y. & Wang, J., Jul 2021, In: Sustainable Cities and Society. 70, 102874.Scopus citations: 50

Thermal conductivity enhancement utilizing the synergistic effect of carbon nanocoating and graphene addition in palmitic acid/halloysite FSPCM

Peng, L., Sun, Y., Gu, X., Liu, P., Bian, L. & Wei, B., 1 Jun 2021, In: Applied Clay Science. 206, 106068.Scopus citations: 31

Solar-photovoltaic-power-sharing-based design optimization of distributed energy storage systems for performance improvements

Huang, P., Sun, Y., Lovati, M. & Zhang, X., 1 May 2021, In: *Energy*. 222, 119931.Scopus citations: 69

A review on integration and design of desiccant air-conditioning systems for overall performance improvements

Gao, D. C., Sun, Y. J., Ma, Z. & Ren, H., May 2021, In: *Renewable and Sustainable Energy Reviews*. 141, 110809. Scopus citations: 40

Improving energy flexibility of a net-zero energy house using a solar-assisted air conditioning system with thermal energy storage and demand-side management

Ren, H., Sun, Y., Albdoor, A. K., Tyagi, V. V., Pandey, A. K. & Ma, Z., 1 Mar 2021, In: *Applied Energy*. 285, 116433. Scopus citations: 61

Inverse optimization investigation for thermoelectric material from device level

Shen, L., Wang, Y., Tong, X., Xu, S. & Sun, Y., 15 Jan 2021, In: *Energy Conversion and Management*. 228, 113669. Scopus citations: 6

Genetic Algorithm and Mont Carlo Method for Global Sensitivity Analysis of Key Parameters Identification of Net Zero Energy Buildings Towards Power Grid Interaction Optimization

Sun, Y., Zhang, Y. & Zhang, X., 2021, *Data-driven Analytics for Sustainable Buildings and Cities: From Theory to Application*. Zhang, X. (ed.). 1 ed. Springer Singapore, p. 337-358 (Sustainable Development Goals Series; vol. Part F2687).

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Zhang, Y., Zhang, X., Huang, P. & Sun, Y., 1 Dec 2020, In: *Applied Energy*. 279, 115820.Scopus citations: 43

Numerical and experimental study on a double-layered coating design using supplemental property particles for achieving user-desired thermal and aesthetic performance

Gao, D., Sun, Y., Zhou, C., Bu, Y., Bao, Y. & Chai, J., 15 Nov 2020, In: *Energy*. 211, 118683.Scopus citations: 4

Preparation and characterizations of a novel temperature-tuned phase change material based on sodium acetate trihydrate for improved performance of heat pump systems

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A new strategy to benchmark and evaluate building electricity usage using multiple data mining technologies

Li, K., Sun, Y., Robinson, D., Ma, J. & Ma, Z., Aug 2020, In: *Sustainable Energy Technologies and Assessments*. 40, 100770.Scopus citations: 26

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Statistical investigations of transfer learning-based methodology for short-term building energy predictions

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Heuristic optimization for grid-interactive net-zero energy building design through the glowworm swarm algorithm

Sun, Y., Ma, R., Chen, J. & Xu, T., 1 Feb 2020, In: *Energy and Buildings*. 208, 109644.Scopus citations: 30

Optimum insulation thicknesses and energy conservation of building thermal insulation materials in Chinese zone of humid subtropical climate

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A review of heat and mass transfer mechanisms of dehumidifiers and regenerators for liquid desiccant cooling systems
REN, H., SUN, Y., LIN, W., WANG, S., LI, W. & MA, Z., 2020, In: Science and Technology for the Built Environment. 26, 4, p. 465-483Scopus citations: 8

Geographic Information System-assisted optimal design of renewable powered electric vehicle charging stations in high-density cities
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Investigations of climate change impacts on net-zero energy building lifecycle performance in typical Chinese climate regions
Chai, J., Huang, P. & Sun, Y., 15 Oct 2019, In: Energy. 185, p. 176-189Scopus citations: 47

A genetic algorithm based dynamic pricing for improving bi-directional interactions with reduced power imbalance
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A collaborative demand control of nearly zero energy buildings in response to dynamic pricing for performance improvements at cluster level
Huang, P. & Sun, Y., 1 May 2019, In: Energy. 174, p. 911-921Scopus citations: 32

Deep learning-based feature engineering methods for improved building energy prediction
Fan, C., Sun, Y., Zhao, Y., Song, M. & Wang, J., 15 Apr 2019, In: Applied Energy. 240, p. 35-45Scopus citations: 195

A robust control of nZEBs for performance optimization at cluster level under demand prediction uncertainty
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A clustering based grouping method of nearly zero energy buildings for performance improvements
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Climate change impact on energy balance of net-zero energy buildings in typical climate regions of China
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Investigation of maximum cooling loss in a piping network using Bayesian Markov Chain Monte Carlo method
Huang, P., Augenbroe, G., Huang, G. & Sun, Y., 2019, In: Journal of Building Performance Simulation. 12, 2, p. 117-132
16 p.Scopus citations: 7

A collaborative control optimization of grid-connected net zero energy buildings for performance improvements at building group level

Fan, C., Huang, G. & Sun, Y., 1 Dec 2018, In: Energy. 164, p. 536-549Scopus citations: 36

A robust design of nearly zero energy building systems considering performance degradation and maintenance

Huang, P., Huang, G. & Sun, Y., 15 Nov 2018, In: Energy. 163, p. 905-919Scopus citations: 35

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Huang, P., Wu, H., Huang, G. & Sun, Y., 15 Sept 2018, In: Energy. 159, p. 891-904Scopus citations: 41

Discovering gradual patterns in building operations for improving building energy efficiency

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Building-group-level performance evaluations of net zero energy buildings with non-collaborative controls

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Development of a simplified resistance and capacitance (RC)-network model for pipe-embedded concrete radiant floors

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WANG, J., HUANG, G. & SUN, Y., Nov 2016, (Presented).

A study on thermoelectric technology application in net zero energy buildings

Shen, L., Pu, X., Sun, Y. & Chen, J., 15 Oct 2016, In: Energy. 113, p. 9-24Scopus citations: 65

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