

Yongjun SUN

Division of Building Science and Technology

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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 HVAC, building energy efficiency, zero energy building and building integration with smart grid. One of his research aims is to improve building energy efficiency through system design and control optimizations.

## Employment

**Division of Building Science and Technology**

City University of Hong Kong

1 Jul 2020 → present

**Division of Building Science and Technology**

City University of Hong Kong

17 Feb 2014 → 1 Jul 2020

## Grants

### Research output

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

Li, M., Lin, Z., Sun, Y., Wu, F., Xu, T., Wu, H., Zhou, X. & 2 others, Wang, D. & Liu, Y., Sep 2020, In : Renewable Energy. 157, p. 670-677

**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.

**Differential evolution - based system design optimization for net zero energy buildings under climate change**

Chai, J., Huang, P. & Sun, Y., Apr 2020, In : Sustainable Cities and Society. 55, 102037. Scopus citations: 2

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

Fan, C., Sun, Y., Xiao, F., Ma, J., Lee, D., Wang, J. & Tseng, Y. C., 15 Mar 2020, In : Applied Energy. 262, 114499. Scopus citations: 4

**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: 1

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

Huang, H., Zhou, Y., Huang, R., Wu, H., Sun, Y., Huang, G. & Xu, T., Jan 2020, In : Sustainable Cities and Society. 52, 101840. Scopus citations: 20

**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. 465-483

**Geographic Information System-assisted optimal design of renewable powered electric vehicle charging stations in high-density cities**

Huang, P., Ma, Z., Xiao, L. & Sun, Y., 1 Dec 2019, In : Applied Energy. 255, 113855.Scopus citations: 4

**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: 6

**A genetic algorithm based dynamic pricing for improving bi-directional interactions with reduced power imbalance**

Huang, P., Xu, T. & Sun, Y., 15 Sep 2019, In : Energy and Buildings. 199, p. 275-286Scopus citations: 3

**Review of uncertainty-based design methods of central air-conditioning systems and future research trends**

HUANG, P., WANG, Y., SUN, Y. & HUANG, G., Aug 2019, In : Science and Technology for the Built Environment. 25, 7, p. 819-835

**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: 10

**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: 34

**A robust control of nZEBs for performance optimization at cluster level under demand prediction uncertainty**

Huang, P. & Sun, Y., Apr 2019, In : Renewable Energy. 134, p. 215-227Scopus citations: 5

**Investigation of maximum cooling loss in a piping network using Bayesian Markov Chain Monte Carlo method**

Huang, P., Augenbroe, G., Huang, G. & Sun, Y., 4 Mar 2019, In : Journal of Building Performance Simulation. 12, 2, p. 117-132 16 p.Scopus citations: 2

**Development of clustering-based sensor fault detection and diagnosis strategy for chilled water system**

Luo, X. J., Fong, K. F., Sun, Y. J. & Leung, M. K. H., 1 Mar 2019, In : Energy and Buildings. 186, p. 17-36Scopus citations : 7

**A clustering based grouping method of nearly zero energy buildings for performance improvements**

Huang, P. & Sun, Y., 1 Feb 2019, In : Applied Energy. 235, p. 43-55Scopus citations: 17

**Investigating the hydrogen storage capacity of surfactant modified graphene**

Xu, T., Chen, J., Yuan, W., Li, L., Sun, Y., Wu, H. & Yang, L., Feb 2019, In : Energy Procedia. 158, p. 2112-2117Scopus citations: 1

**Life-cycle analysis of nearly zero energy buildings under uncertainty and degradation impacts for performance improvements**

Chai, J., Huang, P. & Sun, Y., Feb 2019, In : Energy Procedia. 158, p. 2762-2767Scopus citations: 1

**Climate change impact on energy balance of net-zero energy buildings in typical climate regions of China**

Chai, J., Huang, P. & Sun, Y., 2019, In : E3S Web of Conferences. 111, 04004.

**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: 8

**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: 11

**Response-surface-model-based system sizing for Nearly/Net zero energy buildings under uncertainty**

Zhang, S., Sun, Y., Cheng, Y., Huang, P., Oladokun, M. O. & Lin, Z., 15 Oct 2018, In : Applied Energy. 228, p. 1020-1031Scopus citations: 31

**Self-assembly synthesis of silver nanowires/ graphene nanocomposite and its effects on the performance of electrically conductive adhesive**

Xu, T., Chen, J., Yuan, W., Liu, Y., Sun, Y., Wu, H. & Zhou, X., Oct 2018, In : Materials. 11, 10, 2028.Scopus citations: 4

**A top-down control method of nZEBs for performance optimization at nZEB-cluster-level**

Huang, P., Wu, H., Huang, G. & Sun, Y., 15 Sep 2018, In : Energy. 159, p. 891-904Scopus citations: 11

**Event-driven optimal control of central air-conditioning systems: Event-space establishment**

WANG, J., JIA, Q., HUANG, G. & SUN, Y., Sep 2018, In : Science and Technology for the Built Environment. 24, 8, p. 839-849Scopus citations: 10

**Discovering gradual patterns in building operations for improving building energy efficiency**

Fan, C., Sun, Y., Shan, K., Xiao, F. & Wang, J., 15 Aug 2018, In : Applied Energy. 224, p. 116-123Scopus citations: 19

**Uncertainty-based life-cycle analysis of near-zero energy buildings for performance improvements**

Huang, P., Huang, G. & Sun, Y., 1 Mar 2018, In : Applied Energy. 213, p. 486-498Scopus citations: 36

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

Sun, Y., Huang, G., Xu, X. & Lai, A. C., 15 Feb 2018, In : Applied Energy. 212, p. 565-576Scopus citations: 20

**A new multiplexed optimization with enhanced performance for complex air conditioning systems**

Chen, J. & Sun, Y., 1 Dec 2017, In : Energy and Buildings. 156, p. 85-95Scopus citations: 2

**Standby energy use and saving potentials associated with occupant behavior of chinese rural homes**

Yu, Z. (., Hu, B., Sun, Y., Li, A., Li, J. & Zhang, G., 1 Nov 2017, In : Energy and Buildings. 154, p. 295-304Scopus citations : 5

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

Li, A., Sun, Y. & Xu, X., 1 Sep 2017, In : Energy and Buildings. 150, p. 353-375Scopus citations: 10

**Optimization design and experimental study of thermoelectric dehumidifier**

Yao, Y., Sun, Y., Sun, D., Sang, C., Sun, M., Shen, L. & Chen, H., 1 Aug 2017, In : Applied Thermal Engineering. 123, p. 820-829Scopus citations: 13

**Modeling energy consumption in residential buildings: A bottom-up analysis based on occupant behavior pattern clustering and stochastic simulation**

Diao, L., Sun, Y., Chen, Z. & Chen, J., 15 Jul 2017, In : Energy and Buildings. 147, p. 47-66Scopus citations: 49

**確定零能耗建築中各設備系統大小的方法及裝置**

SUN, Y. & CHAI, J., 4 Jul 2017, (Accepted/In press/Filed) Priority No. 201710537031.4

**香港办公建筑暖通空调系统的优化控制**

DU, J., TSE, C. F. N., CHAN, Y. C. & SUN, Y., Jul 2017.

**Recent Developments in HVAC System Control and Building Demand Management**

SUN, Y. & HUANG, G., Mar 2017, Springer.

**Event-driven optimization of complex HVAC systems**

WANG, J., HUANG, G., SUN, Y. & Liu, X., 1 Dec 2016, In : Energy and Buildings. 133, p. 79-87 8 p.Scopus citations: 26

**基于事件驱动的空调系统实时优化控制**

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: 30

**A GA-based system sizing method for net-zero energy buildings considering multi-criteria performance requirements under parameter uncertainties**

Yu, Z. (., Chen, J., Sun, Y. & Zhang, G., 1 Oct 2016, In : Energy and Buildings. 129, p. 524-534Scopus citations: 23

**Performance evaluation of conventional demand response at building-group-level under different electricity pricings**

Shen, L., Li, Z. & Sun, Y., 15 Sep 2016, In : Energy and Buildings. 128, p. 143-154Scopus citations: 18

**Performance comparisons of two system sizing approaches for net zero energy building clusters under uncertainties**

Shen, L. & Sun, Y., 1 Sep 2016, In : Energy and Buildings. 127, p. 10-21Scopus citations: 12

**A study on pipe-embedded wall integrated with ground source-coupled heat exchanger for enhanced building energy efficiency in diverse climate regions**

Li, A., XU, X. & Sun, Y., 1 Jun 2016, In : Energy and Buildings. 121, p. 139-151Scopus citations: 27

**Optimal Control of Complex HVAC Systems: Event-driven or Time-driven Optimization?**

WANG, J., HUANG, G. & SUN, Y., 22 May 2016.

**Initial ratio optimization for the ejector cooling system with thermal pumping effect (ECSTPE)**

He, Y., Sun, Y., Zhang, S., Lyu, Y. & Chen, G., 1 Apr 2016, In : Energy Conversion and Management. 113, p. 281-289  
Scopus citations: 6

**A GA-based coordinated demand response control for building group level peak demand limiting with benefits to grid power balance**

Gao, D. & Sun, Y., 1 Jan 2016, In : Energy and Buildings. 110, p. 31-40Scopus citations: 18

**A multi-criterion renewable energy system design optimization for net zero energy buildings under uncertainties**

Zhang, S., Huang, P. & Sun, Y., 1 Jan 2016, In : Energy. 94, p. 654-665Scopus citations: 80

**Development of a simplified heat transfer model of hollow blocks by using finite element method in frequency domain**

Li, A., Xu, X., Xie, J. & Sun, Y., 1 Jan 2016, In : Energy and Buildings. 111, p. 76-86Scopus citations: 5

**A robust demand response control of commercial buildings for smart grid under load prediction uncertainty**

Gao, D., Sun, Y. & Lu, Y., 15 Dec 2015, In : Energy. 93, p. 275-283Scopus citations: 45

**Robustness analysis of chiller sequencing control**

Liao, Y., Sun, Y. & Huang, G., Oct 2015, In : Energy Conversion and Management. 103, p. 180-190Scopus citations: 26

**A multi-criteria system design optimization for net zero energy buildings under uncertainties**

Sun, Y., Huang, P. & Huang, G., 15 Jun 2015, In : Energy and Buildings. 97, p. 196-204 5800.Scopus citations: 57

**Optimal scheduling of buildings with energy generation and thermal energy storage under dynamic electricity pricing using mixed-integer nonlinear programming**

Lu, Y., Wang, S., Sun, Y. & Yan, C., 1 Jun 2015, In : Applied Energy. 147, p. 49-58Scopus citations: 92

**Sensitivity analysis of macro-parameters in the system design of net zero energy building**

Sun, Y., Jan 2015, In : Energy and Buildings. 86, p. 464-477Scopus citations: 45

**Stochastic chiller sequencing control**

Li, Z., Huang, G. & Sun, Y., Dec 2014, In : Energy and Buildings. 84, p. 203-213Scopus citations: 20

**Uncertainty analysis for chiller sequencing control**

Liao, Y., Huang, G., Sun, Y. & Zhang, L., Dec 2014, In : Energy and Buildings. 85, p. 187-198Scopus citations: 21

**Life-cycle cost benefit analysis and optimal design of small scale active storage system for building demand limiting**

Cui, B., Wang, S. & Sun, Y., 14 Aug 2014, In : Energy. 73, p. 787-800Scopus citations: 17

**An interactive building power demand management strategy for facilitating smart grid optimization**

Xue, X., Wang, S., Sun, Y. & Xiao, F., 1 Mar 2014, In : Applied Energy. 116, p. 297-310Scopus citations: 106

**Uncertainty impacts on reliability and energy-efficiency of chiller sequencing control**

Liao, Y., Huang, G. & Sun, Y., 2014, *Indoor Air 2014 - 13th International Conference on Indoor Air Quality and Climate*. International Society of Indoor Air Quality and Climate, p. 599-606

**Multiplexed optimization for complex air conditioning systems**

Sun, Y., Huang, G., Li, Z. & Wang, S., Jul 2013, In : Building and Environment. 65, p. 99-108Scopus citations: 23

**Sensitivity and uncertainty analysis of cooling water control strategies**

Shan, K., Wang, S., Xiao, F. & Sun, Y., 19 May 2013, In : HVAC and R Research. 19, 4, p. 435-443Scopus citations: 8

**Sensitivity and uncertainty analysis of measurements in outdoor airflow control strategies**

Shan, K., Wang, S., Xiao, F. & Sun, Y., 19 May 2013, In : HVAC and R Research. 19, 4, p. 423-434Scopus citations: 8

**Building instantaneous cooling load fused measurement: Multiple-sensor- based fusion versus chiller-model-based fusion**

Huang, G., Sun, Y. & Wang, S., May 2013, In : Building Services Engineering Research and Technology. 34, 2, p. 177-194Scopus citations: 1

**An online adaptive optimal control strategy for complex building chilled water systems involving intermediate heat exchangers**

Wang, S., Gao, D., Sun, Y. & Xiao, F., 2013, In : Applied Thermal Engineering. 50, 1, p. 614-628Scopus citations: 32

**An optimal control strategy with enhanced robustness for air-conditioning systems considering model and measurement uncertainties**

Zhu, N., Shan, K., Wang, S. & Sun, Y., 2013, In : Energy and Buildings. 67, p. 540-550Scopus citations: 7

**Development and validation of a simplified online cooling load prediction strategy for a super high-rise building in Hong Kong**

Sun, Y., Wang, S. & Xiao, F., 2013, In : Energy Conversion and Management. 68, p. 20-27Scopus citations: 29

**Energy performance enhancement of Hong Kong International Airport through chilled water system integration and control optimization**

Sun, Y., Wang, S., Cui, B. & Yim, M. S. C., 2013, In : Applied Thermal Engineering. 60, 1-2, p. 303-315Scopus citations: 9

**In situ performance comparison and evaluation of three chiller sequencing control strategies in a super high-rise building**

Sun, Y., Wang, S. & Xiao, F., 2013, In : Energy and Buildings. 61, p. 333-343Scopus citations: 23

**Peak load shifting control using different cold thermal energy storage facilities in commercial buildings: A review**

Sun, Y., Wang, S., Xiao, F. & Gao, D., 2013, In : Energy Conversion and Management. 71, p. 101-114Scopus citations: 152

**A study of pre-cooling impacts on peak demand limiting in commercial buildings**

Sun, Y., Wang, S., Xiao, F. & Huang, G., 1 Dec 2012, In : HVAC and R Research. 18, 6, p. 1098-1111Scopus citations: 11

**Development and In-situ validation of a multi-zone demand-controlled ventilation strategy using a limited number of sensors**

Shan, K., Sun, Y., Wang, S. & Yan, C., Nov 2012, In : Building and Environment. 57, p. 28-37Scopus citations: 32

**Diagnosis of the low temperature difference syndrome in the chilled water system of a super high-rise building: A case study**

Gao, D., Wang, S., Sun, Y. & Xiao, F., Oct 2012, In : Applied Energy. 98, p. 597-606Scopus citations: 15

**A fault-tolerant and energy efficient control strategy for primary-secondary chilled water systems in buildings**

Gao, D., Wang, S. & Sun, Y., Dec 2011, In : Energy and Buildings. 43, 12, p. 3646-3656Scopus citations: 22

**Fusion of redundant measurements for enhancing the reliability of total cooling load based chiller sequencing control**

Huang, G., Sun, Y. & Li, P., Nov 2011, In : Automation in Construction. 20, 7, p. 789-798Scopus citations: 12

**Energy performance and optimal control of air-conditioned buildings with envelopes enhanced by phase change materials**

Zhu, N., Wang, S., Ma, Z. & Sun, Y., Sep 2011, In : Energy Conversion and Management. 52, 10, p. 3197-3205Scopus citations: 63

**Online optimal ventilation control of building air-conditioning systems**

Wang, S., Zhongwei, S., Yongjun, S. & Na, Z., Feb 2011, In : Indoor and Built Environment. 20, 1, p. 129-136Scopus citations: 18

**Online optimal control strategies for multiple-chiller systems**

Wang, S., Sun, Y. & Ma, Z., Dec 2010, In : Huagong Xuebao/CIESC Journal. 61, SUPPL. 2, p. 86-92Scopus citations: 1

**A demand limiting strategy for maximizing monthly cost savings of commercial buildings**

Sun, Y., Wang, S. & Huang, G., Nov 2010, In : Energy and Buildings. 42, 11, p. 2219-2230Scopus citations: 35

**Model-based optimal start control strategy for multi-chiller plants in commercial buildings**

Sun, Y., Wang, S. & Huang, G., May 2010, In : Building Services Engineering Research and Technology. 31, 2, p. 113-129Scopus citations: 12

**Online sensor fault diagnosis for robust chiller sequencing control**

Sun, Y., Wang, S. & Huang, G., Mar 2010, In : International Journal of Thermal Sciences. 49, 3, p. 589-602Scopus citations: 21

**Chiller sequencing control with enhanced robustness for energy efficient operation**

Sun, Y., Wang, S. & Huang, G., Nov 2009, In : Energy and Buildings. 41, 11, p. 1246-1255Scopus citations: 38

**A data fusion scheme for building automation systems of building central chilling plants**

Huang, G., Wang, S., Xiao, F. & Sun, Y., May 2009, In : Automation in Construction. 18, 3, p. 302-309Scopus citations: 30

**Application of data fusion and FDD for improving the performance of chiller sequencing control**

Wang, S., Sun, Y., Huang, G. & Xiao, F., 2009, *Proceedings - 6th International Symposium on Heating, Ventilating and Air Conditioning, ISHVAC 2009*. Vol. 3. p. 2000-2007

**Robust chiller sequencing control for central chilling plant**

Huang, G., Sun, Y. & Wang, S., 2009, *Proceedings of 2009 7th Asian Control Conference, ASCC 2009*. p. 660-665  
5276392Scopus citations: 1

**Enhancing the reliability of chiller control using fused measurement of building cooling load**

Huang, G., Wang, S. & Sun, Y., Nov 2008, In : *HVAC and R Research*. 14, 6, p. 941-958Scopus citations: 21