

Donghun Kim

Energy Technologies Area, Building Tech. & Urban Systems Division, Lawrence Berkeley National Lab.
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EDUCATION *Ph.D.*, 2015, Mechanical Engineering, Purdue University, U.S.
 M.S., 2010, Mechanical Engineering, KAIST, S.Korea
 B.S., 2008, Mechanical Engineering, Pusan National University, S.Korea (valedictorian)

RESEARCH AREA HVAC&R, Thermal Energy System, Modeling, Advanced Control, Machine Learning, System Identification, Optimization, Smart Building+Grid Systems

EXPERIENCE *Computational Research Scientist, Building Technology & Urban Systems Division, Lawrence Berkeley National Laboratory* Mar/2019-present

- Virtual Sensor-based FDD and Control Suite for heat pumps (PI, Sponsor: U.S. DOE) Oct/2022-present
- [A Low-cost, scalable control solution for grid-interactive small and medium-sized commercial buildings](#) (PI, Sponsor: U.S. DOE) Oct/2021-present
- [CALFLEX Hub: Community-level Model Predictive Control](#) (Subtask lead, Sponsor: California Energy Commission) Mar/2022-present
- [HP-FLEX: Next-generation heat pump load flexibility](#) (Co-PI, Sponsor: California Energy Commission) Jun/2020-present
- Optimal design and control for combined heat pump and phase change material system (Researcher, Sponsor: U.S. DOE) Jan/2020 - Apr/2021
- MPC demonstration at campus-level district cooling plant for renewable energy integration and decarbonization (Researcher, Sponsor: U.S. DOE & China Clean Energy Research Center) Mar/2019-Oct/2021
- Integrated sensor and control system for occupants' thermal comfort control (Subtask lead, Sponsor: U.S. DOE) Mar/2020-present
- Fuzzy logic-based condensing cooling coil modeling in Modelica Buildings Library (Researcher, Sponsor: U.S. DOE) Jul/2019-Mar/2021

Research Assistant Professor, School of Mechanical Engineering, Purdue University
Jul/2016-Feb/2019

- Development, evaluation and demonstration of model predictive control for a chiller plant with ice storage tanks (Co-PI, Sponsor: Ingersoll Rand Inc.) Jan/2018-Jan/2019
- Development of a scalable approach for electrical demand management using the building as energy storage (PI, Sponsor: Southern California Edison & Duke Energy) Sep/2018 - Oct/2019
- Fast building energy simulation tool for optimal design and control analysis (PI, Sponsor: Kawnear) Jan/2018 - Jan/2019
- Extending the Unit Coordinator to handle economizers and heat pumping equipment (Sponsor: Johnson Controls Inc. & m-Cloud Corp.) Oct/2018-Sep/2019
- Development of fast dynamic simulation tool for Vapor Compression Cycles (PI, sponsor: LG & Johnson Controls Inc.) Oct/2018 - Sep/2019
- Laboratory evaluation of extremum seeking controller for variable speed DX unit (Researcher, Sponsor: Johnson Controls Inc.) 2017 - 2018
- Dynamic system modeling and control of an affordable Organic Rankine Cycle (Researcher, Sponsor: U.S. DOE) 2016 - 2017

- Extending Roof-top unit (RTU) coordinator for load shifting and enhanced peak load reduction (PI, Sponsor: Johnson Controls Inc. & m-Cloud Corp.) Oct/2016 - Sep/2017

Postdoc Researcher, Purdue University

Aug/2015 - Jun/2016

- Automation and demonstration of MPC in small/medium-sized commercial buildings (Co-PI, Sponsor: FDSI Inc.)
- Development of an integrated MPC for convenience stores with refrigerated cases (Researcher, Sponsor: U.S. DOE)
- Development of computationally efficient modeling approach for evaporator performance under frost conditions (Researcher, Sponsor: U.S. DOE)

Research Assistant, Purdue University

Jan/2011 - Aug/2015

- Development of disturbance modeling approach for building control
- Development/demonstration of a practical control algorithm for multiple rooftop unit (RTU) coordination
- Development of a reduced-order CFD coupled modeling approach for evaluation of control algorithms for small/medium size building
- Development of a model order reduction method for general multi-zone buildings for building control analysis and optimization
- Assessment of Modelica buildings library

Commissioned Researcher, Korea Institute of Energy Research Apr/2010 - Dec/2010

- System modeling of a 1kW solid-oxide fuel cell (SOFC) and experimental demonstration
- CFD analysis of electrochemically reacting flows and thermal stress analysis for a SOFC unit cell and experimental validation (10×10 planar type)
- Numerical analysis and experiment of a liquid fuel combustion

Research Assistant, KAIST, S.Korea

Feb/2008 - Feb/2010

- Study on *Rapid Distortion Theory* of turbulence flows
- Computational models of pressure strain correlation in turbulent homogeneous shear flows
- Low *Reynolds* number modification of C_μ in standard $\kappa - \epsilon$ turbulent model
- CFD analysis of *Ranque-Hilsch* vortex tube
- Fluid structure interaction analysis (wind effect on a bridge)

Rolls-Royce, Canada

Oct/2006 - Aug/2007

- Engine air system modeling and analysis of a *Rolls-Royce* low-cost dual-fuel combustion system
- Sizing and analyzing a fuel distribution system
- Analysis of transient auto-ignition impacts
- Analysis of valve water hammer impacts

RESEARCH AWARD AND GRANTS

- Virtual Sensor-based FDD and Control Suite for Widespread Adoption of Residential Embedded-FDD Heat Pumps, PI, Sponsor: U.S. DOE Building Technologies Office, \$1.3M Jul/2022

- Modeling and Control for Intelligent Autonomous Building Energy Environmental Management System, PI, Sponsor: Korean Energy Technology Evaluation and Planning (KETEP) via Dankook University, \$1.0M Oct/2021
- [A Low-cost, Scalable Control Solution for Grid-Interactive Small and Medium-Sized Commercial Buildings](#), PI, Sponsor: U.S. DOE Building Technologies Office, \$1.0M Jul/2021
- [Next Generation Heat Pump Load Flexibility](#), Co-PI, Sponsor: California Energy Commission (GFO-19-301), \$3.0M Jan/2020
- Development of a Fast Dynamic Simulation Tool for Vapor Compression Cycles, PI, Sponsor: LG and Johnson Controls Inc. via the Center for High-Performance Buildings (CHPB), \$60K Oct/2018
- Extending the Unit Coordinator to Handle Economizers and Heat Pumping Equipment, PI, Sponsor: Johnson Controls Inc. via CHPB, \$60K Nov/2017
- Development of a Scalable Approach for Electrical Demand Management using the Building as Energy Storage, PI, Sponsor: Southern California Edison and Duke Energy via CHPB, \$60K Nov/2017
- Fast Building Energy Simulation Tool for Optimal Design and Control Analysis, PI, Sponsor: Kawneer via CHPB, \$60K Nov/2017
- Development, Evaluation and Demonstration of Model Predictive Control for an Ice Storage System, Co-PI, Sponsor: Ingersoll Rand, \$70K Oct/2017
- Extending the RTU Coordinator for Load Shifting and Enhanced Peak Load Reduction, PI, Sponsor: Johnson Controls Inc. & mCloud Corp., \$50K Nov/2016
- Automation and Demonstration of an RTU Coordinator in Small Commercial Buildings, Co-PI, Sponsor: Johnson Controls Inc. & mCloud Corp., \$70K Nov/2015

OTHER AWARDS

- The 1st Runner Up paper, *the American Modelica 2022 Conference*, U.S. 2022
- Best paper, student best paper competition, *2nd International High-Performance Buildings Conference*, U.S. 2012
- ASHRAE graduate student grant-in-aid award, U.S. 2012
- Scholarship, Kwanjeong educational foundation, S.Korea 2009
- Valedictorian and the presidential gold medal for the highest GPA, Pusan National University, S.Korea 2008
- Selected as *Next Generation Researcher*, Korean Research Foundation, S.Korea 2006
- National engineering scholarship, Korea Science and Engineering Foundation, S.Korea 2003-2006

PROFESSIONAL SOCIETIES

- American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
 - Technical Subcommittee Chair, Building Operations Dynamics subcommittee of TC 7.5 Smart Building Systems
 - Corresponding Member, TC 1.13 Optimization
 - Corresponding Member, TC 1.4 Control Theory and Application

SERVICE

Book Chapter Contributor

- ASHRAE Handbook HVAC applications, "Chapter 43: Supervisory Control Strategies and Optimization", *American Society of Heating, Refrigerating and Air-Conditioning Engineers*, 2019.
- ASHRAE Handbook HVAC applications, "Chapter 63: Smart Building Systems", *American Society of Heating, Refrigerating and Air-Conditioning Engineers*, 2020.

Conference and Workshop Activities

- Student Competition Selection Committee Jul/2022
 - 25th International Compressor Engineering Conference
- Technical Subcommittee Chair: ASHRAE 2020 - present
 - Buildings Operations and Dynamics, TC 7.5 Smart Building Systems
- Organizer : Seminar Jun/2020
 - Grid-Interactive Efficient Buildings: Introduction and Demonstration Projects, *ASHRAE 2020 Virtual Conference*
- Organizing Committee : Workshop 2020
 - Model Predictive Control in Buildings: Today and Tomorrow, International Workshop, 2020 (deferred due to COVID-19)
- Organizing Committee : Conferences 2018
 - Purdue Herrick Conferences
- Organizing Committee : Conference Sessions 2017-2019
 - Control & Energy Management of Building Systems, *American Control Conference*
- Conference Session Chair
 - Advanced Equipment Controls II, *International Refrigeration and Air Conditioning Conference*, 2018
 - Building and Facility Automation II, *American Control Conference*, 2018
 - Control & Energy Management of Building Systems, *American Control Conference*, 2017
 - Transient System Modeling, *International Refrigeration and Air Conditioning Conference*, 2017
 - Air Conditioning Equipment Assessments, *High Performance Buildings Purdue Conference*, 2016

Reviewer

Journal Publications Reviewed

- Energy: (12/2021)
- Applied Energy: (11/2016, 10/2022)
- Energy and Buildings: (06/2016, 04/2017, 05/2017, 11/2017, 03/2017, 02/2018, 09/2018)
- IEEE Transactions on Industrial Informatics: (02/2016)

- IEEE Transactions on Control Systems Technology (11/2016, 09/2016, 04/2017, 11/2017, 01/2022)
- Journal of Building Performance Simulation: (11/2015, 02/2016, 06/2016, 03/2017, 02/2018, 03/2018, 04/2018, 05/2018)
- HVAC& R Research: (01/2015)
- Simulation, Transactions of the Society for Modeling and Simulation International: (09/2016)
- Journal of Dynamic Systems, Measurement and Control-ASME: (10/2018)

Conference Publications Reviewed

- 2019 American Control Conference (2)
- 2018 17th International Refrigeration and Air Conditioning Conference (11)
- 2018 IEEE Conference on Decision and Control (3)
- 2018 IEEE Conference on Control Technology and Applications (1)
- 2018 American Control Conference (1)
- 2017 IEEE Conference on Control Technology and Applications (1)
- 2017 Building Simulation 2017 (7)
- 2017 American Control Conference (2)
- 2016 Refrigeration and Air Conditioning Purdue Conference (3)
- 2016 High Performance Buildings Purdue Conference (2)
- 2016 American Control Conference (1)

Technical Advisory Committee

- NREL (National Renewable Energy Laboratory) project, The Vision for the Commercial Building Integration Laboratory in the ESIF, 2018-2019
- LBNL (Lawrence Berkeley National Laboratory) project, BOPTEST (Building Optimization Performance Tests), 2019 - present

EDUCATIONAL ACTIVITIES

- Guest Lecturer (Mar/2018): Building Mechanical and Electrical System Design (CE 41400), Purdue University. Created a course module (4 class periods) to teach air conditioning and heat pump systems.
- Graduate Student Advising (Aug/2017 - present)
 - Kairui Hao, (2020). Comparing the Economic Performance of Ice Storage and Batteries for Buildings with On-site PV Through Model Predictive Control (Master's thesis), *Purdue University*
 - Jiacheng Ma, (2019). Reduced Order Modeling for Vapor Compression System via Proper Orthogonal Decomposition (Master's thesis), *Purdue University*

SUPERVISOR & HOST

- A postdoctoral researcher Oct/2021 - present
- Two graduate students Aug/2017 - Feb/2019
- Affiliates
 - A general director of the Ministry of Trade, Industry and Energy (MOTIE) of the Republic of Korea Sep/2022 - present
 - A graduate student from Purdue University Jun/2022 - Aug/2022
 - A professor from Dankook University Sep/2020 - Aug/2022
 - A graduate student from Politecnico di Milano Mar/2020 - Nov/2020

TECHNICAL PRESENTA- TIONS AND INVITED TALKS

- Kim, D. (2022). Seminar 12: Presentation 2: Field Demonstration of Optimal Control for Campus Cooling Plant for Renewable Energy Integration and Decarbonization, *ASHRAE 2022 winter conference, Las Vegas*
- Kim, D. (2021). Optimal Operation of Campus-level Thermal Energy Storage Cooling Plant for Renewable Energy Integration, *Chonnam University, S.Korea*
- Kim, D. (2021). Recent Effort on the Use of Chiller System for Renewable Energy Integration and Decarbonization, *Pusan National University, S.Korea*
- Kim, D. (2020). First Experimental Results of Optimal Load Shifting for Small and Medium Sized Commercial Buildings: Impact on Energy Efficiency, *ASHRAE 2020 Virtual Conference*
- Kim, D. (2019). Energy Savings Potential of Model Predictive Control for Supervising Multiple Rooftop Unit Economizers, *Intelligent Building Operations Workshop, University of Colorado Boulder, Colorado*
- Kim, D. (2019). Evaluation of the Krylov Subspace Method for Model-Order Reduction to Enable Faster Building Simulations for Large-Scale Buildings, *Intelligent Building Operations Workshop, University of Colorado Boulder, Colorado*
- Hao, K., Kim, D. & Braun, J.E. (2019). Comparing the Economic Performance of Ice storage and Batteries for Buildings with On-site PV, *Intelligent Building Operations Workshop, University of Colorado Boulder, Colorado*
- Kim, D. (2019). Enabling Algorithm for Grid-Interactive Efficient Small & Medium Sized Commercial Buildings, *Korea Institute of Energy Research*
- Kim, D. (2019). Model Order Reduction Methods for Faster Building Simulations, *Pusan National University, S.Korea*
- Kim, D. (2019). System Identification for Building Thermal Systems under the Presence of Unmeasured Disturbances in Closed Loop Operation: Theoretical Analysis and Application, *Chonnam University, S.Korea*
- Kim, D. (2018). A Low-Cost MPC Solution for Small-Medium Sized Commercial Buildings, *Lawrence Berkeley National Laboratory*
- Kim, D. & Braun, J.E. (2018). Low-Cost MPC for Load Shaping in Small Commercial Buildings, *Intelligent Building Operations Workshop*
- Kim, D. (2018). Development and Large-Scale Deployment of a Model Predictive Controller for Coordinating Multiple Rooftop Units in Small and Medium Sized Commercial Buildings, *Penn State University*

PUBLICATION

Journal Papers

1. Zanetti, E., Kim, D., Blum, D., Scoccia, R. & Aprile, Marcello. (2022). Performance Comparison of Quadratic, Nonlinear, and Mixed Integer Nonlinear MPC Formulations and Solvers on an Air Source Heat Pump Hydronic Floor Heating System, *Journal of Building Performance Simulation*, 0, 1-19, doi.org/10.1080/19401493.2022.2120631
2. Hao, K., Kim, D. & Braun, J.E. (2022). Comparing the Economic Performance of Ice Storage and Batteries for Buildings with On-site PV through Model Predictive Control and Optimal Sizing, *Journal of Building Performance Simulation*, 15, 691-715, doi.org/10.1080/19401493.2022.2084161

3. Kim, D., Wang, Z., Brugger, J., Blum, D., Wetter, M., Hong, T. & Piette, M.A. (2022). Site Demonstration and Performance Evaluation of MPC for a Large Chiller Plant with TES for Renewable Energy Integration and Grid Decarbonization, *Applied Energy*, 321, 119343, doi.org/10.1016/j.apenergy.2022.119343
4. Kim, D. & Braun, J.E. (2022). MPC Solution for Optimal Load Shifting for Buildings with Multiple Staged Packaged Units: Experimental Demonstration, and Lessons Learned, *Energy and Buildings*, 266, 112118, doi.org/10.1016/j.enbuild.2022.112118
5. Blum, D., Wang, Z., Weyandt, C., Kim, D., Wetter, M., Hong, T. & Piette, M.A. (2022). Field Demonstration and Implementation Analysis of Model Predictive Control in an Office HVAC System, *Applied Energy*, 318, doi.org/10.1016/j.apenergy.2022.119104
6. Liu, H., Cai, J. & Kim, D. (2021). A Hierarchical Gray-box Dynamic Modeling Methodology for Direct-expansion Cooling Systems to Support Control Stability Analysis, *International Journal of Refrigeration*, 0140-7007, doi.org/10.1016/j.ijrefrig.2021.10.013
7. Ma, J., Kim, D., & Braun, J.E. (2021). Proper Orthogonal Decomposition for Reduced Order Dynamic Modeling of Vapor Compression Systems, *International Journal of Refrigeration*, 0140-7007, doi.org/10.1016/j.ijrefrig.2021.09.016
8. Ahn, H., Liu, J., Kim, D., Yin, R., Hong, T. & Piette, M. A. (2021). How Can Floor Covering Influence Buildings' Demand Flexibility?. *Energies*, 14(12), 3658. doi.org/10.3390/en14123658
9. Kim, D., Ma, J., Braun, J.E. & Groll, E.A. (2021). Fuzzy Modeling Approach for Transient Vapor Compression and Expansion Cycle Simulation, *International Journal of Refrigeration*, 121, 114-125, doi.org/10.1016/j.ijrefrig.2020.10.025
10. Drgoňa, J., Arroyo, J., Figueroa, I.C., Blum, D., Arendt, K., Kim, D., Ollé, E.P., Oravec, J., Wetter, M., Vrabie, D.L. & Helsen, L. (2020). All you need to know about model predictive control for buildings, *Annual Reviews in Control*, 50, 190-232, doi.org/10.1016/j.arcontrol.2020.09.001
11. Kim, D. & Braun, J.E. (2020). Model Predictive Control for Supervising Multiple Rooftop Unit Economizers to Fully Leverage Free Cooling Energy Resource, *Applied Energy*, 275, 115324. doi.org/10.1016/j.apenergy.2020.115324
12. Kim, D., Bae, Y., Yun, S. & Braun, J.E. (2020). A Methodology for Generating Reduced-Order Models for Large-Scale Buildings using the Krylov Subspace Method, *Journal of Building Performance Simulation*, 13(4), 419-429, doi.org/10.1080/19401493.2020.1752309
13. Kim, D. Braun, J.E. & Ramaraj, S. (2018). Computationally Efficient Modeling Strategy for Evaporator Performance under Frost Conditions, *International Journal of Refrigeration*, 96, 88-99. doi.org/10.1016/j.ijrefrig.2018.09.004
14. Kim, D. & Braun, J.E. (2018). Development, Implementation and Performance of a Model Predictive Controller for Packaged Air Conditioners in Small and Medium-sized Commercial Building Applications, *Energy and Buildings*, 178, 49-60, doi.org/10.1016/j.enbuild.2018.08.019
15. Kim, D., Cai, J., Braun, J.E. & Ariyur, K.B. (2018). System Identification for Building Thermal Systems under the Presence of Unmeasured Disturbances in Closed Loop Operation: Theoretical Analysis and Application, *Energy and Buildings*, 167, 359-369, doi.org/10.1016/j.enbuild.2017.12.007
16. Kim, D., Ziviani, D., Braun, J.E. & Groll, E.A. (2017). A Moving Boundary Modeling Approach for Heat Exchangers with Binary Mixtures, *Energy Procedia*, 129, 466-473, ISSN 1876-6102, doi.org/10.1016/j.egypro.2017.09.161

17. Ziviani, D., Kim, D., Subramanian, S.N., Braun, J.E. & Groll, E.A. (2017). Feasibility Study of ICE Bottoming ORC with Water/EG Mixture as Working Fluid, *Energy Procedia*, 128, 762-769, ISSN 1876-6102, doi.org/10.1016/j.egypro.2017.09.226
18. Kim, D., Cai, J., Ariyur, K.B. & Braun, J.E. (2016). System identification for building thermal systems under the presence of unmeasured disturbances in closed loop operation: Lumped disturbance modeling approach. *Building and Environment*, 107, 169-180. doi.org/10.1016/j.buildenv.2016.07.007
19. Ayed, S. B., Kim, D., Borggaard, J. & Cliff, E. M. (2016). Optimal control of indoor-air cooling in buildings using a reduced order model. *Energy*, 116, 1191-1204. doi.org/10.1016/j.energy.2016.10.022
20. Cai, J., Kim, D., R. Jaramillo, Braun, J.E. & Hu, J. (2016). A general multi-agent control approach for building energy system optimization. *Energy and Buildings*, 127, 337-351. doi.org/10.1016/j.enbuild.2016.05.040
21. Cai, J., Braun, J.E., Kim, D. & Hu, J. (2016). General approaches for determining the savings potential of optimal control for cooling in commercial buildings having both energy and demand charges. *Science and Technology for the Built Environment*, 22(6), 733-750. doi.org/10.1080/23744731.2016.1197716
22. Kim, D., Braun, J.E., Cai, J. & Fugate, D.L. (2015). Development and Experimental Demonstration of a Plug-And-Play Multiple RTU Coordination Control Algorithm for Small/Medium Commercial Buildings, *Energy and Buildings*, 107, 279-293. doi.org/10.1016/j.enbuild.2015.08.025
23. Kim, D., Braun, J.E., Cliff, E. & Borggaard, J. (2015). Development, Validation and Application of a Coupled Reduced-Order CFD Model For Building Control Applications. *Building and Environment*, 93(2), 97-111. doi.org/10.1016/j.buildenv.2015.05.032
24. Putta, V., Kim, D., Cai, J. & Hu, J. & Braun, J.E. (2015). Dynamic Programming Based Approaches to Optimal Rooftop Unit Coordination, *Science and Technology for the Built Environment*. 21(6), 752-760. doi.org/10.1080/23744731.2015.1059153
25. Kim, D. & Braun, J.E. (2015). A General Approach for Generating Reduced-Order Models for Large Multi-Zone Buildings. *Journal of Building Performance Simulation*. 8(6), 435-448. doi.org/10.1080/19401493.2014.977952

Conference Papers

1. Ham, S. & Kim, D. (2022). Hybrid Modeling Approach For Better Identification Of Building Thermal Network Model And Improved Prediction, *7th International Refrigeration and Air Conditioning Conference*, ID3489, <https://docs.lib.purdue.edu/ihpbc/420/>
2. Ma, J., Kim, D. & Braun, J.E. (2022). Improving Robustness of Transient Heat Exchanger Models with Non-uniform Frost Formation , *19th International Refrigeration and Air Conditioning Conference*, ID2586, <https://docs.lib.purdue.edu/iracc/2495/>
3. Ma, J., Kim, D. & Braun, J.E. (2022). Dynamic Modeling of Air Source Heat Pumps under Reverse-cycle Defrosting, *19th International Refrigeration and Air Conditioning Conference*, ID2190, <https://docs.lib.purdue.edu/iracc/2325/>
4. Kim, D. & Braun, J.E. (2022). Optimal Load Shifting for Multiple ON/OFF Air Conditioning Units: How to Avoid Unnecessary Peak for Precooling?, *7th*

- international High Performance Buildings Conference*, ID3543, <https://docs.lib.purdue.edu/ihpbc/430/>
5. Kim, D., Hong, T. & Piette, M.A. (2022). Generalized Disjunctive Programming-based, Mixed Integer Linear MPC Formulation for Optimal Operation of a District Energy System for PV Self-consumption and Grid Decarbonization: Field Implementation, *7th International High Performance Building Conference*, ID3223, <https://docs.lib.purdue.edu/ihpbc/396/>
 6. Ma, J., Kim, D. & Braun, J.E. (2021). A Nonlinear Model Order Reduction Framework for Dynamic Vapor Compression Cycles via Proper Orthogonal Decomposition, *19th International Refrigeration and Air Conditioning Conference*, ID2201, <https://docs.lib.purdue.edu/iracc/2108/>
 7. Ma, J., Kim, D. & Braun, J.E. (2021). A Trajectory Piecewise-Linear Approach to Model Order Reduction and Fast Simulation of Vapor Compression Cycles, *19th International Refrigeration and Air Conditioning Conference*, ID2202 <https://docs.lib.purdue.edu/iracc/2109/>
 8. Ayed, S. B., Kim, D., Borggaard, J. & Cliff, E. (2019). Uncertainties on Cooling Energy Based on Computational Indoor Air Modeling in Sports Facilities. *ASHRAE Transactions*, 125(2), 14+. [url link](#)
 9. Kim, D., Bae, Y., Braun, J.E. & Horton, T. (2018). A Tool for Generating Reduced-Order Models from Building Energy Simulation Input Files to Enable Optimal Design and Control Analysis, *2018 International High Performance Buildings Conference*, ID3614, <https://docs.lib.purdue.edu/ihpbc/312/>
 10. Ma, J., Kim, D. & Braun, J.E. (2018). Development of a Fast Method for Retrieving Thermodynamic Properties to Accelerate Transient Vapor Compression Cycle Simulation, *2018 International Refrigeration and Air Conditioning Conference*, ID2620, <https://docs.lib.purdue.edu/iracc/2048/>
 11. Kim, D. & Braun, J.E. (2018). Hierarchical Model Predictive Control Approach for Optimal Demand Response for Small/Medium-Sized Commercial Buildings, *2018 American Control Conference*, doi.org/10.23919/ACC.2018.8431566
 12. Kim, D., Cai, J. & Braun, J.E. (2017). Identification Approach to Alleviate Effects of Unmeasured Heat Gains for MIMO Building Thermal Systems, *The 2017 American Control Conference*, 50-55, doi.org/10.23919/ACC.2017.7962929
 13. Ziviani, D., Kim, D., Subramanian, S.N., Braun, J.E., Groll, E.A. (2017). Affordable Rankine Cycle (ARC) for Heavy-Duty Truck Waste Heat Recovery, *International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems, ECOS2017*
 14. Cai, J., Jhang, H., Kim, D., Braun, J.E. & Hu, J. (2017). Convex Optimization-Based Control of Sustainable Communities with On-Site Photovoltaic (PV) and Batteries, 1007-1012, *2017 IEEE Conference on Control Technology and Applications*, doi.org/10.1109/CCTA.2017.8062591
 15. Kim, D. & Braun, J.E. (2017). Field Performance of a Model Predictive Controller for Coordinating Multiple Rooftop Units, *2017 ASHRAE Annual Conference*, <https://www.techstreet.com/standards/lb-17-c057>
 16. Kim, D. & Braun, J.E. (2016). Integrated Control of RTUs and Refrigeration Equipment in Convenience Stores. *2016 High Performance Buildings Conference*, ID3642, <https://docs.lib.purdue.edu/ihpbc/222/>
 17. Kim, D., Ramaraj, S. & Braun, J. E. (2016). Computationally Efficient Modeling Approach for Evaporator Performance under Frost Conditions. *16th International*

- Refrigeration and Air Conditioning Conference, ID2643,
<https://docs.lib.purdue.edu/iracc/1820/>
18. Cai, J., Braun, J. E., Kim, D. & Hu, J. (2016). A Multi-Agent Control Based Demand Response Strategy for Multi-Zone Buildings. *2016 American Control Conference (ACC)*, 2365-2372. doi.org/10.1109/ACC.2016.7525271
 19. Cai, J., Kim, D., Braun, J. E. & Hu, J. (2016). Optimizing zone temperature setpoint excitation to minimize training data for data-driven dynamic building models. *2016 American Control Conference (ACC)*, 1478-1484, doi.org/10.1109/ACC.2016.7525125
 20. Kim, D., Braun, J. E., Cai, J. & Hu, J. (2015). Development of a plug-and-play multiple RTU coordination control algorithm for small/medium commercial buildings. *2015 American Control Conference (ACC)*, *IEEE*, 1659-1664, doi.org/10.1109/ACC.2015.7170971
 21. Kim, D., Braun, J.E., Cliff, E., Borggard, J. & Hu, J. (2015). Performance Evaluation of an RTU Coordination Controller using a Reduced-Order CFD Coupled Model, *ASHRAE Winter Conference*, [url link](#)
 22. V. Putta, Kim, D., J.Cai, Hu, J. & Braun, J.E. (2015). A Switched Dynamic Programming Approach towards Optimal Control of Multiple Rooftop Units, *2015 American Control Conference (ACC)*, *IEEE*, 281-287. doi.org/10.1109/ACC.2015.7170749
 23. Cai, J., Kim, D., V. Putta, Braun, J.E. and Hu, J. (2015). Multi-Agent Control for Centralized Air Conditioning Systems Serving Multi-Zone Buildings. *American Control Conference (ACC2015)*, *IEEE*, 986-993, doi.org/10.1109/ACC.2015.7170862
 24. Kim, D., Cai, J. & Braun, J.E. (2014). Comparisons of Model Structure and Identification Methods for Multiple-RTU coordination, *Proceedings of the 9th International Conference on System Simulation in Buildings - SSB 2014*
 25. Kim, D., Cliff, E. & Braun, J.E. & Borggaard, J. (2014). Development of Control Benefit Evaluation Tool for Small Commercial Buildings, *ASHRAE/IBPSA-USA Building Simulation Conference Atlanta, GA*, 64-71, [url link](#)
 26. Kim, D., Witmer, L., Brownson, J.R.S. & Braun, J.E. (2014). Impact of Solar Irradiance Data on MPC Performance of Multi-Zone Buildings. *Proceedings of the 3rd International High Performance Building Conference*, <https://docs.lib.purdue.edu/ihpbc/158/>
 27. V. Putta, Kim, D., Cai, J., Hu, J. & Braun, J.E. (2014) Distributed Model Predictive Control for Building HVAC systems: A Case Study. *Proceedings of the 3rd International High Performance Buildings Conference*, ID3611, <https://docs.lib.purdue.edu/ihpbc/150/>
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