



## CBE Publications & Report List February 2018

Papers that summarize research by CBE and affiliated institutions have appeared in the following journals, trade magazines, and conference proceedings. Many of these publications are also available from the eScholarship Repository, on-line at [http://escholarship.org/uc/cedr\\_cbe](http://escholarship.org/uc/cedr_cbe).

### 2018

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Kim, J., Y. Zhou, S. Schiavon, P. Raftery, and G. Brager. 2018. Personal comfort models: Predicting individuals' thermal preference using occupant heating and cooling behavior and machine learning. *Building and Environment*. February. <https://doi:10.1016/j.buildenv.2017.12.011> [www.escholarship.org/uc/item/54n6b7m3](http://www.escholarship.org/uc/item/54n6b7m3) **NEW**

Duarte, C., P. Raftery, S. Schiavon, and F. Bauman. 2018. How high can you go? Determining the highest supply temperature for high thermal mass radiant cooling systems in California. Accepted for publication in Proceedings of 4<sup>th</sup> International Conference on Building Energy Environment (COBEE 2018). February. **NEW**

Kim, J., S. Schiavon, and G. Brager. 2018. Personal comfort models—A new paradigm in thermal comfort for occupant-centric environmental control. *Building and Environment*. January. <https://doi.org/10.1016/j.buildenv.2018.01.023> [www.escholarship.org/uc/item/18d174zs](http://www.escholarship.org/uc/item/18d174zs) **NEW**

Jin, M. S. Liu, S. Schiavon, and C. Spanos. 2018. Automated mobile sensing: Towards high-granularity agile indoor environmental quality monitoring. *Building and Environment*. January. <https://doi.org/10.1016/j.buildenv.2017.11.003> [www.escholarship.org/uc/item/1kj1v33r](http://www.escholarship.org/uc/item/1kj1v33r) **NEW**

Raftery, P., L. Shuyang, B. Jin, M. Ting, G. Paliaga, and H. Cheng. 2018. Evaluation of a cost-responsive supply air temperature reset strategy in an office building. *Energy and Buildings*. January. <https://doi.org/10.1016/j.enbuild.2017.10.017> [www.escholarship.org/uc/item/1fk2m3v6](http://www.escholarship.org/uc/item/1fk2m3v6) **NEW**

### 2017

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Dennis, A. 2017. Global trends in thermal comfort in air conditioned and naturally ventilated offices in six climates. Master of Science Thesis. Dept. of Architecture, University of California, Berkeley. [www.escholarship.org/uc/item/203955bs](http://www.escholarship.org/uc/item/203955bs) **NEW**

Altomonte, S., S. Schiavon, M. Kent, and G. Brager. 2017. Indoor environmental quality and occupant satisfaction in green-certified buildings. *Building Research & Information*. November. <http://dx.doi.org/10.1080/09613218.2018.1383715> **NEW**

Jin, M., S. Liu, Y. Tian, M. Lu, S. Schiavon, and C. Spanos. 2017. Indoor environmental quality monitoring by autonomous mobile sensing. Accepted for publication in Proceedings of The 4<sup>th</sup> ACM International Conference on Systems for Energy-Efficient Built Environments (BuildSys 2017). November. **NEW**

- Sekhar, C., P. Anand, S. Schiavon, K. W. Tham, D. Cheong, and E. M. Saber. 2017. Adaptable cooling coil performance during part loads in the tropics—A computational evaluation. *Energy & Buildings*. November. <http://doi.org/10.1016/j.enbuild.2017.10.086> [www.escholarship.org/uc/item/176977qw](http://www.escholarship.org/uc/item/176977qw) **NEW**
- Gao, Y., H. Zhang, E. Arens, E. Present, B. Ning, Y. Zhai, J. Pantelic, M. Luo, L. Zhao, P. Raftery, and S. Liu. 2017. Ceiling fan air speeds around desks and office partitions. *Building and Environment*. November. <http://doi.org/10.1016/j.buildenv.2017.08.029> [www.escholarship.org/uc/item/3pq2j9mh](http://www.escholarship.org/uc/item/3pq2j9mh) **NEW**
- Ko, W.H., G. Brager, S. Schiavon, and S. Selkowitz. 2017. Building envelope impact on human performance and well-being: Experimental study on view clarity. CBE Internal Report. October. <https://escholarship.org/uc/item/Ogj8h384> **NEW**
- Xu, Z., G. Hu, C. Spanos, and S. Schiavon. 2017. PMV-based event-triggered mechanism for building energy management under uncertainties. *Energy and Buildings*. October. <http://doi.org/10.1016/j.enbuild.2017.07.008> [www.escholarship.org/uc/item/2z597468](http://www.escholarship.org/uc/item/2z597468) **NEW**
- Carbonnier, K., C. Higgins, F. Bauman, C. Karmann, P. Raftery, S. Schiavon, and L. Graham. 2017. Energy Use, Occupant Surveys and Case Study Summary: Radiant Cooling and Heating in Commercial Buildings. CBE Summary Report. September. [www.escholarship.org/uc/item/3cj9n3n4](http://www.escholarship.org/uc/item/3cj9n3n4) **NEW**
- Duarte, C., P. Raftery, and S. Schiavon. 2017. Development of whole building energy models for detailed energy insights of a large office building with green certification rating in Singapore. *Energy Technology*. September. <http://dx.doi.org/10.1002/ente.201700564> [www.escholarship.org/uc/item/0v1412gk](http://www.escholarship.org/uc/item/0v1412gk) **NEW**
- Raftery, P., C. Duarte, S. Schiavon, and F. Bauman. 2017. A new control strategy for high thermal mass radiant systems. Accepted for publication in Proceedings of *Building Simulation Conference 2017*. August. [www.escholarship.org/uc/item/5tz4n92b](http://www.escholarship.org/uc/item/5tz4n92b) **NEW**
- Ko, W.H. and S. Schiavon. 2017. Balancing thermal and luminous autonomy in the assessment of building performance. Accepted for publication in Proceedings of *Building Simulation Conference 2017*. August. [www.escholarship.org/uc/item/7b4909sf](http://www.escholarship.org/uc/item/7b4909sf)
- Smith, M.J., K. Warren, D. Cohen-Tanugi, S. Shames, K. Sprehn, J. Schwartz, H. Zhang, and E. Arens. 2017. Augmenting smart buildings and autonomous vehicles with wearable thermal technology. *Proceedings of HCI International 2017*, July, Boston: 550-561. [www.escholarship.org/uc/item/9q24x8p3](http://www.escholarship.org/uc/item/9q24x8p3) **NEW**
- Lipczynska, A., S. Schiavon, and L. Graham. 2017. Thermal comfort and self-reported productivity in an office with ceiling fans in the tropics. Proceedings of *Healthy Building 2017*. Lublin, Poland, July 2-5. **NEW**
- Zhai, Y., E. Arens, K. Elsworth, and H. Zhang. 2017. Selecting air speeds for cooling at sedentary and non-sedentary office activity levels. *Building and Environment*. June. <https://doi.org/10.1016/j.buildenv.2017.06.027> **NEW**
- Altomonte, S., S. Saadouni, M. Kent, and S. Schiavon. 2017. Satisfaction with indoor environmental quality in BREEAM and non-BREEAM certified office buildings. *Architectural Science Review*, Volume 4, 343-355. June. <http://dx.doi.org/10.1080/00038628.2017.1336983> **NEW**
- Higgins, C. and K. Carbonnier. 2017. Energy Performance of Commercial Buildings with Radiant Heating and Cooling. CBE Summary Report. June. [www.escholarship.org/uc/item/34f0h35q](http://www.escholarship.org/uc/item/34f0h35q) **NEW**
- Paliaga, G., F. Farahmand, P. Raftery, and J. Woolley. 2017. TABS Radiant Cooling Design & Control in North America: Results from Expert Interviews. CBE Summary Report. June. [www.escholarship.org/uc/item/0w62k5pq](http://www.escholarship.org/uc/item/0w62k5pq)

- Cohn, S. 2017. Development of a personal heater efficiency index. Master of Science Thesis. Dept. Of Architecture, University of California, Berkeley. [www.escholarship.org/uc/item/4dv241wd](http://www.escholarship.org/uc/item/4dv241wd) **NEW**
- Dutra de Vasconcellos, G. 2017. Evaluation of Annual Sunlight Exposure (ASE) as a Proxy to Glare: A Field Study in a NZEB and LEED Certified Office in San Francisco. Master of Science Thesis. Dept. of Architecture, University of California, Berkeley. [www.escholarship.org/uc/item/3js1z0b8](http://www.escholarship.org/uc/item/3js1z0b8) **NEW**
- Talami, R., C. Karmann, F. Bauman, S. Schiavon, and P. Raftery. 2017. Recent trends in radiant system technology in North America. Internal report. April. [www.escholarship.org/uc/item/7pz8p9r6](http://www.escholarship.org/uc/item/7pz8p9r6)
- Bauman, F., P. Raftery, J. Kim, S. Kaam, S. Schiavon, H. Zhang, E. Arens, K. Brown, T. Peffer, C. Blumstein, D. Culler, M. Andersen, G. Fierro, G. Paliaga, A. Pande, H. Cheng, and J. Stein. 2017. Changing the rules: innovative low-energy occupant-responsive HVAC controls and systems. Final project report, California Energy Commission. March. [www.escholarship.org/uc/item/23t9k6rm](http://www.escholarship.org/uc/item/23t9k6rm) **NEW**
- Karmann, K., F. Bauman, P. Raftery, S. Schiavon, W. Frantz, and K. Roy. 2017. Cooling capacity and acoustic performance of radiant slab systems with free-hanging acoustical clouds. *Energy and Buildings*. March. [www.escholarship.org/uc/item/8r07k5g3](http://www.escholarship.org/uc/item/8r07k5g3) <https://doi.org/10.1016/j.enbuild.2017.01.002>
- Kaam, S., P. Raftery, H. Cheng, and G. Paliaga. 2017. Time-averaged ventilation for optimized control of variable-air-volume systems. *Energy and Buildings*. March. [www.escholarship.org/uc/item/5jq443p4](http://www.escholarship.org/uc/item/5jq443p4) <http://dx.doi.org/10.1016/j.enbuild.2016.11.059>
- Filingeri, D., H. Zhang, and E. Arens. 2017. Characteristics of the local cutaneous sensory thermoneutral zone. *Journal of Neurophysiology*. February. <http://dx.doi.org/10.1152/jn.00845.2016> <http://escholarship.org/uc/item/1t35k0g8> <http://jn.physiology.org/content/117/4/1797> **NEW**
- Ning, B., S. Schiavon, and F. Bauman. 2017. A novel classification scheme for design and control of radiant system based on thermal response time. *Energy and Buildings*. February. [www.escholarship.org/uc/item/2j75g92w](http://www.escholarship.org/uc/item/2j75g92w) <http://dx.doi.org/10.1016/j.enbuild.2016.12.013>
- Cheung, T., S. Schiavon, E. Gall, M. Jin, and W. Nazaroff. 2017. Longitudinal assessment of thermal and perceived air quality acceptability in relation to temperature, humidity, and CO2 exposure in Singapore. *Building and Environment*. January. [www.escholarship.org/uc/item/483474qj](http://www.escholarship.org/uc/item/483474qj)

## 2016

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- Liu, S., S. Schiavon, A. Kabanshi, and W. Nazaroff. 2016. Predicted Percentage Dissatisfied with Ankle Draft. *Indoor Air*. December. [www.escholarship.org/uc/item/9076254n](http://www.escholarship.org/uc/item/9076254n) <http://dx.doi.org/10.1111/ina.12364>
- Liu, S., L. Yin, W.K. Ho, K.V. Ling, and S. Schiavon. 2016. A Tracking Cooling Fan Using Geofence and Camera-Based Indoor Localization. *Building and Environment*. November. [www.escholarship.org/uc/item/5br8q4x4](http://www.escholarship.org/uc/item/5br8q4x4) <http://dx.doi.org/10.1016/j.buildenv.2016.11.047>
- Ghahramani, A., G. Castro, B. Becerik-Gerber, and X. Yu. Infrared thermography of human face for monitoring thermoregulation performance and estimating personal thermal comfort. *Building and Environment*. November. <https://doi.org/10.1016/j.buildenv.2016.09.005> [www.escholarship.org/uc/item/37d3q23w](http://www.escholarship.org/uc/item/37d3q23w) **NEW**
- de Dear, R., V. Foldvary, H. Zhang, E. Arens, M. Luo, T. Parkinson, X. Du, W. Zhang, C. Chun, and S. Liu. 2016. Comfort is in the mind of the beholder: A review of progress in adaptive thermal comfort research over the past two decades. *The Fifth International Conference on Human-Environment System*. Nagoya, Japan. October 29-November 2. <http://dx.doi.org/10.1016/j.buildenv.2017.01.014> [www.escholarship.org/uc/item/62n2985w](http://www.escholarship.org/uc/item/62n2985w)

- Karmann, C., S. Schiavon, and F. Bauman. 2016. Thermal comfort in buildings using radiant vs. all-air systems: A critical review. *Building and Environment*. October. [www.escholarship.org/uc/item/1vb3d1j8](http://www.escholarship.org/uc/item/1vb3d1j8)
- Schiavon, S., B. Yang, Y. Donner, V. Chang, and W. Nazaroff. 2016. Thermal comfort, perceived air quality and cognitive performance when personally controlled air movement is used by tropically acclimatized persons. *Indoor Air*. October. <http://dx.doi.org/10.1111/ina.12352> **NEW**
- Kim, H. and E. Macdonald. 2016. Measuring the effectiveness of San Francisco's planning standard for pedestrian wind comfort. *International Journal of Sustainable Development and World Ecology*. October. [www.escholarship.org/uc/item/748006tf](http://www.escholarship.org/uc/item/748006tf)
- Kim, A., S. Schiavon, L. Graham, and W.H. Ko. 2016. Lighting for circadian health: Survey module and non-invasive open-source wearable sensor system. Internal report. October. [www.escholarship.org/uc/item/8bf683j8](http://www.escholarship.org/uc/item/8bf683j8)
- Zhao, P., T. Peffer, R. Narayanamurthy, G. Fierro, P. Raftery, S. Kaam, and J. Kim. 2016. Getting into the zone: how the internet of things can improve energy efficiency and demand response in a commercial building. *Proceedings of ACEEE Summer Study on Energy Efficiency in Buildings*. Pacific Grove, CA. August 21-26. 12 pp. [www.escholarship.org/uc/item/5bm711zk](http://www.escholarship.org/uc/item/5bm711zk)
- Peffer, T., M. Pritoni, G. Fierro, S. Kaam, J. Kim, and P. Raftery. 2016. Writing controls sequences for buildings: from HVAC industry enclave to hacker's weekend project. *Proceedings of ACEEE Summer Study on Energy Efficiency in Buildings*. Pacific Grove, CA. August 21-26. 12 pp. [www.escholarship.org/uc/item/3671b82b](http://www.escholarship.org/uc/item/3671b82b)
- Andersen, M., G. Fierro, S. Kumar, J. Kim, E. Arens, H. Zhang, P. Raftery, and D. Culler. 2016. Well-connected microzones for increased building efficiency and occupant comfort. *Proceedings of ACEEE Summer Study on Energy Efficiency in Buildings*. Pacific Grove, CA. August 21-26. 16 pp. [www.escholarship.org/uc/item/7710g5cb](http://www.escholarship.org/uc/item/7710g5cb)
- Feng, J.D., S. Schiavon, and F. Bauman. 2016. New method for the design of radiant floor cooling systems with solar radiation. *Energy and Buildings* 125, 9-18. August. <http://dx.doi.org/10.1016/j.enbuild.2016.04.048> [www.escholarship.org/uc/item/5sj3h2s5](http://www.escholarship.org/uc/item/5sj3h2s5)
- Gall, E., T. Cheung, I. Luhung, S. Schiavon, and W. Nazaroff. 2016. Real-time monitoring of personal exposure to carbon dioxide. *Building and Environment* 104, 59-67. August. <http://dx.doi.org/10.1016/j.buildenv.2016.04.021> [www.escholarship.org/uc/item/0q1269cv](http://www.escholarship.org/uc/item/0q1269cv)
- Gandhi, P. and G. Brager. 2016. Commercial office plug load energy consumption trends and the role of occupant behavior. *Energy and Buildings* 125, 1-8. August. [doi:10.1016/j.enbuild.2016.04.057](http://dx.doi.org/10.1016/j.enbuild.2016.04.057)
- Altomonte, S., S. Saadouni, S. Schiavon. 2016. Occupant Satisfaction in LEED and BREEAM-Certified Office Buildings. *Proceedings of PLEA 2016 - 36th International Conference on Passive and Low Energy Architecture: Cities, Buildings, People: Towards Regenerative Environments*. Los Angeles, CA. July 10-13. [www.escholarship.org/uc/item/77j647gr](http://www.escholarship.org/uc/item/77j647gr)
- Gall, E., T. Cheung, L. Luhung, S. Schiavon, and W. Nazaroff. 2016. Real-time measurement of personal exposures to carbon dioxide. *Proceedings of the 14th International Conference Indoor Air 2016*. Ghent, Belgium. July 3-8.
- Landsman, J. and G. Brager. 2016. Performance, prediction, and optimization of night ventilation across different climates: an assessment of mechanical and natural night ventilation *Proceedings of PLEA 2016 - 36th International Conference on Passive and Low Energy Architecture: Cities, Buildings, People: Towards Regenerative Environments*. Los Angeles, CA. July 11-13. [www.escholarship.org/uc/item/5cq9t8d2](http://www.escholarship.org/uc/item/5cq9t8d2)

Kabanshi, A., S. Liu, and S. Schiavon. 2016. Potential adaptive behaviors to counteract thermal discomfort in spaces with displacement ventilation or underfloor air distribution systems. *Proceedings of the 14th International Conference Indoor Air 2016*. Ghent, Belgium. July 3-8.

Filingeri, D. 2016. Neurophysiology of skin thermal sensations. *Comprehensive Physiology* 6, 1429-1491. July. <http://dx.doi.org/10.1002/cphy.c150040>

Adams, K., E. Arens, D. Banks, S. Brunswick, G. Carrilho da Graca, N. Daish, S. Dutton, M. Fountain, B. Fisk, R. Gerard, F. Gillan, G. Gross, P. Haves, M. Hill, A. Honnekeri, M. Hovanec, T. Lawton, P. Linden, M. Pigman, P. Switenki, G. Szakats, R. Thomas, Y. Zhai, and H. Zhang. 2016. Natural ventilation for energy savings in California commercial buildings. Final Project Report, California Energy Commission. June. 516 pp. <http://www.escholarship.org/uc/item/4cd386s7>

Foldvary, V. 2016. Assessment of indoor environmental quality in residential buildings before and after renovation. Doctor of Philosophy Dissertation. Dept. of Civil Engineering, Slovak University of Technology in Bratislava. June. [www.escholarship.org/uc/item/7p13k7zd](http://www.escholarship.org/uc/item/7p13k7zd)

Landsman, J. 2016. Performance, Prediction and Optimization of Night Ventilation across Different Climates. Master of Science Thesis. Dept. of Architecture, University of California, Berkeley. [www.escholarship.org/uc/item/6n99w3bx](http://www.escholarship.org/uc/item/6n99w3bx)

Bauman, F., T. Webster, and D. Dickerhoff. 2016. Field Study of Capitol Area East End Complex (CAEEC) Sacramento, California. Final Project Report, California Department of General Services. May. [www.escholarship.org/uc/item/066992h3](http://www.escholarship.org/uc/item/066992h3) **NEW**

Indraganti, M., J. Lee, H. Zhang, and E. Arens. 2016. Why is the Indian Sari an all-weather gear? Clothing insulation of Sari, Salwar-Kurti, Pancha, Lungi, and Dhoti. *Proceedings of the 9<sup>th</sup> Windsor Conference*. April. [www.escholarship.org/uc/item/0080t60q](http://www.escholarship.org/uc/item/0080t60q) (Earlier version in *Proceedings of the 8<sup>th</sup> Windsor Conference*. April 2014. <http://www.escholarship.org/uc/item/1wp225b2>)

Kim, H., and E. Macdonald. 2016. Does wind discourage sustainable transportation mode choice? Findings from San Francisco, California, USA. *Sustainability* 8, 257. March. <http://dx.doi.org/10.3390/su8030257> [www.escholarship.org/uc/item/6gz6t90p](http://www.escholarship.org/uc/item/6gz6t90p)

Schiavon, S., D. Rim, W. Pasut, and W. Nazaroff. 2016. Sensation of draft at uncovered ankles for women exposed to displacement ventilation and underfloor air distribution systems. *Building and Environment* 96, 228-236. February. <http://dx.doi.org/10.1016/j.buildenv.2015.11.009> [www.escholarship.org/uc/item/4p692575](http://www.escholarship.org/uc/item/4p692575)

## 2015

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Yang, B., S. Schiavon, C. Sekhar, K.W. Cheong, K.W. Tham, and W. Nazaroff. 2015. Cooling efficiency of a brushless direct current stand fan. *Building and Environment* 85, 196-204. <http://dx.doi.org/10.1016/j.buildenv.2014.11.032> [www.escholarship.org/uc/item/0767n79h](http://www.escholarship.org/uc/item/0767n79h)

Duarte, C., P. Raftery, and S. Schiavon. 2015. SinBerBEST technology energy assessment report. [www.escholarship.org/uc/item/7k1796zv](http://www.escholarship.org/uc/item/7k1796zv)

Fannon, D. 2015. Developing low-energy personal thermal comfort systems: design, performance, testing, and research methods. Master of Science Thesis. Dept. of Architecture, University of California, Berkeley. [www.escholarship.org/uc/item/92h1p54j](http://www.escholarship.org/uc/item/92h1p54j)



- Shitzer, A., E. Arens, and H. Zhang. 2015. Compilation of basal metabolic and blood perfusion rates in various multi-compartment, whole-body thermoregulation models. *International Journal of Biometeorology*, November. DOI 10.1007/s00484-015-1096-5. [www.escholarship.org/uc/item/7jt469t3](http://www.escholarship.org/uc/item/7jt469t3)
- Bauman, F., P. Raftery, and C. Karmann. 2015. Lessons learned from field monitoring of two radiant slab office buildings in California. Proceedings, 6th International Building Physics Conference. Torino, Italy. June 14-17. [www.escholarship.org/uc/item/6tj0s2bm](http://www.escholarship.org/uc/item/6tj0s2bm)
- Indraganti, M., J. Lee, H. Zhang, and E. Arens. 2015. Thermal adaptation and insulation opportunities provided by different drapes of Indian saris. *Architectural Science Review* 58, 1. <http://dx.doi.org/10.1080/00038628.2014.976540> [www.escholarship.org/uc/item/8f10n38d](http://www.escholarship.org/uc/item/8f10n38d)
- Zhai, Y., C. Elsworth, E. Arens, H. Zhang, Y. Zhang, and L. Zhao. 2015. Using air movement for comfort during moderate exercise. *Building and Environment* 94, 344-352. <http://escholarship.org/uc/item/6018h6wz>
- Zhai, Y., Y. Zhang, H. Zhang, W. Pasut, E. Arens, and Q. Meng. 2015. Human comfort and perceived air quality in warm and humid environments with ceiling fans. *Building and Environment*, 90, 178-185. <https://doi.org/10.1016/j.buildenv.2015.04.003>
- Gandhi, P. 2015. Commercial office plug load energy consumption trends and the role of occupant behavior. Master of Science Thesis. Dept. of Architecture, University of California, Berkeley. [www.escholarship.org/uc/item/2c76d4nw](http://www.escholarship.org/uc/item/2c76d4nw)
- Schiavon S., B. Yang, W.C. Chang, and W. Nazaroff. 2015. Effect of air temperature and personally controlled air movement on thermal comfort for tropically acclimatized persons. *Proceedings of the 9<sup>th</sup> International Symposium on Heating, Ventilation and Air Conditioning (ISHVAC) and the 3<sup>rd</sup> International Conference on Building Energy and Environment (COBEE)*. Tianjin, China. July 12-15.
- Schiavon, S., F. Bauman, B. Tully, and J. Rimmer. 2015. Chilled ceiling and displacement ventilation system: Laboratory study with high cooling load. *Science and Technology for the Built Environment* (Previously HVAC&R). <http://dx.doi.org/10.1080/23744731.2015.1034061> <http://escholarship.org/uc/item/58m8302p>
- Rim, D., S. Schiavon, and W. Nazaroff. 2015. Energy and cost associated with ventilating office buildings in a tropical climate. *PLoS ONE*, 10(5): e0127930. <http://dx.doi.org/10.1371/journal.pone.0127930>
- Raftery, P., F. Bauman, S. Schiavon, and T. Epp. 2015. Laboratory testing of a displacement ventilation diffuser for underfloor air distribution systems. *Energy and Buildings*. doi:10.1016/j.enbuild.2015.09.005 [www.escholarship.org/uc/item/9qz2w733](http://www.escholarship.org/uc/item/9qz2w733)
- Ning, B., S. Schiavon, and F. Bauman. 2015. A Classification Scheme for Radiant Systems based on Thermal Time Constant. *Proceedings of the 9<sup>th</sup> International Symposium on Heating, Ventilation and Air Conditioning (ISHVAC) and the 3<sup>rd</sup> International Conference on Building Energy and Environment (COBEE)*. Tianjin, China. July 12-15. [www.escholarship.org/uc/item/1sx88662](http://www.escholarship.org/uc/item/1sx88662)
- Bauman, F., H. Zhang, E. Arens, P. Raftery, C. Karmann, J. Feng, Y. Zhai, D. Dickerhoff, S. Schiavon, and X. Zhou. 2015. Advanced Integrated Systems Technology Development: Personal Comfort Systems and Radiant Slab Systems. *Final report to CEC*. June. [www.escholarship.org/uc/item/88p8v7zb](http://www.escholarship.org/uc/item/88p8v7zb) <http://www.energy.ca.gov/2016publications/CEC-500-2016-068/index.html>
- Zhang, H., E. Arens, M. Taub, D. Dickerhoff, F. Bauman, M. Fountain, W. Pasut, D. Fannon, Y.C. Zhai, and M. Pigman. 2015. Using footwarmers in offices for thermal comfort and energy savings. *Energy and Buildings* 104, 233-243. <http://dx.doi.org/10.1016/j.enbuild.2015.06.086> [www.escholarship.org/uc/item/3cf6268m](http://www.escholarship.org/uc/item/3cf6268m)

- Arens, E., H. Zhang, T. Hoyt, S. Kaam, F. Bauman, Y.C. Zhai, G. Paliaga, J. Stein, B. Tully, J. Rimmer, and J. Toftum. 2015. Effects of Diffuser Airflow Minima on Occupant Comfort, Air Mixing, and Building Energy Use (RP-1515). *Science and Technology for the Built Environment* 0, 1-16.  
<http://dx.doi.org/10.1080/23744731.2015.1060104> [www.escholarship.org/uc/item/6kj9t7cj](http://www.escholarship.org/uc/item/6kj9t7cj)
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