Editorial

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With the successful publication of this issue, the *Building Simulation* journal is now in its third year of operation. Needless to say, this success would not be possible without the enthusiastic support of many colleagues, friends, authors, reviewers, and editorial board members. With their continuous support, we are most confident that the journal is heading to its next level of excellence.

Beginning with Volume 1, the journal established the annual Best Paper Awards. I am pleased to announce that the following two papers have received a Best Paper Award for Volume 2 (2009) of *Building Simulation*:

- Demetriou DW, Khalifa HE (2009). Evaluation of distributed environmental control systems for improving IAQ and reducing energy consumption in office buildings. *Building Simulation*, 2: 197 – 214.
- Jiang Y, Zhao B, Li X, Yang X, Zhang Z, Zhang Y (2009). Investigating a safe ventilation rate for the prevention of indoor SARS transmission: An attempt based on a simulation approach. *Building Simulation*, 2: 281 – 289.

Selection of the best papers is based on nominations from all the editorial board members and the recommendation of an award selection committee consisting of William Nazaroff (Chair), Lixing Gu, and Philip Haves. We thank them for an outstanding job in selecting the winners.

The importance of building simulation has motivated substantial scientific research over the past few decades. *Building Simulation* provides an important venue to discuss the results of such studies. In the coming one or two years, the editors plan to invite selected authors to contribute their papers for publication in special issues with topics of significant interest among the scientific community.

This special issue publishes seven invited and peer reviewed papers focusing on indoor/outdoor airflow and air quality, which corresponds to Column C of the journal.

Understanding airflow, heat transfer and mass (contaminant) indoor/outdoor transfer is critical to the study of health, productivity, thermal comfort, ventilation system optimization and architectural and urban planning. Simulation based on numerical methods provides a straightforward view of the physical characteristics of airflow, together with heat and mass transfer in and around a building environment.

The first two papers in this special issue address simulation of aerosol particle dispersion in an indoor environment. Tung et al. performed a computational fluid dynamics (CFD) simulation on indoor airflow and particle dispersion inside clean rooms of ISO cleanliness Class 7 with different ventilation arrangements and room layouts. The results provide possible guidance for ventilation system and room design for similar clean rooms. This study also demonstrates the benefit of indoor airflow and contaminant (particle) transport simulation for engineering applications. Zhao et al. measured and simulated aerosol particle pollution in three university cafeterias, where indoor air quality problems may be of special interest. The authors simulated the airflow and cooking-generated particle concentrations by both CFD and multizone network model. They also tested the effect of different approaches of directing and blocking smoke exhaust in the cooking area, and the effect of ventilation mode/rate in the dining area on controlling the cooking-generated particle pollution. These results are expected to aid in ventilation design and functional zone arrangement in large cafeterias.

The next three papers discuss simulations and measurements of airflow, temperature and pollutant distribution in urban/outdoor environments. Bu et al. presented a numerical and experimental study on the natural ventilation driven by wind force in areaway space. The mean air velocity, turbulence and pollutant concentration were measured in a wind tunnel for a rectangular, cavity-like areaway model. The measured flow field was used to validate the numerical simulated results. Key factors in determining the concentration level were found. These results are of practical importance for the design of areaways in residential buildings. Wang and Emmerich modeled multiple scenarios of a portable generator operated outdoors. This was done by using the CONTAM indoor air quality model coupled with a CFD model to predict CO concentrations near and within a home. They found that a generator positioned 4.6 m away from open windows may not be far enough away to limit CO entry into a house. They also studied the influence of wind direction and wind speed on CO infiltration/entry and suggested that the generator should ideally be positioned outside of the

airflow recirculation region near the open windows for the purpose of reducing CO entry. In contrast to the above two studies, which address air quality problems, the article by Hsieh et al. is focused on thermal environment of a new riverside residential development in summer. The stepwise CFD simulation of radiation, conduction and convection was employed to investigate the factors influencing the thermal environment of the studied area which consisted of more than one hundred detached houses built next to a river. The effects of the river, permeable pavements, green space and building arrangement were examined by means of numerical simulation.

The final two papers focus on equipment-related airflow topics. One of them focuses on energy and the other on air quality. Huang and Tuan presented the application of simulation on a new concept in energy-saving equipment: a regional air-conditioning mechanism. They simulated the airflow and temperature distribution while changing the cool air inlet velocity, negative outlet pressure and distance between the floor surface and outlet port of an airflow circulation cell. The simulated results were used to optimize energy savings for the mechanism. Pei and Zhang developed two models to simulate the performance of sorbent air filters/cleaners. Experiments were performed to validate

the models before applying the models to simulate the effect of different factors, including sorbent filter design parameters, environmental conditions and sorbent properties. The presented model may provide a useful tool for designing, selecting or maintaining sorption-based filters/air cleaners for non-industrial building applications.

We hope that you find this special issue useful.

Column C Special Issue Co-editors

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