



August 1-4, 2012

**The Second International
Conference on Building
Energy and Environment
(COBEE2012)**



**CONFERENCE
PROGRAM**

**UNIVERSITY OF COLORADO
BOULDER, COLORADO, US**

Welcome to COBEE2012!



Energy and environment concerns have been ranked among the top problems facing society for the next 50 years, of which buildings are a major factor. Buildings use a significant portion of electricity and thermal energy, and the conversion of primary energy to electricity and thermal energy accounts for a large portion of greenhouse gas emissions. Energy is demanded and used to maintain comfortable and healthy environments in buildings, although such environments are difficult to achieve. Indeed, reports of building related symptoms and health complaints have been increasing in the past decade.

Following the success of the first COBEE conference held in Dalian, China, the COBEE2012 is to provide a platform for discussing energy and environmental issues and for initiating collaborations among building engineers, environmental scientists, architects, facility managers, and policy makers. The conference will provide a forum for discussion of the challenges and opportunities the international community encounters, while enabling collaboration that encourages the participants from both developed and several of developing countries to work together to solve the world's most critical problems.

The COBEE2012 is held in beautiful Boulder, Colorado, one of the top ten livable cities in the US. Located in the Front Range at the edge of the Rockies, Boulder is a vibrant and exciting city with access to hundreds of outdoor recreation activities, fantastic dining options, and an involved and passionate local community that is dedicated to the responsible and effective use of renewable energy and green building practices. The world renowned National Renewable Energy Laboratory (NREL) and National Center for Atmospheric Research (NCAR), and the Renewable and Sustainable Energy Institute (RASEI) at University of Colorado, have secured Boulder as a vital hub for environmental and energy related activity in the US.

I sincerely hope you enjoy your stay in Boulder!!!

A handwritten signature in blue ink, appearing to read "Z. Zhai", with a long horizontal flourish extending to the right.

Prof. Zhiqiang (John) Zhai, Dr.Eng., Ph.D.
University of Colorado at Boulder, CO, USA
General Chair of COBEE2012

Table of Contents

Welcome to COBEE2012!	I
Table of Contents	III
General Information	4
Emergency Call: 911	4
Arrival at Denver International Airport	4
Conference Venue	4
Registration	8
Name Badges	9
Conference Facilities	9
Social Events	10
Technical Tour	11
Instructions for Speakers	11
Practical Information	12
COBEE2012 Secretariats	13
General Timetable	14
Detailed Technical Program	15
Wednesday, August 1, 2012	15
Thursday, August 2, 2012	15
Friday, August 3, 2012	33
Saturday, August 4, 2012	45
Index	54
Chair Index	54
Presenter Index	56
Organizers	59
Organizing Committee	59
International Advisory Committee	59
International Scientific Committee	60

General Information

Emergency Call: 911

All emergency issues must be reported to the COBEE2012 Conference Secretariat.

Cell Phone: +001-303-502-7339 or +001-517-525-3349

Arrival at Denver International Airport

The destination airport for Boulder is Denver International Airport (DEN). Taxi, bus and door-to-door shuttle are available to transport between DEN and Boulder. After you exit the customs service, you can take Taxi (about \$150), Shuttle (about \$40) or Bus (about \$13) to the conference hotel. It is about 1.5 hour from the airport to the hotel by the bus. You can buy bus or shuttle ticket at the arrival terminal of DEN. And you can book your return shuttle at the conference hotel. Please refer to <http://www.flydenver.com/> for more info.

Conference Venue

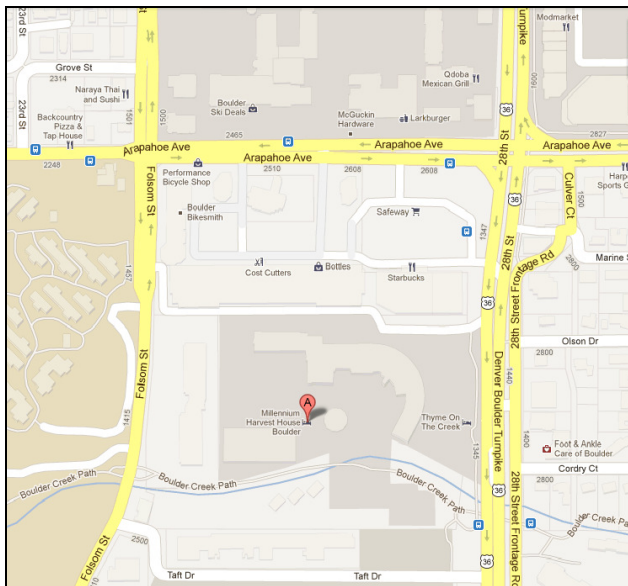
Millennium Harvest House Boulder is the headquarter hotel of the COBEE2012:

Millennium Harvest House Boulder

1345 28th Street, Boulder, CO, 80302, USA

Tel: 001-303-998-3823

The Millennium Hotel Harvest House Boulder, near Denver, CO, provides modern accommodations in a clean and stylish establishment. Situated at the base of the Rocky Mountains alongside Boulder Creek Path, the hotel affords spectacular views of the surrounding forests, plains and craggy Peaks. The University of Colorado lies just 100 yards from the hotel, while downtown amenities are close at hand, including Pearl Street Mall and 29th Street Retail District.



Map of Conference Venue and Accommodation



Conference Venue Floor Plans

The conference room arrangements are:

Grand Ballroom: Opening Ceremony, Welcome Reception and Dinner, and Plenary Session

Grand Ballroom A (Canyon Room): Parallel Sessions

Grand Ballroom B (Flagstaff Room): Parallel Sessions

Grand Ballroom C (Sugarloaf): Parallel Sessions

Grand Ballroom D (Trail Ridge): Parallel Sessions

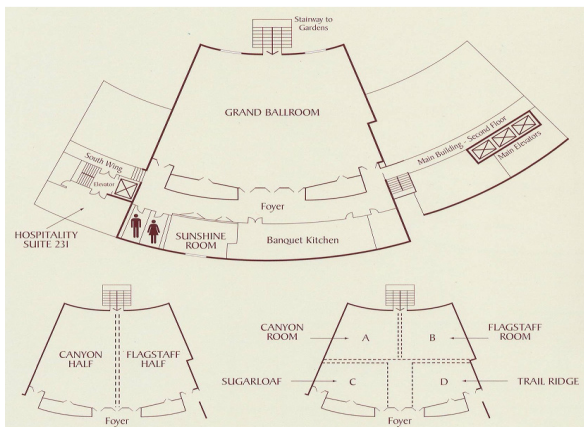
Millennium Room: Workshop

Century Room: Workshop

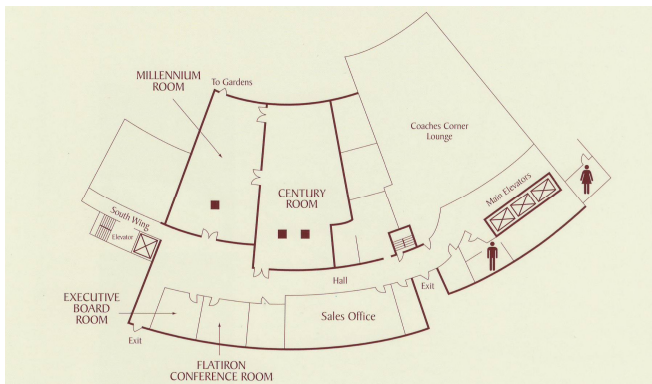
Pavilion: Banquet Dinner, Closing Session, and Lunches

The Registration Desk/Information Desk: Locate at Sunshine Room on the 2nd floor opposite to Grand Ball Room

Coffee and Tea Break: Locate at the Foyer in the hallway of Grand Ball Room



Second Floor



First Floor

Registration

Registration Hours

The Registration Desk/Information Desk is located at Sunshine Room on the 2nd floor opposite to Grand Ball room. The open hours are:

14:00 – 18:00 on Wednesday, August 1

07:30 – 18:00 on Thursday, Friday, August 2, 3

07:30 – 12:00 on Saturday, August 4

On-site Registration Fees

Participant	US \$900
Student (Please bring student ID)	US \$500
Each extra paper (when over two)	US \$200
Accompanying person (package)	US \$400
Extra reception dinner ticket	US \$50
Extra banquet dinner ticket	US \$50

The registration for participants and students includes:

- Opening ceremony
- All technical sessions
- One copy of conference program
- One electronic copy of conference proceedings
- Coffee and tea breaks
- One technical tour
- Closing ceremony
- Lunches on August 2, 3, 4
- Welcome reception dinner on August 1
- Live band BBQ dinner on August 3

The registration for accompanying persons includes:

- Opening ceremony

- Coffee and tea breaks
- Closing ceremony
- Lunches on August 2, 3, 4
- Welcome reception dinner on August 1
- Live band BBQ dinner on August 3

Name Badges

A name badge will be issued to each registered participant. The name badge must be shown for all the conference events.

Conference Facilities

Projectors

Multimedia LCD projectors will be available in all the meeting rooms.

Speaker's Lounge

The Registration/Information Desk at Sunshine Room on the 2nd floor opposite to Grand Ball Room is served as the speaker's lounge. The open hours are:

14:00 – 18:00 on Wednesday, August 1

07:30 – 18:00 on Thursday, Friday, August 2, 3

07:30 – 12:00 on Saturday, August 4

All the speakers must give their PowerPoint files at least **half a day** prior to their sessions to the Information Desk to ensure they will work properly on COBEE PCs and for the inspection of commercialism. No personal laptop from the participants will be allowed for use in the presentations to avoid any potential interruption.

Social Events

Opening Ceremony

17:00-18:00 on Wednesday, August 1, at Grand Ball Room on the 2nd floor of Millennium Harvest House Boulder Hotel. Name badge is required for admission.

Welcome Reception and Dinner

18:00-21:00 on Wednesday, August 1, at Grand Ball Room on the 2nd floor of Millennium Harvest House Boulder Hotel. Name badge is required for admission.

Live Band BBQ Dinner

18:00-21:00 on Friday, August 3, at the Pavilion, outside of Millennium Harvest House Boulder Hotel. Name badge is required for admission.

Closing Ceremony

12:40-14:00 on Saturday, August 4, at the Pavilion. Name badge is required for admission.

Lunch

For participants with registration, lunch will be provided at the Pavilion, outside of Millennium Harvest House Boulder. Lunch is from 12:40 to 14:00 on August 2-4.

Coffee and Tea Break

Coffee and tea will be served at the Foyer in the hallway of Grand Ball Room.

Technical Tour

COBEE2012 will organize several tours (such as visiting National Renewable Energy Laboratory and University of Colorado at Boulder Green Campus) on Friday, August 3. Coach will leave at 15:50 from Millennium Harvest House. Coach will return to the hotel around 18:00. Please gather 10 minutes prior to the departure time in the lobby of the first floor of the hotel.

Instructions for Speakers

Oral Presentations in Parallel Sessions

It is highly recommended that an oral presenter practice his/her talk several times prior to the presentation. The presenter must make sure he/she can complete the presentation in **ten (10) minutes** during the practice. Note that when the presenter presents to a large audience, a ten (10) minutes presentation will take twelve (12) minutes to finish.

A presenter is kindly requested to be in the meeting room ten (10) minutes prior to the beginning of the session. The presenter should check if the PowerPoint file works on the computer. Introduce himself/herself to the session chairs and other presenters in the same session. Due to limited time, the introduction by the session chairs for each presenter will be very brief. Each presenter is asked to prepare a brief note as follows and gives it to the session chairs.

“Dr. Junjie Liu will present the paper entitled: ‘Thermal environment around passengers in an aircraft cabin’ that is co-authored by Ms. Sumei Liu and Dr. Qingyan Chen. Dr.

Junjie Liu is a professor from The School of Environmental Science and Technology at Tianjin University, China.” When the session chairs ask a presenter to start the presentation, the presenter should please

1. Start the talk immediately on the topic and avoid another introduction by the presenter.
2. Pace the talk to end before the scheduled ending time. This will allow time for questions and discussion.
3. Listen carefully to the questions from audience and answer them briefly. If the presenter cannot answer the questions briefly, ask for a private discussion after the session.
4. Adhere to session chairs’ instructions.

Practical Information

Language

The official language of the COBEE2012 is English.

Dress Code

Business attire is appropriate for meetings and social events. Casual dress is suggested for the tours.

Weather

The weather in Boulder is pleasant with a temperature in the beginning of August ranging from 30 to 35°C and relative humidity around 20-40%.

Business Center

The front desk in Millennium Harvest House Boulder can help you for most daily business service, including mail delivery.

Internet

Wireless internet access is provided at the conference rooms.
You may contact The Registration/Information Desk for help.

Conference Publication

All accepted papers/abstracts are published in the conference proceedings [electronic version]

COBEE2012 Secretariats

Haidong Wang, Ph.D.
University of Colorado Boulder
Cell Phone: 001-303-502-7339
Email: cobee2012@Colorado.EDU
URL: <http://www.colorado.edu/cobee2012/>

Xiangli Li, Ph.D.
Dalian University of Technology
Cell Phone: 001-517-525-3349
Email: cobee2012@Colorado.EDU
URL: <http://www.colorado.edu/cobee2012/>

General Timetable

Time:	1-Aug Wed	2-Aug Thu	3-Aug Fri	4-Aug Sat
8:00		Plenary Session 1 (Grand Ballroom)	Plenary Session 2 (Grand Ballroom)	Plenary Session 3 (Grand Ballroom)
9:00		Workshop 1-2 (Millenium Room & Century Room)	Workshop 3-4 (Millenium Room & Century Room)	Workshop 5-6 (Millenium Room & Century Room)
10:40		Break	Break	Break
11:00		Technical Session 1-4 (Grand Ballroom A-D)	Technical Session 13- 16 (Grand Ballroom A-D)	Technical Session 17- 20 (Grand Ballroom A-D)
12:40		Lunch (Pavilion)	Lunch (Pavilion)	Closing Session and Lunch (Pavilion)
14:00		Technical Session 5-8 (Grand Ballroom A-D)	Special Forum 1-4 (Grand Ballroom A-D)	
15:40		Break		
16:00		Technical Session 9- 12 (Grand Ballroom A-D)	Technical Tours	
17:00	Opening Ceremony			
17:40				
18:00	Reception Dinner (Grand Ballroom)		Live Band BBQ Dinner (Pavilion)	

(*: corresponding author; bold: presenter)

Session Codes

All the sessions have been assigned a code, such as “Th-T1”.
The first two letters stand for:

Th = Thursday; Fr = Friday; Sa = Saturday

The third letter stands for:

T = Technical session; F = Forum; W = Workshop

The number stands for the sequence number of sessions.

Detailed Technical Program

Wednesday, August 1, 2012

17:00—18:00 Opening Ceremony

Room: Grand Ballroom

Chair: John Zhai, University of Colorado at Boulder, USA

18:00—21:00 Welcome Reception and Dinner

Room: Grand Ballroom

Chair: John Zhai, University of Colorado at Boulder, USA

Thursday, August 2, 2012

08:00—09:00 Plenary Session

Room: Grand Ballroom

Chair: Qingyan Chen, Purdue University, USA

Speaker: Costas Spanos, University of California, Berkeley, USA

Title: The Agile Building

09:00—10:40 Parallel Workshops

Session Th-W1: Sustainable Building in Europe

Room: Century Room

Co-Chairs: Andreas Wagner, Karlsruhe Institute of Technology, Germany; Milorad Bojić, University of Kragujevac, Serbia

T14-03 Tuning of Control Parameters by Combining Building Simulations and a Multi-Magnitude Wireless Sensor Network: A Case Study

Joachim Verhelst*, Jeroen Van der Veken, Geert Van Ham, Dirk Saelens and Lieve Helsen

Knowledge Centre for Energy related research (KCE), Belgium

T07-07 Multi-Criteria Analyze of Environmental Performance of the Constructions for Green Design

Ingrid Šenitková*, Monika Čuláková

Technical University of Košice, Slovakia

T14-09 Performances of Low Temperature Radiant Heating Systems

Milorad Bojić*, Dragan Cvetković, Jasmina Skerlić, Danijela Nikolić, Harry Boyer

Faculty of Engineering, University of Kragujevac, Serbia

T11-03 Energy Performance Evaluation of New Residential Buildings with a Low-Temperature Heating System: Results from Site Measurements and Building energy simulations

Arefeh Hesaraki*, Sture Holmberg

KTH Royal Institute of Technology, Sweden

T06-06 Review of Air-to-Air Heat/Energy Exchangers for Use in NZEBs in the Nordic Countries

Maria Justo Alonso*, Hans M. Mathisen, Vojislav

Novakovic, Carey J. Simonson, **Laurent Georges**

Norwegian University of Science and Technology, Norway

Room: Millennium Room

Co-Chairs: *Chao-Hsin Lin, Boeing Commercial Airplanes, USA;
Hejiang Sun, Tianjin University, China*

T03-24 Application of CFD Predictions to Quantify
Thermal Comfort for Indoor Environments
Tateh Wu*, Andrew D. Clark, Gary L. Mitchell,
Chao-Hsin Lin, Raymond H. Horstman
Boeing Commercial Airplanes, USA

T06-27 Evaluation of a Multizone Airflow Network
Model for Calculating Contaminant Transport in Airliner
Cabins
Jiangyue Chao*, Chen Wu, Qingyan Chen
Tianjin University, China

T06-22 A Full-Scale Study of Exhaled Droplet Movement
in the Micro Environment around One and Two Persons
Peter V. Nielsen*, Yuguo Li, Farzad Khalegi, Anders
Møllerskov, Li Liu
Aalborg University, Denmark

W06-26 Experimental Investigation of Air Distributions in
the First-Class Cabin of an MD-82 Commercial Airliner
Wei Liu*, Jizhou Wen, Chen Shen, Chao-Hsin Lin, Junjie
Liu, Qingyan Chen
Tianjin University, China

T03-48 An Investigation on Dust Mite and Endotoxin in a
Selection of Subway Cabins on Three Lines in Seoul,
Korea
Joonsig Jung, Duckshin Park*, Soonbark Kwon, Wootae
Jeong, Gwangjae Lee, Yoonshin Kim

Korea Railroad Research Institute, South Korea

T03-05 Study of Thermal Comfort in a Commercial
Airliner Cabin with Different Ventilation Rates

Chen Wu*, **Hejiang Sun**
Tianjin University, China

10:40—11:00 Coffee and Tea

11:00—12:40 Parallel Technical Sessions

Session Th-T1: Advanced Building Envelope

Room: Grand Ballroom A

Co-Chairs: Sylvie Prétot, *Université Européenne de Bretagne, France*; Chaobin Zhou, *China Vanke Co., LTD, China*

T01-01 Impact of Thermal Mass on Life Cycle Primary
Energy Use of Concrete- and Timber-Frame Versions of a
Building

Ambrose Dodoo*, Leif Gustavsson (**Krushna
Mahapatra**)

Linnaeus University, Växjö, Sweden

T02-02 Monitoring of Passive Cooling on Typical Roofing
of House in Subtropical Climate

Carla F. B. Teixeira*, Lucila Chebel Labaki
State University of Campinas, Brazil

T09-22 Development and Validation of a Numerical
Model for Living Walls via Field Measurements and
Evaluation of Thermal Performance on a Building Wall

Ugo Mazzali*, Fabio Peron, Massimiliano Scarpa
Università IUAV di Venezia, Italy

T09-03 Experimental Assessment of the Energy Performance of an Advanced Responsive Multifunctional Façade Module

Fabio Favoino, Francesco Goia, Marco Perino, **Valentina Serra***

Polytechnic University of Turin, Italy

T09-13 Experimental Study of Hygrothermal Behaviour of a Hemp Concrete Wall (without and with coating)

Sylvie Prétot*, Florence Collet

Université Européenne de Bretagne, France

T07-17 Life Cycle Assessment of a Hemp Concrete Wall Manufactured by Spraying

Charles Garnier, **Sylvie Prétot***, and Florence Collet

Université européenne de Bretagne, France

Session Th-T2: Natural Ventilation

Room: Grand Ballroom B

Co-Chairs: *Junjie Liu, Tianjin University, China; John Carter, CPP Wind Engineering & Air Quality Consultants, USA*

T06-24 Natural Ventilation: Stack Effect and the Importance of Wind Pressure for Natural Ventilation Design

John J. Carter*, David Banks, Dave A. Carpenter
Cermak Peterka Petersen, Wind Engineering and Air Quality Consultants, USA

T06-03 Combined Wind Tunnel and CFD Analysis for Flow Prediction of Wind-Driven Cross Ventilation

L. James Lo*, Atila Novoselac, David Banks
University of Texas at Austin, USA

T06-10 Prediction of Natural Ventilation Performance for a Residential Community

Sumei Liu*, Dayi Lai, **Junjie Liu**, Chaobin Zhou
Tianjin University, China

T06-15 Theoretical and Experimental Studies on Natural Ventilation in Urban Transportation Tunnels with Multiple Roof Openings

Yan Tong, John Zhai, Xiangli Li*
Nanjing University of Technology, China

T06-21 Scale Modeling Studies in Smoke Control with Natural Vents

Y.C. Leung, W.K. Chow*, **Gigi C.H. Lui**
The Hong Kong Polytechnic University, China

Session Th-T3: Systems and Energy Efficiency

Room: Grand Ballroom C

Co-Chairs: *Peter T. May-Ostendorp,, University of Colorado Boulder, USA; Youngchull Ahn, Pusan National University, South Korea*

T06-30 Characteristic Analyses of a Heat Recovery Ventilator According to the Changes of Core Material

Youngchull Ahn*, Taekeun Lim, Byeongheon Jeon, Jongwon Kim, Sunghak Jung
Pusan National University, South Korea

T07-23 Simulation Study on a Heat Pump System Using R744/R290 as Refrigerant

Xiaowei Fan*, Fengkun Wang, **Xianping Zhang**
Henan Institute of Engineering, China

T10-10 Experimental Investigation of Model Predictive Control-Based Rules for a Radiantly Cooled Office

Peter T. May-Ostendorp*, Gregor P. Henze, Balaji Rajagopalan, Doreen E. Kalz, Martin Fischer, and Jan Mehnert

University of Colorado Boulder, USA

T08-14 Charge and Discharge Characteristics of Absorption Chemical Energy Storage System

Xiaoling Zhang, **Wei Wu**, Baolong Wang, Wenxing Shi and Xianting Li*

Tsinghua University, China

T01-22 Energy-Saving by Optimizing Combination of Chillers with Different Capacities

Haiwen Shu, **Xiangli Li***, Lin Duanmu

Dalian University of Technology, China

T08-17 Study on Alternate Heat and Mass Transfer Absorption Process of Aqueous LiBr Solution for Solar Chillers

Yaping Chen*, Fen Liu, Ruibing Cao, Jiafeng Wu, Baohuai Zhang

Southeast University, China

Session Th-T4: Building Energy and Environment Policies

Room: Grand Ballroom D

Co-Chairs: Robert Baker, BBJ Environmental Solutions, US;
Youngsun Jeong, Korea Institute of Construction Technology,
South Korea;

T13-02 Transforming Maintenance: California Energy Efficiency HVAC Action Plan

Mel Johnson, **Robert Baker**^{*}, Lorene Flaming
ASHRAE and BBJ Environmental, USA

T13-01 Influences of Quantitative Indicators of “Friendly Service, Good Quality, Good Medical Ethics and Satisfy the Crowd” on Indoor Environment and HVAC Systems in General Hospital

Min Chen^{*}, Xiangzhao Fu
Chongqing University, China

T01-23 Assessment of CO₂ Emissions and Reduction Potential in Residential Buildings in South Korea
Young-Sun Jeong^{*}, Kyoung-Woo Kim, Ki-Hyung Yu
Korea Institute of Construction Technology, Republic of Korea

T13-10 2011 Public Opinion Survey: Awareness on Energy Saving Needs in Serbia
Milorad Bojic^{*}, Dragan Adamovic, Jasna Radulović, Marko Miletić, Ivan Miletić, Vesna Marjanović
University of Kragujevac, Serbia

T13-08 A Contrastive Analysis on the Minimum Allowable Values of the Energy Efficiency for Room Air Conditioners between China National Standard and Commission Regulation (EU)
Zhongbin Zhang, Kai Du^{*}, Hu Huang
Southeast University, China

T13-09 A Study on the Energy Saving Design Alternatives for Apartment Houses in South Korea
Hae-Kwon Jung^{*}, Ki-Hyung Yu, Soung-Hun Yun
Korea Institute of Construction Technology (KICT), Korea

12:40—14:00 Lunch Break

14:00—15:40 Parallel Technical Sessions

Session Th-T5: Window and Lighting

Room: Grand Ballroom A

Co-Chairs: *Valerio R.M. Lo Verso, Politecnico di Torino, Italy;*
Tse-ming Chung, The Hong Kong Polytechnic University,
Hongkong

T01-17 Daylighting Performance and Potential for
Electricity Savings by Using Daylighting in Commercial
Buildings Located in Florianópolis, Brazil
Ricardo F. Rupp*, **Enedir Ghisi**
Federal University of Santa Catarina, Brazil

T05-01 Investigation on Window Systems for Lighting
Performance and Energy Efficiency
Chanjuan Sun, Harry Giles, Zhiwei Lian*
Shanghai Jiao Tong University, China

T05-02 Environmental Quality for Comfort and
Performance in Healthcare Buildings: a Lighting
Experimental Study and Simulations
Chiara Aghemo, **Valerio R.M. Lo Verso***, Federica
Caffaro
Politecnico di Torino, Italy

T05-03 A Study on Acceptable Daylight Levels for
Cellular Office Occupants Using High Dynamic Range
(HDR) Photography
Tse-ming Chung*, Roger T.H. Ng
The Hong Kong Polytechnic University, China.

T03-26 Impact on Thermal Comfort of Conventional and Advanced Glazed Façades in Office Buildings

Lorenza Bianco, Francesco Goia, **Valentina Serra***

Polytechnic of Turin, Italy

T01-39 Prediction of Energy Demand for Lighting in Buildings with Different Architectural Features

C. Aghemo, **Valerio R.M. Lo Verso***, Anna Pellegrino,

Franco Pellerey

Politecnico di Torino, Italy

Session Th-T6: Outdoor Environment and Impact

Room: Grand Ballroom B

***Co-Chairs:** Dong Chen, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia; Yi Jiang, Built Environment Group LTD., China*

T07-08 A Parametric Study on the Urban-Ventilation Potential Regarding Building Shape

Jongyeon Lim*, Ryoza Ooka

The University of Tokyo, Japan

T01-49 Modeling the Urban Heat Island Effect and Assessing the Impact on Building Energy Consumption

Yuming Sun*, Godfried Augenbroe

Georgia Institute of Technology, USA

T03-55 Outdoor Space Quality Study in a Housing Community in Subtropical Urban Areas

Dayi Lai, Chaobin Zhou, Jianxiang Huang, Qingyan Chen,

Yi Jiang*

Built Environment Group LTD., China

T03-02 Numerical Analysis and Experimental Validation of the Influence of Buildings Environment in the Dispersion of Cooling Tower Drift in Different Ambient Conditions

Antonio J. Consuegro*, Antonio S. Kaiser, Blas Zamora, Javier Ruiz, Manuel Lucas
Universidad Politécnica de Cartagena, Spain

T07-06 Investigation into Recognition and Evaluation of Outside-Class Spaces among Teaching Buildings in Universities

Haoxu Guo*, Mengren Deng
Architectural Design and Research Institute of South China University of Technology, China

T11-09 Steady and Unsteady CFD Simulation of Airflow Patterns around an Arched Type Roof Building and Validation with Wind Tunnel Experiment

Xiong Shen, Georgios K. Ntinis, Guoqiang Zhang*, Vassilios P. Fragos
Aarhus University, Denmark

Session Th-T7: IAQ in Diverse Environments

Room: Grand Ballroom C

Co-Chairs: *Shih-Cheng Hu, National Taipei University of Technology, Taiwan; Manuela Cano, Instituto Nacional de Saúde Dr. Ricardo Jorge IP, Portugal*

T07-12 Research on the Building of Energy Resource Educational Centres in Taiwanese Schools – Using Elementary/Secondary Schools as an Example

Yulin Shih, Kuangsheng Liu, Cheming Chiang, Mengchun Hsieh, Nientsu Chen*

National Cheng Kung University, Taiwan

T03-40 Indoor Air Quality in Portuguese Children Day Care Centers – ENVIRH Project

Manuela Cano^{*}, Susana Nogueira, Ana Luísa Papoila, Fátima Aguiar, Pedro Martins, João Marques, Iolanda Caires, José Martins, Catarina Pedro, Paulo Paixão, José Rosado-Pinto, Paula Leiria-Pinto, Daniel Aelenei, Ana Mendes¹, João P. Teixeira, Carmo Proença and Nuno Neuparth

Instituto Nacional de Saúde Dr. Ricardo Jorge IP, Portugal

T06-14 The Optimization of Airflow in Raised Floor Internet Data Center

Xinjie Ven^{*}, Jinxiang Liu

Nanjing University of Technology, China

T06-07 Inorganic Gas Contaminants Removal in a Make-Up Air Unit with the Air Washer of Cleanrooms
Angus Shiue, **Shih-Cheng Hu**^{*}, Sei-Min Chao

National Taipei University of Technology, Taiwan

T06-08 Removal Characteristic of PM_{5.0} Airborne Pollutant with Different Return Air System Designs in a Non-Unidirectional Cleanroom for IC Manufacturing Processes

Angus Shiue, **Shih-Cheng Hu**^{*}, Ming-Heng Cai

National Taipei University of Technology, Taiwan

T03-18 Computational Fluid Dynamics Modeling of Ozone Distributions in an Aircraft Cabin.

Aakash C. Rai, **Qingyan Chen**^{*}

Purdue University, USA

Session Th-T8: Load and Energy Consumption

Room: Grand Ballroom D

Co-Chairs: *Jelena Srebric, Pennsylvania State University, US;
Antonio S. Kaiser, Universidad Politécnica de Cartagena, Spain*

T01-50 Comparison of Energy Consumption Depending on the Indoor Temperature Settings for Three Retail Buildings

Zuhaira Alhafi*, Shi Shu, Jelena Srebric
Pennsylvania State University, USA

T01-35 Numerical Study on Different Energy-Saving Rate of Residential Buildings in Dalian, China

Yongming Ji, **Lin Duanmu***, Guangyu Cao
Dalian University of Technology, China

T01-27 Impact Study of Different Windows and Shading Strategy on Building Energy Consumption by Orthogonal Design

Yingying Zhou, **Shuhong Li***, Xiaosong Zhang, Weiping Yu, Ji Zhao
Southeast University, China

T08-09 Comparison of Zone Cooling Load for Radiant and All-Air Conditioning Systems

Jingjuan Feng*, Stefano Schiavon, and Fred Bauman
University of California, Berkeley, USA

T11-47 Different Strategies for Building Energy Consumption Assessment, from Mandatory Regulation to Field Measurements

Ugo Mazzali*, Fabio Peron, Piercarlo Romagnoni
Massimiliano Scarpa
Università IUAV di Venezia, Italy

15:40—16:00 Coffee and Tea

16:00—17:40 Parallel Technical Sessions

Session Th-T9: Building Control and Management

Room: Grand Ballroom A

Co-Chairs: *Kristian Blomqvist, Novia University of Applied Sciences, Finland; Tetsuya Toma, Keio University, Japan*

T14-05 A System-Level Incipient Fault Detection and Diagnosis Strategy for HVAC System Based on EWMA Control Chart

Yang Zhao*, Shengwei Wang, Fu Xiao
The Hong Kong Polytechnic University, Hong Kong

T10-02 Increasing Energy Efficiency in Existing Public Buildings through the Implementation of a Building Management System Based on Interoperable Networks

Andrea Acquaviva, Laura Blaso, Daniele Dalmaso,
Valerio Lo Verso, Anna Osello, Edoardo Patti, Anna Pellegrino*, Paolo Piumatti
Politecnico di Torino, Italy

T08-11 A Study on an Energy Balancing System and Control Strategy

Dae Uk Shin, Seung Jae Lee, Goo Sang Joe, So Jeong Park, Myoung Souk Yeo*, Kwang Woo Kim
Graduate School of Seoul National University, Korea

T10-06 Intelligent Control of Relative Humidity in an Outdoor-Air Ventilated Crawl space

Johan Westö, **Kristian Blomqvist***, Dag Björklund
Novia University of Applied Sciences, Finland

T10-07 Sensitivity and Uncertainty Analysis of Measurements in Cooling Water Control System

Kui Shan*, Shengwei Wang
The Hong Kong Polytechnic University, Hong Kong

T11-21 A Study on Advantages of a High-Speed Network System for a Home Monitoring, Management and Communication System in a Smart House

Tetsuya Toma*, Hideo Asada, Hiroki Nishikawa, Masakazu, Yamamoto, Yasuhiro Koike
Keio University, Japan

Session Th-T10: Ventilation and IAQ

Room: Grand Ballroom B

Co-Chairs: Yanhua Liu, Xi'an Jiaotong University, China;
Moshood O. Fadeyi, British University in Dubai, UAE

T03-22 Reactive Oxygen Species in Institutional Buildings in Austin, TX

Shahana S. Khurshid*, Jeffrey A. Siegel, Kerry A. Kinney
University of Texas at Austin, USA

T03-30 Mass Balance Modelling of Building Recirculation Rates Effects on Secondary Organic Aerosols Generated from Indoor Chemistry

Moshood O. Fadeyi*
British University in Dubai, UAE

T08-12 Novel Personalized Air Distribution System for
Commercial Aircraft Cabins

Weijuan Li*, **Hejiang Sun**

Tianjin University, China

T06-31 Evaluation of Low-Dimensional Linear Ventilation
Models for Heavy-Gas Dispersion in Indoor Environments

Shi-Jie Cao*, Johan Meyers

*Department of Mechanical Engineering, KU Leuven,
Belgium*

T03-46 A Study for Characteristics of PM10 in the
Subway Passenger Cabins

Duckshin Park*, Gwangjae Lee, Soonbark Kwon, Wootae
Jeong, **Joonsig Jung**, Kiyong Lee

Korea Railroad Research Institute, South Korea

T03-32 Experimental Study on the Formaldehyde
Adsorption on Black Clay Particles in China

Bo Dong, Jiancheng Cai, Huiying Ma, **Yanhua Liu***

Xi'an Jiaotong University, China

Session Th-T11: Energy Simulation and Modeling

Room: Grand Ballroom C

Co-Chairs: Cheol-Soo Park, SungKyunKwan University, South
Korea; Weirong Zhang, University of Tokyo, Japan

T11-22 Building Load and Energy Consumption
Forecasting Model within the Green Carbon Community

Xiaotong Zhang*, Jinxiang Liu, Jinying Sun, Xiaochun
Chen, and Jian Zhang

Nanjing University of Technology, Nanjing, China

T11-30 Energy Performance Evaluation Approach in Early Design Stage for Buildings with Twisted Shape

Hyeun Jun Moon, Sa Kyum Kim*, Min Seok Choi, Seung Ho Ryu

Dankook University, South Korea

T11-25 Building Energy Simulation by the Means of Coupling the Contribution Ratio of Indoor Climate (CRI) to Network Model

Weirong Zhang*, Kyosuke Hiyama, Shinsuke Kato

University of Tokyo, Japan

T11-26 A Simulation-Based POE Study about Passive Performance of Office Buildings in China

Juan Xiao*, Borong Lin, Yingxin Zhu

Tsinghua University, Beijing, China

T11-45 A Mini Test-Bed for Building Energy Simulation and Control

Deuk-Woo Kim, Won-Jun Suh, Jitae Jung, Sung-Hwan Yoon, **Cheol-Soo Park***

SungKyunKwan University, South Korea

T11-41 Development of Interface for BIM Based Building Energy Simulation

Ki-Uhn Ahn, Young-Jin Kim, Se-Min Oh, **Cheol-Soo**

Park*, In-Han Kim, Deuk-Woo Kim and Keon-Ho Lee

SungKyunKwan University, South Korea

Session Th-T12 Building Material and Envelope

Room: Grand Ballroom D

Co-Chairs: Kai Loh, *University of São Paulo, Brazil*; Florence Collet, *Université Européenne de Bretagne, France*

T01-09 Use of Functional Particles in Cement Based Coatings to Improve Thermal Comfort Inside of Buildings

Kai Loh*, Neide M. N. Sato, Isabela M.S.Liborio

University of São Paulo, Brazil

T01-20 The Effects of Emissivity and Insulation Levels on Radiant Barrier Performance

Stephen Bourne*, Atila Novoselac

University of Texas, Austin, USA

T03-47 Study on Bake-Out Technology with Dilution Ventilation for Building Materials

Xiangli Li, Yang Lu*, Hongtao Yu, Jing Liu

Dalian University of Technology, China

T09-05 Effect of Coating on Moisture Buffering of Hemp Concrete

Florence Collet*, Sylvie Pretot

Université Européenne de Bretagne, France

T04-04 Evaluation of Compressibility and Acoustical Performance of Resilient Materials

Kyoung-woo Kim*, Jun-ho Yeon, Hyun-jung Choi and Kwan-seop Yang

Korea Institute of Construction Technology, South Korea

T12-03 Integrated Simulation Based Design Optimization of Office Building Envelopes for the Minimization of Life Cycle Costs

Omer T. Karaguzel*, Rongpeng Zhang, and Khee Poh Lam

Carnegie Mellon University, USA

Friday, August 3, 2012

08:00—09:00 Plenary Session

Room: Grand Ballroom

Chair: *Moncef Krarti, University of Colorado at Boulder, USA*

Speaker: Ren Anderson, National Renewable Energy Lab, USA

Title: Maximizing System-Level Benefits in Peak Performance Homes

09:00—10:40 Parallel Workshops

Session Fr-W3: Weatherization Approaches and Practices of Residential Buildings

Room: Century Room

Co-Chairs: *Moncef Krarti, University of Colorado at Boulder, USA; Larry Bellamy, RMIT University, Australia*

T01-30 Evaluation of Sensor Sensitivity and Inspection in Actual Building on the Infrared Camera Method to Diagnose Wall Thermal Insulation Performance

Sihwan Lee*, Shinsuke Kato, Shinji Haghihara, Katsuichi Kuroki, Satoshi Nikawa, Junichi Tezuka
Tokyo University of Science, Tokyo, Japan

T14-15 Aerogel Containing High Efficiency Insulation Layer Used for Retrofitting a 130 Years Old Building

Karim Ghazi Wakili*, Bruno Binder, Mark Zimmermann, Christoph Tanner
Swiss Federal Laboratories for Materials Science and Technology, Switzerland

T12-02 Towards the Development of New Energy Performance Indicators for the External Walls of Residential Buildings

Larry Bellamy*

RMIT University, Australia

T02-20 Evaluating Passive and Active Solar Design and Performance Interaction: First Measured Results

Ulrike Passe*

Iowa State University, USA

T9-30 Consumer-Appealing Refurbishment of Solid-Wall Homes in the UK: Report from Project 'CALEBRE'

Dennis L Loveday*

Loughborough University, UK

Session Fr-W4: CFD in Ventilation Research

Room: Millennium Room

Co-Chairs: *Peter Nielsen, Aalborg University, Denmark;*

Liangzhu (Leon) Wang, Concordia University, Canada

T11-60 CFD in Ventilation - Early Work and a Two-Dimensional Benchmark Test

Peter V. Nielsen*

Aalborg University, Denmark

T11-19 CFD Modeling for Assessment of Person to Person Disease Transmission due to Respiratory Activities

Shichao Liu*, *Atila Novoselac*

University of Texas at Austin, USA

T11-61 The Implication of Low-Re-Number Effects on CFD in Ventilation

Shia-Hui Peng^{*}, **Sture Holmberg**
KTH Royal Institute of Technology, Sweden

T11-62: What Should We Do When CFD Simulations Do Not Agree with Measured Data?

Wei Liu, Qingyan Chen^{*}
Purdue University, USA

T11-63 Multi-Scale CFD Modeling of Built Environments

Jelena Srebric^{*}, Jiying Liu
The Pennsylvania State University, University Park, USA

T11-48 An Exploratory Study on Graphics Processing Units Computing for Combined Computational Fluid Dynamics and Multizone Building Simulations

Liangzhu (Leon) Wang^{*}, Zhaoyu Zheng
Concordia University, Canada

10:40—11:00 Coffee and Tea

11:00—12:40 Parallel Technical Sessions

Session Fr-T13: Solar Systems

Room: Grand Ballroom A

Co-Chairs: *M. I Okoroh, University of Derby, UK; Dennis L Loveday, Loughborough University, UK*

T11-20 Comparison Investigation of Two Types of Solar Water Heaters based on Life Cycle Assessment

Yikang Feng, **Shuhong Li**^{*}, Xiaosong Zhang, Kai Cao, Fengling Wang
Southeast University, China

T02-21 Mathematical Model and Numerical Simulation of
P2CC Concentrating Solar Collector

Velimir P. Stefanović*, Saša R. Pavlović, Nenad
Apostolović, **Milorad Bojić**
University of Kragujevac, Serbia

T01-41 Impact Assessment of Refrigeration on Building
Integrated Photovoltaic (BIPV)

C. U. Ikedi, **M. I Okoroh***, A Dean
University of Derby, UK

T07-16 Hybrid Solar Air-Conditioner Modelling and
Optimal Usage for Energy Saving and Comfort
Enhancement

Vahid Vakiloroaya*, Richard Dibbs, Q. P. Ha, Bijan
Samali
University of Technology, Sydney, Australia

T02-11 Numerical and Experimental Study of Thermal
Stratification on Solar Storage Tank with Different Inlets
for Building Hot Water Supply

Yang Li, **Shuhong Li***, Xiaosong Zhang, Miao Zhao, Ji
Zhao
Southeast University, China

Session Fr-T14: HVAC Systems

Room: Grand Ballroom B

Co-Chairs: Zhaojun Wang, Harbin Institute of Technology,
China; Manuel Lucas Miralles, Universidad Miguel Hernández,
Spain

T11-43 HVAC Decision Making Using Bayesian Decision
Theory and Markov Chain Monte Carlo Method

Young-Jin Kim, Ki-Uhn Ahn, Cheol-Soo Park*, and
In-Han Kim

SungKyunKwan University, South Korea

T08-03 Modeling the System Performance of a Waste
Heat Driven Activated Carbon Based Composite
Adsorbent-Water Adsorption Chiller

Chi Yan Tso, Christopher Y.H. Chao*, Sau Chung Fu
*The Hong Kong University of Science and Technology,
Hong Kong*

T01-03 Energy Efficiency Comparison of Cooling Towers
and Air-Cooled Systems with Adiabatic Pre-Cooling to
Dissipate Heat from Buildings under Different
Environmental Conditions

Manuel Lucas, Antonio S. Kaiser*, Blas Zamora, Angel
Molina-García, Teodoro García, Pedro Martínez, Pedro J.
Martínez, Javier Ruiz, Adriana Sotomayor
Universidad Politécnica de Cartagena, Spain

T12-05 Control Strategies of Variable Speed Pumps in
Central Heating Metering Systems

Zhaojun Wang*, Lihua Dong, Yongcheng Jiang
Harbin Institute of Technology, China

T08-01 Technical Feasibility Study of a New Compact
Desiccant-Based Energy Recovery System using
Cogenerated Hot Water

Beungyong Park*, Sihwan Lee, Shinsuke Kato
The University of Tokyo, Japan

Co-Chairs: *Matt Gregg, Oxford Brookes University, UK;*
Duanmu Lin, Dalian University of Technology, China

T11-10 Research on the Preference Evaluation Factors of Schoolroom via Psychophysical Tests

Haoxu Guo*, Xiana Hou

Architectural Design and Research Institute of South China University of Technology, China

T04-03 Evaluation for the Floor Impact Sound Reduction Performance of Dry Double-Floor System

Junoh Yeon*, Kyoungwoo Kim, Hyunjuong Choi, Kwanseop Yang, and Kyungho Kim

Korea Institute of Construction Technology, South Korea

T11-16 Validation of Three Dimensional Fast Fluid Dynamics for Indoor Airflow Simulations

Mingang Jin, Wangda Zuo, Qingyan Chen*

Purdue University, USA

T03-12 Assessment of the Indoor Microbiome Using HVAC Filters: Comparison of Bioanalytical Techniques

Andrew J. Hoisington, Juan P. Maestre, Sungwoo Bae, Jeffrey A. Siegel, and Kerry A. Kinney

University of Texas, Austin, TX, USA

T11-38 Simplify Turbulence Modeling in Indoor Environment Study by Using Coarse Grid

Haidong Wang*, John Zhai, Xiang Liu

University of Colorado Boulder, USA

T11-11 A New Passive Scalar Transport Subgrid Scale Model and its Application in Building Environment

Huiyuan Shen, **Yanhua Liu***, Yufei Zhang, Bo Dong
Xi'an Jiaotong University, China

Session Fr-T16: Load and Energy Consumption**Room: Grand Ballroom D**

Co-Chairs: *Sture Holmberg, KTH Royal Institute of Technology, Sweden; Borong Lin, Tsinghua University, China*

T08-02 Sizing Thermally Active Building Systems (TABS): A Brief Literature Review

Chandrayee Basu*, Stefano Schiavon, Fred Bauman
University of California, Berkeley, USA

T01-25 Baseline Models for Commercial Building Energy Consumption and Case Studies in Tianjin

Bo Peng*, Borong Lin, Juan Xiao
Tsinghua University, China

T07-11 Energy Performance Analyses of Campus Buildings over Heating and Cooling Seasons

Nicholas M. Rekstad*, **Mohammad Heidarinejad**, Joshua R. Wentz Jelena Srebric
The Pennsylvania State University, University Park, USA

T03-06 The Effect of Solar Radiation on Both Long Term Thermal Comfort Assessment and Building Energy Consumptions

Concettina Marino*, Antonino Nucara, Matilde Pietrafesa, Alfredo Pudano, Margherita Tripodi
Mediterranea University of Reggio Calabria, Italy

T11-50 The Impact of Occupant Behaviour on the Energy Consumption of Low Energy Dwellings

Tom Blight*, David Coley
University of Bath, UK

T06-44 Sensitivity Analysis of Air Infiltration through the
Building Envelope to the Stochastic Characteristics of
Wind Speed and Air Temperature

Krystyna Pietrzyk*, Ireneusz Czmocho
Chalmers University of Technology, Sweden

12:40—14:00 Lunch Break

14:00—15:40 Special Forums

Session Fr-F1: Advances in Industry

Room: Grand Ballroom A

Co-Chairs: Sorin Bengea, *United Technologies Research Center, US*;
Jaeyoon Koh, *LG Electronics, US*

T06-01 Moving Closer to Net Zero Buildings with the
IAQ Procedure of ASHRAE Standard 62.1-2010

Christopher Muller*
Purafil, Inc., USA

T03-08 Lowering Gas-Phase Concentration of
Formaldehyde in Indoor Environment by a New Amino
Silane Based Coating

Gourish Sirdeshpande*, Kenneth Caldwell, Michael
Cook
Armstrong World Industries, USA

T11-55 Building Energy Modeling and Case Study for LG
VRF Systems

Jaeyoon Koh*

LG Electronics, USA

T10-13 Model Predictive Control for Mid-Size Commercial Building HVAC: Implementation, Results and Energy Savings

Sorin C. Bengea*, Anthony D. Kelman, Francesco Borrelli, Russell Taylor, and Satish Narayanan
United Technologies Research Center, USA

T11-02 Development of a Comprehensive Simulator for Low Carbon Buildings and Districts

Akira Urano*, Ken Syoji, Taiki Sato, Hidemitsu Koyanagi, Masayuki Oguro, Yasushige Morikawa
Taisei Corporation, Japan

Session Fr-F2: Research in US National Labs

Room: Grand Ballroom B

Co-Chairs: *Chuck Booten, National Renewable Energy Laboratory; Meng-Dawn Cheng, Oak Ridge National Laboratory*

T10-14 Design and Performance of an Image Processing Occupancy Sensor

Larry J. Brackney, Anthony R. Florita*, Alex C. Swindler,
Luigi Gentile Polese, George A. Brunemann
National Renewable Energy Laboratory, USA

T09-10 Using EnergyPlus to Simulate the Dynamic Response of a Residential Building to Advanced Cooling Strategies

Chuck Booten*, Paulo Cesar Tabares-Velasco
National Renewable Energy Laboratory, USA

T08-26 Desiccant Enhanced Evaporative Air Conditioning:
Parametric Analysis and Design

Jason Woods*, Eric Kozubal

National Renewable Energy Laboratory, USA

T03-43 An Accelerated Testing Method for Determining
the Effects of Environmental Contamination on the
Reduction Material Reflectance

Meng-Dawn Cheng*, Susan M. Pfiffner, Karen R. Cheng,
Steve Allman, William A. Miller, Andre Desjarlais

Oak Ridge National Laboratory, USA

T05-06 Reducing Energy Consumption through Efficient
and Effective Lighting

Alamelu Ramesh*

National Institutes of Health, USA

Session Fr-F3: Phase Change Materials

Room: Grand Ballroom C

Co-Chairs: *Hens Hugo, KU Leuven, Netherland; Valentina
Serra, Polytechnic of Turin, Italy*

T02-03 Analysis on the Thermal Performance of Phase
Change Wall in the Solar Hot Air Heating Room

Guohui Feng*, Xin Liu, **Kailiang Huang**, Huixing Li,
Jianshun Zhang

Chongqing University, China

T02-07 Performance of a Solar Storage Packed Bed Using
Spherical Capsules Filled with PCM Having Different
Melting Points

Lei Yang*, Xiaosong Zhang, Guoying Xu

Southeast University, China

T09-14 New PCM Components for Thermal Management of the Light Envelope of Buildings

L. Karim, F. Bergeron, P. Gegout, L. Royon*

Université Denis Diderot, France

T09-07 Thermal Performance Analysis of Wall Inserted with Phase Change Material and Thermal Insulation Material in Hot Summer Zone

Yuan Zhang, Kai Du*, Jiapeng He

Southeast University, China

T14-12 Heat Transfer Performance and Structural Optimization Design Method of Vertical Phase Change Thermal Energy Storage Device

Lu Liang, **Chao Chen***, Ye Zhang, Chao Deng, Ziguang Chen, Guangya Xie, Hang Yu and Jiancheng Zhao

Beijing University of Technology, China

Session Fr-F4: Heat Pump

Room: Grand Ballroom D

Co-Chairs: Alexander G. Floss, *University of Applied Sciences Biberach, Germany*, Yanfeng Gong, *Nanjing University of Technology*

T08-24 Experimental Study on Concentration Change of Spray Solution Used for a Novel Non-Frosting Air Source Heat Pump System

Yiqiang Jiang*, Huiying Fu, Yang Yao, Ling Yan and Qiang Gao

Harbin Institute of Technology, China

T08-13 Analysis on Heating Performance of Ground Source Absorption Heat Pump System with Direct

Cooling in Summer

Wei Wu, Xiaoling Zhang, Tian You, Xianting Li*,
Wenxing Shi, Baolong Wang
Tsinghua University, China

T01-46 Optimized Integration of Storage Tanks in Heat Pump Systems

Alexander G. Floss*, Stefan Fink, Stefan Hofmann
University of Applied Sciences Biberach, Germany

T08-07 Research and Exploitation of High Efficiency Heat Pump Water Heater System

Hong Qin*, Chenchen Xiong, Xiaofan Jin
Guangdong University of Technology, China

T08-06 An Operation Strategy for Using a Ground Heat Exchanger System for Industrial Waste Heat Storage and Extraction

Hao Fang*, Jianjun Xia, Alison Lu, Yi Jiang
Tsinghua University, China

T08-22 Energy Analyses of Heat Pump Station Using Cooling Water in the Condenser of a Coal-Fired Power Plant

Long Ni*, Zhigang Zhou, Peng Wang, Pinghua Zou, Hua Zhao, and Yang Yao
Harbin Institute of Technology, China

15:40 Technical Tours

US National Renewable Energy Laboratory (NREL)

Green Campus of University of Colorado at Boulder

18:00 Dinner Break

Saturday, August 4, 2012

08:00—09:00 Plenary Session

Room: Grand Ballroom

Chair: *Gregor Henze, University of Colorado at Boulder, USA*

Speaker: *Andreas Wagner, Karlsruhe Institute of Technology, Germany*

Title: Performance Analysis of Commercial Buildings – Results and Experiences from the German Demonstration Program
“Energy Optimized Construction – EnOB”

09:00—10:40 Parallel Workshop

Session Sa-W5: Integration of Adaptation and Mitigation in Retrofit of Existing Dwellings

Room: Century Room

Co-Chairs: *Li Shao, De Montfort University, UK; Virtanen Markku, VTT Technical Research Centre, Finland*

T07-26 Adapting UK Dwellings to Future Heatwaves

Li Shao*

De Montfort University, UK

T03-51 Comparing Structural and Behavioural Adaptations to Future Proofing Buildings

David Coley*, *Tristan Kershaw, Matt Eames*

University of Bath, UK

T01-10 System Analysis of and Stakeholders' Perceptions on End-Use Energy Efficiency Measures for Existing Swedish Multi-Family Buildings

Krushna Mahapatra*, Ambrose Dodoo, Leif Gustavsson, Gireesh Nair

Linnaeus University, Sweden

T11-01 Influence of User Behaviour on Indoor Environmental Quality and Heating Energy Consumptions in Danish Dwellings

Valentina Fabi*, Rune Vinther Andersen, **Stefano Paolo Corgnati**, Francesca Venezia

Politecnico di Torino, Italy

T10-09 Taking into Account Uncertainties due to the Inhabitants' Behavior in Anticipative Energy Management for Dwellings

Minh Hoang Le*, Stéphane Ploix, Mireille Jacomino

Grenoble Institute of Technology, France

T07-25 Using a Mapping-Based Simulation Approach to Rapidly Investigate the Potential for Adapting English Homes for a Warming Climate

Rajat Gupta*, **Matt Gregg**

Oxford Brookes University, UK

Session Sa-W6: Sustainable Building Development in Asia

Room: Millennium Room

Co-Chairs: Shengwei Wang, *The Hong Kong Polytechnic University, Hongkong*; Yasuo Utsumi, *Sendai National College of Technology, Japan*

T01-12 Investigating the Performance and Energy Saving

Potential of Chinese Commercial Building Benchmark
Models for Extreme Climate Regions

Lesley Herrmann*, John Zhai, Michael Deru
University of Colorado at Boulder, USA

W01-51 Development and Implementation of Optimal and
Energy Efficient Control Strategies in a Super-High-Rise
Building

Shengwei Wang*, Yongjun Sun
The Hong Kong Polytechnic University, Hong Kong

T02-09 Analyses on Optimization of Residential Building
Integrated Solar System in Western China

Jia Wang, **Nan Liang***, Qiong Yu, Yingqiu Zhu, Xiaojun
Ma, Hongqing Xu
Beijing Institute of Architectural Design, China

T11-14 A Study on Method for the Experimental
Installation of Energy Balancing System

Seung Jae Lee, Dae Uk Shin, Goo Sang Joe, Myoung
Souk Yeo*, Kwang Woo Kim
Seoul National University, South Korea

T03-31 The Monitoring and Control System to Improve
the Indoor Thermal Environment of Temporary Houses
after the Disaster

Yasuo Utsumi*, Toshimitu Ono, Kazusige Yasuda, Shinji
Sato
Sendai National College of Technology, Japan

T02-13 Evaluation of the Applicability of Solar Radiant
Heating System in Residential Houses

Youngjin Choi*, Kozo Takase, Makoto Sato, Masayuki

Mae
University of Tokyo, Japan

10:40—11:00 Coffee and Tea

11:00—12:40 Parallel Technical Sessions

Session Sa-T17: Flow and Heat Transfer

Room: Grand Ballroom A

Co-Chairs: *Xiangli Li, Dalian University of Technology, China;*
Jason Woods, National Renewable Energy Laboratory, USA

T06-13 Numerical Study of Piston Wind Effect for a
Subway Station with Screen Doors and By-Pass Tunnels
Dingke Hu, **Wei Wang***, Yaohua Zhao, Tian Gan, Xingguo
Dong, Gaoying Hua
Beijing University of Technology, China

T07-05 The Impact of Effective Diffusion Coefficients on
Transport and Reaction to Porous Indoor Materials
Elliott T. Gall, Brent Stephens, Jeffrey A. Siegel, Richard
L. Corsi, and Jeffrey A. Siegel*
The University of Texas at Austin, USA

T06-02 Semi-Empirical Models for Convective Heat
Transfer near Diffusers
Jordan Clark*, Atila Novoselac
The University of Texas at Austin, USA

T02-01 Ice Slurry Isthothermal Flow Prediction in Various
Pipes by CFD
Jihong Wang*, Shugang Wang, Tengfei (Tim) Zhang
Dalian University of Technology, China

T14-08 Influence on Thermal Conditions of Direct Connection Hot Water Heat-Supply System Caused by Pipeline Heat Loss

Pinghua Zou*, Kun Li

Harbin Institute of Technology, China

T11-23 Experimental Study on the Corrosion of Prefabricated Directly-Buried Insulating Pipe Based on the BOTDA (R) Technique

Xiangli Li, Xunfeng Zhao*, Haiyang Yu

Dalian University of Technology, China

Session Sa-T18: Thermal Comfort

Room: Grand Ballroom B

Co-Chairs: Zhuolun Chen, *South China University of Technology, China*; Wilmer Pasut, *University of California, Berkeley, USA*

T03-16 Overall Thermal Sensation's Changing Rule during Step-Change between Workstation and Ambient Environment

Quan Jin, Lin Duanmu*, Xiangli Li, Min Li

Dalian University of Technology, China

T03-04 Investigation on Thermal Comfort and Energy Conservation of Local Ventilation

Chanjuan Sun, Harry Giles, Guoliang Xu, Zhiwei Lian*

Shanghai Jiao Tong University, China

T03-28 Effect of a Heated- or Cooled-Surface Chair on Thermal Comfort

Wilmer Pasut*, Hui Zhang, Soazig Kaam, Ed Arens, Juyoun Lee, Fred Bauman, Yongchao Zhai

University of California, Berkeley, USA

T03-36 SVM Predictive Model of Dynamic Thermal Sensation during Step-Change in Non-Uniform Environment

Min Li, **Quan Jin**, Hongbo Xu, Lin Duanmu^{*}

Dalian University of Technology, China

T03-33 The Effect of Cold Radiation on Human Thermal Sensation and Thermal Comfort in Harbin Winter

Zhaojun Wang^{*}, Yanan He, Juan Hou, Hongbo Fan, Ling Jiang

Harbin Institute of Technology, China

T03-11 Thermal Environment around Passengers in an Aircraft Cabin

Sumei Liu^{*}, Junjie Liu, Hejiang Sun, Xiaojing Xiao, Guopeng Nan

Tianjin University, China

Session Sa-T19: Load and Energy Consumption

Room: Grand Ballroom C

Co-Chairs: David Coley, *University of Bath, UK*; Haoxu Guo, *South China University of Technology, China*

T01-15 A Dynamic Method for Predicting Electrical Load of Residential Building and Its Application

Xiaohai Wu, Chao Chen, **Nan Liang**^{*}, Xiaojun Ma, Yingqiu Zhu

Beijing Institute of Architectural Design, China

T01-05 Will Today's Energy Efficient Houses Maintain Their Relative Performance under Warming Climate

Dong Chen^{*}, Zhengeng Ren, Xiaoming Wang
*Commonwealth Scientific and Industrial Research
Organisation (CSIRO), Australia*

T10-03 The Amenity Evaluation of Built Environment
with Analytic Hierarchy Process Method

Haoxu Guo^{*}, Mengren Deng
*Architectural Design & Research Institute, South China
University of Technology, China*

T11-49 Lumped Parameter Models for Building Thermal
Modelling: An Analytic Approach to Simplifying Complex
Multi-Layered Constructions

Alfonso P. Ramallo González^{*}, Matthew E. Eames,
David A. Coley
University of Exeter, UK.

T01-16 Daily Energy Consumption Density Analyzing
Method for Hourly Data Monitoring System

Qi Shen^{*}, Alison Lu, Jianjun Xia
Tsinghua University, China

Session Sa-T20: System and Energy Efficiency

Room: Grand Ballroom D

Co-Chairs: Zhao Wang, South China University of Technology,
China; Laurent Georges, Norwegian University of Science and
Technology, Norway

T08-21 Research and Development of the Software for
Optimal Operation Dispatch of Multi-Heat Source
Co-Heating System

Zhigang Zhou^{*}, Long Ni, Peng Wang, Pinghua Zou, Hua
Zhao

Harbin Institute of Technology, China

T01-07 Building System Optimization with Respect to Mechanical and Enclosure Systems

Guiyuan Han*, Jelena Srebric

Pennsylvania State University, University Park, USA

T14-02 Energy Savings from Cleaning Constant Air Volume HVAC Systems

Eric Wilson*, James McNeill, John Zhai, Moncef Krarti

University of Colorado Boulder, USA

T07-04 Indoor Environment Improvement and Energy Conservation by Using a Safer Photocatalytic System

Benigno Sánchez*, María Muñoz-Vicente, Marta Sánchez-Muñoz, Raquel Portela, Silvia Suárez, María D. Hernández-Alonso, and María C. Canela

Environmental Application of Solar Radiation in Air CIEMAT, Spain

T02-06 On the Proper Integration of Wood Stoves for the Space-Heating of Passive Houses

Laurent Georges*, Vojislav Novakovic

Laurent Georges, Norwegian University of Science and Technology, Norway

T07-24 The Optimization of Heat Pump System with Blend of R744 and R290

Xianping Zhang, Henggen Shen*, Xiaowei Fan, Fengkun Wang

Donghua University, China



12:40—14:00 Closing Ceremony and Lunch

Room: Pavilion

Chair: John Zhai, University of Colorado at Boulder, USA

Index

Chair Index

A		<i>Gong, Yanfeng</i>	<i>Fr-F4</i>
<i>Ahn, Youngchull</i>	<i>Th-T3</i>	<i>Gregg, Matt</i>	<i>Fr-T15</i>
		<i>Guo, Haoxu</i>	<i>Sa-T19</i>
B		H	
<i>Baker, Robert</i>	<i>Th-T4</i>	<i>Holmberg, Sture</i>	<i>Fr-T16</i>
<i>Bellamy, Larry</i>	<i>Fr-W3</i>	<i>Hu, Shih-Cheng</i>	<i>Th-T7</i>
<i>Bengea, Sorin</i>	<i>Fr-F1</i>	<i>Hugo, Hens</i>	<i>Fr-F3</i>
<i>Blomqvist, Kristian</i>	<i>Th-T9</i>		
<i>Bojić, Milorad</i>	<i>Th-W1</i>	J	
<i>Booten, Chuck</i>	<i>Fr-F2</i>	<i>Jeong, Youngsun</i>	<i>Th-T4</i>
		<i>Jiang, Yi</i>	<i>Th-T6</i>
C		K	
<i>Cano, Manuela</i>	<i>Th-T7</i>	<i>Kaiser, Antonio S</i>	<i>Th-T8</i>
<i>Carter, John</i>	<i>Th-T2</i>	<i>Koh, Jaeyoon</i>	<i>Fr-F1</i>
<i>Chen, Dong</i>	<i>Th-T6</i>	<i>Krarti, Moncef</i>	<i>Fr-W3</i>
<i>Chen, Zhuolun</i>	<i>Sa-T18</i>		
<i>Cheng, Meng-Dawn</i>	<i>Fr-F2</i>	L	
<i>Chung, Tse-ming</i>	<i>Th-T5</i>	<i>Li, Xiangli</i>	<i>Sa-T17</i>
<i>Coley, David</i>	<i>Sa-T19</i>	<i>Lin, Borong</i>	<i>Fr-T16</i>
<i>Collet, Florence</i>	<i>Th-T12</i>	<i>Lin, Chao-Hsin</i>	<i>Th-W2</i>
D		<i>Liu, Junjie</i>	<i>Th-T2</i>
<i>Duanmu, Lin</i>	<i>Fr-T15</i>	<i>Liu, Yanhua</i>	<i>Th-T10</i>
F		<i>Loh, Kai</i>	<i>Th-T12</i>
<i>Fadeyi, Moshood</i>	<i>Th-T10</i>	<i>Loveday, Dennis L</i>	<i>Fr-T13</i>
<i>Floss, Alexander</i>	<i>Fr-F4</i>	<i>Lucas, Manuel Miralles</i>	<i>Fr-T14</i>
G		M	
<i>Georges, Laurent</i>	<i>Sa-T20</i>	<i>Markku, Virtanen</i>	<i>Sa-W5</i>

<i>May-Ostendorp, Peter T</i>	<i>Th-T3</i>	<i>Zhang, Weirong</i>	<i>Th-T11</i>
		<i>Zhou, Chaobin</i>	<i>Th-T1</i>

N

<i>Nielsen, Peter</i>	<i>Fr-W4</i>
-----------------------	--------------

O

<i>Okoroh, Michael</i>	<i>Fr-T13</i>
------------------------	---------------

P

<i>Park, Cheol-Soo</i>	<i>Th-T11</i>
------------------------	---------------

<i>Pasut, Wilmer</i>	<i>Sa-T18</i>
----------------------	---------------

<i>Prétot, Sylvie</i>	<i>Th-T1</i>
-----------------------	--------------

S

<i>Serra, Valentina</i>	<i>Fr-F3</i>
-------------------------	--------------

<i>Shao, Li</i>	<i>Sa-W5</i>
-----------------	--------------

<i>Srebric, Jelena</i>	<i>Th-T8</i>
------------------------	--------------

<i>Sun, Hejiang</i>	<i>Th-W2</i>
---------------------	--------------

T

<i>Toma, Tetsuya</i>	<i>Th-T9</i>
----------------------	--------------

U

<i>Utsumi, Yasuo</i>	<i>Sa-W6</i>
----------------------	--------------

V

<i>Verso, Valerio</i>	<i>Th-T5</i>
-----------------------	--------------

W

<i>Wagner, Andreas</i>	<i>Th-W1</i>
------------------------	--------------

<i>Wang, Leon</i>	<i>Fr-W4</i>
-------------------	--------------

<i>Wang, Shengwei</i>	<i>Sa-W6</i>
-----------------------	--------------

<i>Wang, Zhao</i>	<i>Sa-T20</i>
-------------------	---------------

<i>Wang, Zhaojun</i>	<i>Fr-T14</i>
----------------------	---------------

<i>Woods, Jason</i>	<i>Sa-T17</i>
---------------------	---------------

Z

Presenter Index

A			<i>Sa-W5</i>
<i>Ahn, Youngchull</i>	<i>Th-T3</i>	<i>Coley, David</i>	<i>Sa-W5</i>
<i>Alhafi, Zuhaira</i>	<i>Th-T8</i>		
B		D	
<i>Baker, Robert</i>	<i>Th-T4</i>	<i>Duanmu, Lin</i>	<i>Th-T8</i>
<i>Basu, Chandrayee</i>	<i>Fr-T16</i>	F	
<i>Bellamy, Larry</i>	<i>Fr-W3</i>	<i>Fadeyi, Moshood O</i>	<i>Th-T10</i>
<i>Bengea, Sorin C</i>	<i>Fr-F1</i>	<i>Fang, Hao</i>	<i>Fr-F4</i>
<i>Blomqvist, Kristian</i>	<i>Th-T9</i>	<i>Feng, Jingjuan</i>	<i>Th-T8</i>
<i>Blight, Tom</i>	<i>Fr-T16</i>	<i>Floss, Alexander</i>	<i>Fr-F4</i>
<i>Bojić, Milorad</i>		G	
	<i>Th-W1, Th-T4, Fr-T13</i>	<i>Gall, Elliott T</i>	<i>Sa-T17</i>
<i>Bourne, Stephen</i>	<i>Th-T12</i>	<i>Georges Laurent</i>	
<i>Booten, Chuck</i>	<i>Fr-F2</i>		<i>Th-W1, Sa-T20</i>
C		<i>Ghisi, Enedir</i>	<i>Th-T5</i>
<i>Cano, Manuela</i>	<i>Th-T7</i>	<i>González, Alfonso P. Ramallo</i>	<i>Sa-T19</i>
<i>Cao, Shi-Jie</i>	<i>Th-T10</i>	<i>Gregg, Matt</i>	<i>Sa-W5</i>
<i>Carter, John J</i>	<i>Th-T2</i>	<i>Guo, Haoxu</i>	<i>Th-T6, Fr-T15, Sa-T19</i>
<i>Chao, Jiangyue</i>	<i>Th-W2</i>		
<i>Chen, Chao</i>	<i>Fr-F3</i>	H	
<i>Chen, Dong</i>	<i>Sa-T19</i>	<i>Han, Guiyuan</i>	<i>Sa-T20</i>
<i>Chen, Min</i>	<i>Th-T4</i>	<i>Hesaraki, Arefeh</i>	<i>Th-W1</i>
<i>Chen, Qingyan</i>	<i>Th-T7</i>	<i>Heidarinejad, Mohammad</i>	<i>Fr-T16</i>
<i>Chen, Yaping</i>	<i>Th-T3</i>	<i>Herrmann, Lesley</i>	<i>Sa-W6</i>
<i>Cheng, Ming-Dawn</i>	<i>Fr-F2</i>	<i>Holmberg, Sture</i>	<i>Fr-W4</i>
<i>Choi, Youngjin</i>	<i>Sa-W6</i>	<i>Hoisington, Andrew J</i>	<i>Fr-T15</i>
<i>Chung, Tse-ming</i>	<i>Th-T5</i>	<i>Hu, Shih-Cheng</i>	<i>Th-T7, Th-T7</i>
<i>Clark, Jordan</i>	<i>Sa-T17</i>	<i>Huang, Kailiang</i>	<i>Fr-F3</i>
<i>Collet, Florence</i>	<i>Th-T12</i>		
<i>Consuegro, Antonio</i>	<i>Th-T6</i>		
<i>Corgnati, Stefano Paolo</i>			

J		Loveday, Dennis L	Fr-W3
Jiang, Yi	Th-T6	Lucas, Manuel Miralles	Fr-T14
Jiang, Yiqiang	Fr-F4	M	
Jin, Mingang	Fr-W4, Tr-T15	Mahapatra, Krushna	
Jin, Quan	Sa-T18, Sa-T18		Th-T1, Sa-W5
Jeong, Young-Sun	Th-T4	Mazzali, Ugo	Th-T1, Th-T8
Jung, Joonsig	Th-W2, Th-T10	May-Ostendorp, Peter T	Th-T3
Jung, Hae-Kwon	Th-T4	Marino, Concettina	Fr-T16
K		Moon, Hyeun Jun	Th-T11
Karaguzel, Omer T.	Th-T12	Muller, Christopher	Fr-F1
Khurshid, Shahana	Th-T10	N	
Kim, Kyoung-Woo	Th-T12	Nielsen, Peter V	
Kim, Young-Jin	Fr-T14		Th-W2, Fr-W4
Koh, Jaeyoon	Fr-F1	Ni, Long	Fr-F4
Karim, L	Fr-F3	O	
L		Okoroh, M. I	Fr-T13
Lee, Sihwan	Fr-W3	P	
Lee, Seung Jae	Sa-W6	Park, Beungyong	Fr-T14
Le, Minh Hoang	Sa-W5	Park, Cheol-Soo	Th-T11
Li, Shuhong		Passe, Ulrike	Fr-W3
	Th-T8, Th-T13, Th-T13	Pasut, Wilmer	Sa-T18
Li, Xiangli		Peng, Bo	Fr-T16
	Th-T3, Th-T12, Sa-T17	Pietrzyk, Krystyna	Fr-T16
Liang, Nan	Sa-W6, Sa-T19	Prétot, Sylvie	Th-T1, Th-T1
Lim, Jongyeon	Th-T6	Polese, Luigi Gentile	Fr-F2
Lin, Chao-Hsin	Th-W2	Q	
Liu, Junjie	Th-T2	Qin, Hong	Fr-F4
Liu, Shichao	Fr-W4	R	
Liu, Sumei	Sa-T18	Ramesh, Alamelu	Fr-F2
Liu, Wei	Th-W2, Fr-W4	S	
Liu, Yanhua	Th-T10, Fr-T15	Sánchez, Benigno	Sa-T20
Lui, Gigi CH	Th-T2		
Lo, L. James	Th-T2		
Loh, Kai	Th-T12		

<i>Šenitková, Ingrid</i>	<i>Th-W1</i>	<i>Wilson, Eric</i>	<i>Fr-W3, Sa-T20</i>
<i>Serra, Valentina</i>	<i>Th-T1, Th-T5</i>	<i>Wu, Wei</i>	<i>Th-T3, Fr-F4</i>
<i>Shan, Kui</i>	<i>Th-T9</i>	<i>Woods, Jason</i>	<i>Fr-F2</i>
<i>Shen, Qi</i>	<i>Sa-T19</i>		
<i>Shen, Xiong</i>	<i>Th-T6</i>	<i>X</i>	
<i>Shin, Dae Uk`</i>	<i>Th-T9</i>	<i>Xiao, Juan</i>	<i>Th-T11</i>
<i>Shih, Yulin</i>	<i>Th-T7</i>		
<i>Sirdeshpande, Gourish</i>	<i>Fr-F1</i>	<i>Y</i>	
<i>Srebric, Jelena</i>	<i>Fr-W4</i>	<i>Yang, Lei</i>	<i>Fr-F3</i>
<i>Sun, Hejiang</i>	<i>Th-W2, Th-T10</i>	<i>Yeon, Junoh</i>	<i>Fr-T15</i>
<i>Sun, Chanjuan</i>	<i>Th-T5, Sa-T18</i>		
<i>Sun, Yuming</i>	<i>Th-T6</i>	<i>Z</i>	
		<i>Zhang, Weirong</i>	<i>Th-T11</i>
<i>T</i>		<i>Zhang, Xianping</i>	<i>Th-T3, Sa-T20</i>
<i>Teixeira, Carla</i>	<i>Th-T1</i>	<i>Zhang, Xiaotong</i>	<i>Th-T11</i>
<i>Toma, Tetsuya</i>	<i>Th-T9</i>	<i>Zhang, Yuan</i>	<i>Fr-F3</i>
<i>Tong, Yan</i>	<i>Th-T2</i>	<i>Zhang, Zhongbin</i>	<i>Th-T4</i>
<i>Tso, Chi Yan</i>	<i>Fr-T14</i>	<i>Zhao, Yang</i>	<i>Th-T9</i>
		<i>Zhou, Zhigang</i>	<i>Sa-T20</i>
<i>U</i>		<i>Zou, Pinghua</i>	<i>Sa-T17</i>
<i>Urano, Akira</i>	<i>Fr-F1</i>		
<i>Utsumi, Yasuo</i>	<i>Sa-W6</i>		
<i>V</i>			
<i>Vakiloroaya, Vahid</i>	<i>Fr-T13</i>		
<i>Verhelst, Joachim</i>	<i>Th-W1</i>		
<i>Verso, Valerio</i>	<i>Th-T5, Th-T9</i>		
<i>Ven, Xinjie</i>	<i>Th-T7</i>		
<i>W</i>			
<i>Wakili, Karim Ghazi</i>	<i>Fr-W3</i>		
<i>Wang, Haidong</i>	<i>Fr-T15</i>		
<i>Wang, Jihong</i>	<i>Sa-T17</i>		
<i>Wang, Liangzhu</i>	<i>Fr-W4</i>		
<i>Wang, Shengwei</i>	<i>Sa-W6</i>		
<i>Wang, Wei</i>	<i>Sa-T17</i>		
<i>Wang, Zhaojun</i>	<i>Fr-T14, Sa-T18</i>		

Organizers

Organizing Committee

- *Stein Sture*, Conference President, Vice Chancellor for Research, University of Colorado
- *Zhiqiang (John) Zhai*, Conference General Chair, University of Colorado
- *Moncef Krarti*, Conference Technical Chair, University of Colorado
- *Qingyan Chen*, Conference Technical Chair, Purdue University
- *Jelena Srebric*, Conference Technical Chair, The Pennsylvania State University
- *Michael Brandemuehl*, Conference Program Chair, University of Colorado
- *Gregor Henze*, Conference Program Chair, University of Colorado
- *Junjie Liu*, Conference Program Chair, Tianjin University
- *Lin Duanmu*, Conference Program Chairs, Dalian University of Technology
- *Haidong Wang*, Conference Secretary, University of Colorado
- *Xiangli Li*, Conference Secretary, Dalian University of Technology
- *James McNeill*, Conference Secretary, University of Colorado

International Advisory Committee

- *Lawrence C. Bank*, The City College of New York, USA
- *Richard Corsi*, University of Texas at Austin, USA

- *Robert Hutchinson*, Rocky Mountain Institute, USA
- *Ron Judkoff*, National Renewable Energy Laboratory, USA
- *Yuguo Li*, The Hong Kong University, China
- *Farhad Memarzadeh*, National Institutes of Health, USA
- *William Nazaroff*, University of California at Berkeley, USA
- *Peter Nielsen*, Aalborg University, Denmark
- *Bjarne Olesen*, Technical University of Denmark, Denmark
- *Andrew Persily*, National Institute of Standards and Technology, USA
- *Branislav Todorovic*, University of Belgrade, Serbia
- *Xudong Yang*, Tsinghua University, China
- *Hiroshi Yoshino*, Tohoku University, Japan

International Scientific Committee

- *Hazim Awbi*, University of Reading, UK
- *Costas Balaras*, National Observatory of Athens, Greece
- *Jamie Bennett*, Center for Disease Control and Prevention, USA
- *Zhuolun Chen*, South China University of Technology, China
- *Craig Christensen*, National Renewable Energy Laboratory, USA
- *Derek Clements-Croome*, University of Reading, UK
- *Peter Ellis*, Big Ladder Software, USA
- *Ellen Franconi*, Rocky Mountain Institute, USA
- *Yanfeng Gong*, Nanjing University of Technology, China
- *Lixing Gu*, Florida Solar Energy Center, USA
- *Fariborz Haghighat*, Concordia University, Canada
- *Guoqing He*, Zhejiang University, China
- *Hugo Hens*, Katholieke Universiteit, Belgium

- *Jan Hensen*, Eindhoven University, Netherlands
- *Abel Hernández-Guerrero*, Universidad de Guanajuato, Mexico
- *Tianzhen Hong*, Lawrence Berkeley National Laboratory, USA
- *Shih-Cheng Hu*, National Taipei University of Technology, Taiwan
- *Joe Huang*, White Box Technologies, USA
- *Shinsuke Kato*, University of Tokyo, Japan
- *Ezzat Khalifa*, Syracuse University, USA
- *Kwang-Woo Kim*, Seoul National University, Korea
- *Joseph Lam*, City University of Hong Kong, China
- *Angui Li*, Xi'an University of Architectural Technology, China
- *Xianting Li*, Tsinghua University, China
- *Zhiwei Lian*, Shanghai Jiaotong University, China
- *Borong Lin*, Tsinghua University, China
- *Chao-Hsin Lin*, The Boeing Company, USA
- *John Lin*, Hong Kong City University, China
- *John Little*, Virginia Tech, USA
- *John Mardaljevic*, De Montfort University, UK
- *Lupita D. Montoya*, University of Colorado Boulder, USA
- *Jianlei Niu*, Hong Kong Polytechnic University, China
- *Atila Novoselac*, University of Texas at Austin, USA
- *John A. Ochsendorf*, Massachusetts Institute of Technology, USA
- *Menghao Qin*, Nanjing University, USA
- *Anu Ramaswami*, University of Colorado Denver, USA
- *Sue Reilly*, Group 14 Engineering, Inc., USA
- *Claude-Alain Roulet*, Swiss Federal Institute of Technology, Switzerland

- *Mattheos Santamouris*, University of Athens, Greece
- *Chandra Sekhar*, National University of Singapore, Singapore
- *Stefano Schiavon*, University of California, Berkeley, USA
- *Gang Tan*, University of Wyoming, USA
- *Kwok Wai Tham*, National University of Singapore, Singapore
- *Marija Todorovic*, University of Belgrade, Serbia
- *Yasuo Utsumi*, Sendai National College of Technology, Japan
- *Fu-jen Wang*, National Chin-Yi University of Technology, Taiwan
- *Leon Wang*, Concordia University, Canada
- *Xinlei Wang*, University of Illinois at Urbana-Champaign, USA
- *Zhao Wang*, South China University of Technology Design Institute, China
- *Peter Wouters*, Belgian Building Research Institute, Belgium
- *Peng Xu*, Shanghai Tongji University, China
- *Tim Xu*, Lawrence Berkeley National Laboratory, USA
- *Runming Yao*, University of Reading, UK
- *Guoqiang Zhang*, Hunan University, China
- *Guoqiang Zhang*, Aarhus University, Denmark
- *Jianshun (Jensen) Zhang*, Syracuse University, USA
- *Tim Zhang*, Dalian University of Technology, China
- *Nan Zhou*, Lawrence Berkeley National Laboratory, USA
- *Wangda Zuo*, Lawrence Berkeley National Laboratory, USA