

**WEDNESDAY, 10:45AM TO 12 NOON****TECHNICAL SESSION 1A - DAYLIGHT AND ENERGY I****CHAIR: SPENCER DUTTON**

R Versage, A Melo, and R Lamberts

Impact of different daylighting simulation results on the prediction of total energy consumption

S Kleindienst, and M Andersen

Solar Heat Surplus and Solar Heat Scarcity: the inclusion of solar heat gain in a dynamic and holistic daylight analysis

W O'Brien, K Kapsis, A Athienitis, and T Kesik

Methodology for quantifying the performance implications of intelligent shade control in existing buildings in an urban context

**TECHNICAL SESSION 1B - EXISTING BUILDING AND MODEL CALIBRATION****CHAIR: DAVID ELDRIDGE**

A Nassiopoulous, F Bourquin

Real-time monitoring of building energy behaviour: a conceptual framework

G Salvalai, J Pfaffert, and D Jacob

Validation of a low-energy whole building simulation model

T Leibing, C Reiser, and O Baumann

Development of a calibration methodology for the energy simulation of an existing building from 1969

**WEDNESDAY, 1:30PM TO 2:45PM****TECHNICAL SESSION 2A - MODELING PROCESS IN PRACTICE****CHAIR: OLIVER BAUMANN**

K Tupper and C Fluhrer

Energy modeling at each design phase: strategies to minimize design energy use

S Ali

Analysis of procedures and workflow for conducting energy analysis using Autodesk Revit, GBXML, and TRACE 700

C Baker, P Vaidya, and A D'Souza

Modeling protocol for early energy design assistance

**TECHNICAL SESSION 2B - PARAMETRIC MODELING****CHAIR: HARVEY BRYAN**

E Hale, N Long

Enumerating a diverse set of building designs using discrete optimization

K Field, M Deru, and D Studer

Using DOE commercial reference buildings for simulation studies

W Sheta, and S Sharples

A building simulation sustainability analysis to assess dwellings in a new Cairo development

**WEDNESDAY, 3:15PM TO 4:30PM****TECHNICAL SESSION 3A - DESIGN OPTIMIZATION****CHAIR: TIMOTHY MCDOWELL**

L Peters, M Wetter, A Ferguson, and W D'haeseleer

The coupling of ESP-r and GenOpt: a simple case study

J Gagne and M Andersen

Multi-objective facade optimization for daylighting design using a genetic algorithm

D Jacob, S Burhenne, A Florita, and G Henze

Optimizing building energy simulation models in the face of uncertainty

**TECHNICAL SESSION 3B - ENERGY MODELING SOFTWARE - DEVELOPMENT AND COMPARISON****CHAIR:**

Y Pan

Visual Eplus: A Chinese interactive graphical user interface (GUI) for Energyplus

N Kruijs

Reconciling differences in residential DX cooling models in DOE-2 and EnergyPlus

S Andolsun, C Culp, and J Haberl

Energyplus vs DOE-2: The effect of ground coupling on heating and cooling energy consumption of a slab-on-grade code house in a cold climate

**THURSDAY, 9:00AM TO 10:15AM****TECHNICAL SESSION 4A - FAÇADE AND WINDOW MODELING****CHAIR: SAM MASON**

S Kasarekar and C Waddell

Space load &amp; system load comparison using energy modeling software

A Brun, E Wurtz, and D Quenard

Experimental and numerical comparison of heat transfer in a naturally ventilated roof cavity

M Azarbayjani

Beyond arrows: CFD modeling of a new configuration of naturally ventilated double-skin facade in a high rise Office Building

P Lyons, J Wong, and M Bhandari

A Comparison of Window Modeling Methods in EnergyPlus 4.0

**TECHNICAL SESSION 4B - HVAC SYSTEM MODELING****CHAIR: DAN NALL**

D Kang, and R Strand

A new model for calculating the convective and radiant impact of radiators and baseboards in Energyplus

X Li, Y Li, and J Seem

Dynamic modeling of mechanical draft counter-flow wet cooling tower with Modelica

C Miller and C Sekhar

Modeling of the single coil, twin fan air-conditioning system in Energyplus

**TECHNICAL SESSION 4C - MODELING OF BUILDING LOADS****CHAIR: ANDREW MCNAMARA**

M Mirsadeghi, D Costola, B Blocken, and J Hensen

Towards the application of distributed simulation in whole building heat, air and moisture performance engineering

G Zimmermann, Y Lu, and G Lo

Heat flow modeling of HVAC systems for fault detection and diagnosis

A Jain and A Osborne

Thermodynamics of the microclimate: effects of external elements on internal heat gains

**THURSDAY, 10:30AM TO 11:45AM****TECHNICAL SESSION 5A - MODELING ON A LARGE SCALE I****CHAIR: JEFF HABERL**

A Rosheidat and H Bryan

Optimizing the effect of vegetation for pedestrian thermal comfort and urban heat island mitigation in a hot arid urban environment

C Yimprayoon and M Navvab

Quantification of available solar irradiation on rooftops using orthophotograph and LiDar data

R Brandao and M Alucci

Thermal behavior of urban canyons using numerical modeling, CFD simulation and GIS mapping

**TECHNICAL SESSION 5B - MODELING OF OCCUPANT BEHAVIOR****CHAIR: PHIL HAVES**

R Goldstein, A Tessier, and A Khan

Customizing the behavior of interacting occupants using personas

S Dutton and L Shao

Window opening behavior in a naturally ventilated school

G Zimmermann

Agent-based modeling and simulation of individual building occupants

**TECHNICAL SESSION 5C - RESIDENTIAL ENERGY****CHAIR:**

Z Liu, H Kim, M Malhotra, J Mukhopadhyay, J Baltazar, J Haberl, C Culp, B Yazdani, and C Montgomery

Going beyond a RESnet certification for code-compliant simulations: a comparison of detailed results of three RESnet-certified, code-compliant residential simulation programs

M Malhotra, J Haberl

Simulating building energy performance of single-family detached residences designed for off-grid, off-pipe operation

K Otto, R Taylor, R Brahme, and W Sisson

What does it take for the residential building sector to reach net-zero energy?

**THURSDAY, 1:15PM TO 2:30PM****TECHNICAL SESSION 6A - DAYLIGHT AND ENERGY II****CHAIR: CHRISTOPH REINHART**

R Guglielmetti, S Pless, and P Torcellini

On the use of integrated daylighting and energy simulations to drive the design of a large net-zero energy office building

J An and S Mason

Integrating advanced daylight analysis into building energy analysis

K Lagios, J Niemasz, and C Reinhart

Animated building performance simulation (ABPS) - Linking Rhinoceros/Grasshopper with Radiance/Daysim

**TECHNICAL SESSION 6B - RENEWABLE ENERGY MODELING METHODS****CHAIR:**

R Hendron, J Burch, G Barker

Tool for generating realistic residential hot water event schedules

D Kang, and R Strand

Implementation of a model for a wind turbine system in Energyplus

S Cho, and J Haberl

Integrating solar thermal and photovoltaic systems in whole building energy simulation

**THURSDAY, 3:00PM TO 4:15PM****TECHNICAL SESSION 7A - MODELING ON A LARGE SCALE II****CHAIR: JORGE GONZALEZ**

C Amorim, M Cintra, C e Silva, J Fernandes, L Sudbrack  
Energy efficiency code in Brazil: Experiences in the first public building labelled in Brasilia

A Strzalka, U Eicker, V Coors, and J Schumacher  
Modeling energy demand for heating at city scale

D Quinn, and J Fernandez  
Estimating material usage of road infrastructure in US cities

**TECHNICAL SESSION 7B - CONTROL OPTIMIZATION****CHAIR: MICHAEL WETTER**

V Zavala, J Wang, S Leyffer, E Constantinescu, M Anitescu, and G Conzelmann  
P Li, Y Li, J Seem  
Proactive energy management for next-generation building systems  
Dynamic modeling and consistent initialization of system of differential-algebraic equations for centrifugal chillers

R Zhang, K Lam  
Comparison of building load performance between first principle based shading algorithm and implementable shading control algorithm

**FRIDAY, 9:00AM TO 10:15AM****TECHNICAL SESSION 8A - DAYLIGHT MODELING PROCESS AND METHODS****CHAIR: SHANTA TUCKER**

M Saxena, G Ward, T Perry, L Heschong, and R Higa  
Dynamic radiance - predicting annual daylighting with variable fenestration optics using BSDFs

C Reinhart and J Weinold  
The daylighting dashboard - a simulation-based analysis for daylight spaces

R Manudhane, C Reinhart  
Daylight nomographs revisited

**TECHNICAL SESSION 8B - UNCERTAINTY ANALYSIS AND STATISTICAL METHODS****CHAIR:**

S Burhenne, D Jacob, and G Henze  
Uncertainty analysis in building simulation with monte carlo techniques

J Yuan, L Glicksman  
Using statistical methods to investigate the mapping from initial values to the multiple steady states in complex building simulation problems

B Eisenhower, T Maile, M Fischer, and I Mezic  
Decomposing building system data for model validation and analysis using the Koopman operator

**FRIDAY, 10:30AM TO 11:45AM****TECHNICAL SESSION 9A - BUILDING COMPONENT INTERACTION****CHAIR: WANGDA ZUO**

N Khan  
Use of building simulation software TAS to investigate the dynamic thermal performance of a school building with installation of a Monodraught natural ventilation and cooling system

C Brown, L Glicksman, and M Lehar  
Toward zero energy buildings: optimized for energy use and cost

Y Chae and R Strand  
Development of a dedicated outdoor air system module for a whole building annual energy simulation program

**TECHNICAL SESSION 9B - HVAC AND BUILDING ENERGY PERFORMANCE****CHAIR: ADRIAN TULUCA**

T Webster, KH Lee, F Bauman, S Schiavon, T Hoyt, J Feng, A Daly  
Influence of supply air temperature on underfloor air distribution (UFAD) system energy performance

Z O'Neill, S Narayanan, R Brahme  
Model-based thermal load estimation in buildings

P Im, and J Haberl  
Analysis of the Energy Savings Potential in K-5 Schools in Hot and Humid Climates: Application of high performance measures and renewable energy systems

**FRIDAY, 1:15 TO 2:30****TECHNICAL SESSION 10A - CFD CASE STUDIES AND APPLICATION****CHAIR: GREGORY DOBBS**

L Wang, W Dols, Q Chen  
An introduction to the CFD capabilities in CONTAM 3.0

M Popovac  
Robust eddy viscosity turbulence modeling with elliptic relaxation for external building flow analysis

G Tan and K Venerable  
CFD simulation enhances the optimization of a data center's expansion process

W Zuo and Q Chen  
Improvements on the fast fluid dynamic model for indoor airflow simulation

**TECHNICAL SESSION 10B - GETTING TO ZERO****CHAIR:**

M Karpman  
Performance-based incentive program for new buildings: Report from the field

M Jones, S Ledinger  
Pushing the limits of simulation complexity - a building energy performance simulation of an exhibition center in the U.A.E

J Perlman, A McNamara, D Huang, and L Audin  
Is Real Time Pricing Right For Solar PV?