Wednesday, September 10

Wednesday, September 10, 7:00 AM-8:00 AM
Breakfast

Wednesday, September 10, 7:30 AM-8:00 AM
Vendor Demonstration: IES

Wednesday, September 10, 8:15 AM-9:15 AM

Welcome Remarks and Keynote Address
Chair: Dennis Knight, P.E., Member, Whole Building Systems, LLC, Charleston, SC

BIM to SIM: Trends in Buildings, Technologies and Tools
Drury Crawley, Ph.D., Fellow ASHRAE, Bentley Systems, Inc., Washington, DC
Wednesday, September 10, 9:15 AM - 10:45 AM

Lighting and Daylighting 1

The Ever Changing Sky - BIM Model in Daylighting Study
Yun-Shang Chiou, Ph.D. and Pei-Chung Huang, National Taiwan University of Science and Technology, Taipei, Taiwan

Comparison of Integrated Simulation Tools for LEED V4 Daylight Credit Assessment
Aho Malekafzali Ardakan, Ph.D., Ladan Ghobad, Ph.D., and Jianxin Hu, Ph.D., (1) North Carolina State University, Raleigh, NC, (2) Interface Engineering, Washington D.C., DC

Complex Geometry Facades in Building Energy Simulations and Standards
Won Hee Ko, Buro Happold, Los Angeles, CA

Wednesday, September 10, 9:15 AM - 10:45 AM

Modeling and Algorithm Advances

Towards Standardized Building Properties Template Files for Early Design Energy Model Generation
Timur Dogan, Student Member, Carlos Cerezo Davila and Christoph F. Reinhart, Dr.Ing., Massachusetts Institute of Technology, Cambridge, MA

Reducing Energyplus Run Time for Code Compliance Tools
Rahul A. Athalye, Associate Member1, Krishnan Gowri, Ph.D., Member2, Robert W. Schultz1 and Jason Glazer, P.E., Member3, (1) Pacific Northwest National Laboratory, Richland, WA, (2) Pacific Northwest National Laboratory, Seattle, WA, (3) GARD Analytics, Inc., Arlington Heights, IL

Using the BEopt Automated Residential Simulation Test Suite to Enable Comparative Analysis Between Energy Simulation Engines
Paulo Cesar Tabares-Velasco, Ph.D., Associate Member, Jeff Maquire, Scott Horowitz and Craig Christensen, National Renewable Energy Laboratory, Golden, CO

Wednesday, September 10, 9:15 AM - 10:45 AM

BIM in the Cloud 1

Cloud Simulation for Data Driven Design at SOM
Matthew Shaxted, Affiliate1, Jason Kirkpatrick, Associate Member2, J on Sargent, Affiliate3, Sebastian Claussnitzer, Affiliate1 and Arpan Bakshi, Affiliate1, (1) Skidmore Owings & Merrill LLP, Chicago, IL, (2) Skidmore Owings & Merrill LLP, San Francisco, CA, (3) Skidmore, Owings & Merrill LLP (SOM), New York, NY

Daylighting in the Cloud: Fast, Seamless, Managed (Day)Lighting Analysis for Architects
R David Scheer, Member, Autodesk, SF, CA

Glazing in the Cloud
Susan Reilly, Member, Group14 Engineering, Inc., Denver, CO
Wednesday, September 10, 9:15 AM -10:45 AM

**Codes and Rating Systems I**

**Mechanical Calculations and Code Compliance with Revit**
Ionel Petrus, P.E., Associate Member and Daniel McGee, Associate Member, SmithGroupJJR, Washington, DC

**Modeling, Benchmarking and Validating Performance: Why Energy Should be a Secondary Concern**
Ruairi Barnwell, Member and Shona O Dea, Member, DLR Group, Chicago, IL

**The Cold Truth about Modeling Thermostats and Behavior**
Bryan Urban, Fraunhofer Institute, Boston, MA

Wednesday, September 10, 10:45 AM -11:15 AM

**Break**

Wednesday, September 10, 11:15 AM -12:15 PM

**Combined Use of Multiple Tools**

**Linking Simulation Programs, Advanced Control and FDD Algorithms with a Building Management System Based on the Functional Mock-up Interface and the Building Automation Java Architecture Standards**
Thierry Stephane Nouidui, Ph.D. and Michael Wetter, Ph.D., Member, Lawrence Berkeley National Laboratory, Berkeley, CA

**Coupled Simulation of Indoor Environment, HVAC and Control System By Using Fast Fluid Dynamics and the Modelica Buildings Library**
Wangda Zuo, Ph.D., Member, Michael Wetter, Ph.D., Member, Dan Li, Mingang Jin, Student Member and Qingyan Chen, Ph.D., Fellow ASHRAE, University of Miami, Coral Gables, FL, Lawrence Berkeley National Laboratory, Berkeley, CA, Purdue University, West Lafayette, IN

Wednesday, September 10, 11:15 AM -12:15 PM

**Modeling for Controls**

**Development of Control Benefit Evaluation Tool for Small Commercial Buildings**
Donghun Kim, Eugene M Cliff, Ph.D., James Braun, Ph.D., Fellow ASHRAE and Jeff Borggaard, Ph.D., Purdue University, West Lafayette, IN, Virginia Tech, Blacksburg, VA

**Adaptive and Predictive Control of Thermally Activated Building Systems**
Martin Schmelas, M.D., Thomas Feldmann and Elmar Bollin, Offenburg University of Applied Sciences, Offenburg, Germany
Wednesday, September 10, 11:15 AM - 12:15 PM
**BIM in the Cloud 2**

Scott Duncan, Ph.D., Linyu Zhang, Yongchang Li, Ph.D., Michael Balchanos, Ph.D., Kisun Song and Juhyun Kim, Georgia Institute of Technology, Atlanta, GA

Commercial Model-Predictive Control through Cloud Computing: The Performance-Price Tradeoff  
Peter May-Ostendorp, Ph.D., Associate Member, Sandro Plamp, Associate Member, and Gregor Henze, Ph.D., P.E., Member, (1)QCoefficient, Chicago, IL, (2)University of Colorado, Boulder, CO

Wednesday, September 10, 12:15 PM - 1:30 PM  
Lunch

Wednesday, September 10, 1:00 PM - 1:30 PM  
Vendor Demonstration: DesignBuilder USA

Wednesday, September 10, 1:45 PM - 3:00 PM  
**Cloud Computing**

Scaling Building Energy Modeling Horizontally in the Cloud with Openstudio  
Nicholas L. Long, Member, Brian L. Ball, Ph.D., Katherine A. Fleming, Ph.D. and Daniel L. Macumber, Member, National Renewable Energy Laboratory, Golden, CO

A Graphical Tool for Cloud-Based Building Energy Simulation  
Daniel L. Macumber, Member, Brian L. Ball, Ph.D. and Nicholas L. Long, Member, National Renewable Energy Laboratory, Golden, CO

Challenges, Limitations, and Success of Cloud Computing for Parallel Simulation of Multiple Scenario and Co-Simulation  
Livio Mazzarella, Ph.D., P.E., Martina Pasini, Ph.D. and Narges Shahmandi Hoonejan, P.Eng., Politecnico di Milano, Milano, Italy

Wednesday, September 10, 1:45 PM - 3:00 PM  
**Lighting and Daylighting 2**

A Radiance-Based Building Energy Model to Evaluate the Performance of Complex Fenestration Systems  
Bruno Bueno, Dr.Ing., Elena Guidolin, Jan Wienold, Dr.Ing. and Tilmann E. Kuhn, Fraunhofer ISE, Freiburg, Germany

Irradiance Caching for Global Illumination Calculation on Graphics Hardware  
Nathaniel L. Jones and Christoph F. Reinhart, Dr.Ing., Massachusetts Institute of Technology, Cambridge, MA
Wednesday, September 10, 1:45 PM - 3:00 PM
**Life Cycle Cost Analysis 1**

Energy Simulation for Future Weather Extremes  
Tristan Truyens, P.Eng., Associate Member, DIALOG, Toronto, ON, Canada

The Impacts of Duct Design on Life Cycle Costs of Central Residential Heating and Air-Conditioning Systems  
Brent Stephens, Ph.D., Associate Member, Illinois Institute of Technology, Chicago, IL

Wednesday, September 10, 1:45 PM - 3:00 PM
**Codes and Rating Systems 2**

Automated Compliance Modeling - California and Beyond  
Dimitri Contoyannis, P.E., Member, Architectural Energy Corp, San Francisco, CA

Overview of 2013 California Residential Title 24 Compliance Software  
Charles S. Barnaby, Member, Wrightsoft Corp., Lexington, MA

Wednesday, September 10, 3:00 PM - 3:30 PM
**Break**

Wednesday, September 10, 3:30 PM - 5:00 PM
**BIM and Airflow**  
Room: Suwanee

Automated CFD Simulation System with BIM for Green Mark Certification  
Nari Yoon, Associate Member, Nobuyuki Oshitani and Yuya Andz, Cradle North America, Beavercreek, OH

BIM-Based Processes and Standardized Information Exchanges for Multizone Airflow Analysis  
Sanghoon Lee, Ph.D., Jason W. DeGraw, Ph.D., Member, William P. Bahnfleth, Ph.D., P.E., Fellow ASHRAE, Robert M. Leicht, Ph.D. and John I. Messner, Ph.D., The Pennsylvania State University, University Park, PA

Wednesday, September 10, 3:30 PM - 5:00 PM
**Fault Detection and Diagnosis**  
Room: Buckhead B

An FMI-based Toolchain for the Adoption of Model-based FDD  
Marco Bonvini, Ph.D., Michael Wetter, Ph.D., Member and Michael D. Sohn, Ph.D., P.E., Lawrence Berkeley National Laboratory, Berkeley, CA

Shokouh Pourarian, Ph.D., Jin Wen, Ph.D., Member1, Xiwang Li, Student Member1, Daniel Veronica, Member2, Xiaohui (Joe) Zhou2 and Ran Liu, Ph.D., Student Member3, (1)Drexel University, Philadelphia, PA, (2)National Institute of Standards and Technology (NIST), Gaithersburg, MD, (3)Iowa Energy Center, Ames, IA, (4)Iowa Energy Center, Ankeny, IA
Wednesday, September 10, 3:30 PM - 5:00 PM

**Design Firms 1**
Room: Heritage AB

**BIM Integration Best Practices for Today's Engineering Firm**
David Butts, Gannett Fleming, Raleigh, NC

**Change in an Engineering Firm: It Really Happened**
Mark Mergenschroer, TME, Inc, Little Rock, AR

**Integrated Workflow of Building Information Modeling (BIM) Software with Building Energy Modeling Simulation**
Nick Gmitter, P.E., Associate Member and David Quirk, P.E., Member, DLB Associates, Eatontown, NJ

**Integrating Building Simulation and the Design Process**
Brendan Hall, P.E., Member, Ben Arnett, Associate Member, Emy McGann and Dennis Wessel, P.E., Karpinski Engineering, Cleveland, OH

Wednesday, September 10, 3:30 PM - 5:00 PM

**Design Firms 2**
Room: Buchead A

**Laboratory Systems: Impact of Functional, Operational and Climatic Parameters (Paper)**
Shreshth Nagpal, Member and Jagan Pillai, Associate Member, Atelier Ten, New York, NY

**Comparing Methods for Modeling VRF Systems**
Bryce K. Cox, P.E., Member, CH2M HILL, Corvallis, OR

**The Impact of Occupancy Behavior on Energy Consumption in Low Income Residential Buildings**
Bing Dong, Ph.D., Member, The University of Texas at San Antonio, San Antonio, TX

**The Design of Natural Ventilation Strategies of an Office Tower through Simulation**
Emir A. Pekdemir, Associate Member and Matthew Herman, Buro Happold, Chicago, IL

Wednesday, September 10, 5:00 PM - 5:30 PM

**Vendor Demonstration: Trane**
Room: Heritage C
Thursday, September 11

Thursday, September 11, 7:00 AM - 8:00 AM
Breakfast
For Hotel Guests: Lennox Dining Room in the Lobby; For Non-Guests: Heritage Pre-Function in Conference Center

Thursday, September 11, 7:30 AM - 8:00 AM
Vendor Demonstration: Carrier Corporation
Room: Heritage C

Thursday, September 11, 8:15 AM - 8:45 AM
KEYNOTE
Cloud-based BIM to BEM for Early Design
Room: Heritage AB
Krishnan Gowri, Ph.D., Member, Autodesk, Tukwila, WA

Energy modeling in early design stages is the key to getting architects involved in the critical decision making stages for energy efficiency building design. But several challenges remain in the creation of models, multiple simulations for parametric analysis and data visualization for design decision making. This keynote will highlight the recent breakthrough for energy analytical model development during conceptual design, cloud-based parallel simulations for parametric analysis and new energy dashboard visualization techniques for customized review of analytical results. These advancements provide a vision for evolutionary energy model development that can originate from early design BIM which can be updated and used throughout the building life cycle.

Thursday, September 11, 9:00 AM - 10:30 AM
Calibration 1
Room: Buckhead A

An Energyplus Whole Building Energy Model Calibration Method for Office Buildings Using Occupant Behavior Data Mining and Empirical Data
Khee Poh Lam, Ph.D.1, Jie Zhao1, B. Erik Ydstie1, Jason Wirick2, Meiwei Qi3 and Jihyun Park4, (1)Carnegie Mellon University, Pittsburgh, PA, (2)Phipps Conservatory and Botany Garden, Pittsburgh, PA, (3)Tsingshua University, Beijing, China

Post-Occupancy Evaluation and Partial-Calibration of 18 Design-Phase Energy Models
Holly W. Samuelson1, Arash Ghorayshi, P.Eng.2 and Christoph F. Reinhart, Dr.Ing.3, (1)Harvard University Graduate School of Design, Cambridge, MA, (2)MMM Group Ltd., formerly Enermodal Engineering, Kitchener, ON, Canada, (3)MIT, Cambridge, MA

Piljae Im, Ph.D., Member and Mahabir Bhandari, Member, Oak Ridge National Laboratory, Oak Ridge, TN

Spreadsheet Tool Development for Visualizing Building Performance and Simulation Data to Help Calibrating Models
Simon Sansregret, M.D., Member and Karine Lavigne, Hydro-Quebec, Shawinigan, QC, Canada
Thursday, September 11, 9:00 AM - 10:30 AM
Uncertainty, Assumptions and Sensitivity

Room: Suwanee
Sizing HVAC Systems Under Uncertainty
Yuming Sun, Ph.D., Student Member, Li Gu, C. F. Jeff Wu and Godfried Augenbroe, Georgia Institute of Technology, Atlanta, GA

Impact of Modeler Decisions on Simulation Results
Pamela Berkeley¹, Philip Haves, Ph.D., Fellow ASHRAE² and Erik Kolderup, P.E., Member³, (1)University of California, Berkeley, Berkeley, CA, (2)Lawrence Berkeley National Laboratory, Berkeley, CA, (3)Kolderup Consulting, San Francisco, CA

Right-Sizing a Residential Photovoltaic System Under the Influence of Demand Response Programs and in the Presence of System Uncertainties
Yuna Zhang and Godfried Augenbroe, Georgia Institute of Technology, Atlanta, GA

The Impact of Default Assumptions from Simulation Protocols on Predicted Energy Consumption in Office Buildings in Australia
Daniel Daly, Paul Cooper and Zhenjun Ma, University of Wollongong, Wollongong, Australia

Thursday, September 11, 9:00 AM - 10:30 AM
Urban Scale Modeling

Room: Buckhead B
Campus-Wide Integrated Building Energy Simulation
Willy Bernal, Ph.D., Truong Nghiem, Dr.Ing., Madhur Behl, Ph.D. and Rahul Mangharam, Dr.Ing., University of Pennsylvania, Philadelphia, PA

Urban Energy Modeling: GIS as an Alternative to BIM
Praveen Sehrawat and Karen Kensek, University of Southern California, Los Angeles, CA

Urban Scale Modelling – How Generalised Models CAN Help Communities Half Their Energy Use in 30 YEARS
Annie Marston, Ph.D.¹, Peter Garforth², Oliver Baumann¹ and Gerd Fleichammer³, (1)Ebert and Baumann Consulting Engineers Inc., Washington DC, (2)Garforth International, Toledo, OH, (3)Ingenieurbüro GF LLC, Nußloch, Germany

Site-Level Energy Monitoring and Analysis using Koopman Operator Methods
Michael Georgescu, Student Member and Igor Mezić, Ph.D., University of California, Santa Barbara, Santa Barbara, CA

Thursday, September 11, 9:00 -10:30 AM
Modeling Tools Market-Reality Session 1: Design Workflow

Room: Heritage AB
Major modeling and simulation vendors participate in an all-day session to explain and answer questions about their software's capabilities. Specific questions are posed to the vendors, who provide their answers and then answer questions from the audience. Confirmed vendors are: Autodesk, Carrier, EnergyPlus, eQuest, IES, OpenStudio, Sefaira, Trane and TRNSYS.

Thursday, September 11, 10:30 AM - 10:45 AM
Break
Thursday, September 11, 10:45 AM - 12:00 PM

Calibration 2

Room: Buckhead B

A Novel Calibration Methodology for Heating Coil Models Using Real Data and Modelica Models

Jesús Febres, Raymond Sterling and Marcus M. Keane, National University of Ireland, Galway, Ireland

Calibration of an Energyplus Simulation of a Phase Change Material Product using Experimental Test Cell Data

Nathan Brown, Santosh Philip, Ibone Santiago Trojaola, Susan Ubbelohde and George Loisos, Loisos + Ubbelohde, Alameda, CA

A Guide to Bayesian Calibration of Building Energy Models

Matthew Riddle, Ph.D. and Ralph T. Muehleisen, Ph.D., P.E., Member, Argonne National Laboratory, Lemont, IL

Thursday, September 11, 10:45 AM - 12:00 PM

Optimization

Room: Suwanee

Early Design Analysis Using Optimization Techniques in Design/Practice

Sukreet Singh¹ and Karen M. Kensek², (1)Cunningham Group Architecture Inc, Denver, CO, (2)University of Southern California, Los Angeles, CA

Performance Based Architectural Design Optimization: Automated 3D SPACE Layout using Simulated Annealing

Hwang Yi and Yun Kyu Yi, Ph.D., University of Pennsylvania, Philadelphia, PA

Optimization of the Water-Cooled Chiller Plant System Operation

Sen Huang and Wangda Zuo, Ph.D., Member, University of Miami, Coral Gables, FL

Thursday, September 11, 10:45 AM - 12:00 PM

Uncertainty Analysis of Building Energy Retrofit Assessments

Room: Buckhead A

Chair: Ellen Franconi, Ph.D., Member, Rocky Mountain Institute, Boulder, CO; Godfried Augenbroe, Georgia Institute of Technology, Atlanta, GA

The session brings three invited speakers together to share their work that considers energy savings uncertainty as part of efficiency opportunity assessments in existing buildings. The presentations outline assessment methods that incorporate uncertainty analysis and address its ramifications on investment decision-making. The session will conclude with a 15-minute Q&A discussion about UA and its application in today’s market.

Incorporating Uncertainty Analysis into a Building Retrofit Analysis Using Openstudio and Energyplus

Hayes Zirnhelt, Rocky Mountain Institute, Boulder, CO

A Methodology for Transparent Risk Assessment of Energy Efficiency Investments

Qinpeng Wang and Benjamin Lee, Georgia Institute of Technology, Atlanta, GA

Case Study of Retrofit Application in High Rise Apartments: Investment Decisions Under Uncertainty

Paola Sanguinetti, University of Kansas, Lawrence, KS

Thursday, September 11, 10:45 AM - 12:00 PM

Modeling Tools Market-Reality Session 2: Code and Rating Documentation

Room: Heritage AB

Thursday, September 11, 12:00 PM - 1:15 PM

Lunch

Room: Lennox Dinning Rooming (Hotel Lobby)
Thursday, September 11, 1:00 PM - 1:30 PM
Vendor Demonstration: Sefaira
Room: Heritage C

Thursday, September 11, 1:30 PM - 3:00 PM
Energy Efficiency / Modeling and Algorithm Advances
Room: Buckhead B
An Improved Method of Modeling Infiltration in Commercial Building Energy Models
Lisa C. Ng, Ph.D., Associate Member, Steven J. Emmerich, Member and Andrew K. Persily, Ph.D., Member, National Institute of Standards and Technology, Gaithersburg, MD

Development of a Simplified Model of the Switchable Exhaust Air Insulation Window
Chong Zhang, Jinbo Wang, Xinhua Xu and Jing Kang. Huazhong University of Science & Technology, Wuhan, China

Inverse Modeling to Estimate the Effective Leakage Area in Buildings
Te Qi, Member1, Zheng O'Neill, P.H.D., P.E., Member2 and Godfried Augenbroe3, (1)The Beck Group, Dallas, TX, (2)United Technologies Research Center, East Hartford, CT, (3)Georgia Institute of Technology, Atlanta, GA

Thursday, September 11, 1:30 PM - 3:00 PM
Retrofits
Room: Suwanee
BIM-Extracted Energyplus Model Calibration for Retrofit Analysis of a Historically Listed Building in Switzerland
Clayton Miller, Associate Member, Daren Thomas, Silvia Domingo Irigoyen, Christian Hersberger, Zoltan Nagy, Ph.D., Dino Rossi and Arno Schluter, Ph.D., ETH Zürich, Zürich, Switzerland

Design and Modeling Strategies for Retrofit to Natural Ventilation
Santosh Philip, Abe Shameson, Nathan Brown, George Loisos and Susan Ubbelohde, Loisos + Ubbelohde, Alameda, CA

Evaluating Energy Efficiency Retrofits in Multifamily Housing
Piljae Im, Ph.D., Member and Mini Malhotra, Ph.D., Associate Member, Oak Ridge National Laboratory, Oak Ridge, TN

An Overview of the Web-Based Integration of Energy, Daylight, and Airflow Simulations to Facilitate Implementation of Energy Efficiency Measures
Mohammad Heidarinejad4, Matthew Dahlhausen, Student Member1, Joshua R. Wentz2, Jinbin Li3, Mujing Wang4, Ying Sun5, Nicholas Mattise1, Craig Casey2, Jelena Srebric, Ph.D., Member3 and Richard Mistrick, Ph.D., P.E.1, (1)The Pennsylvania State University, University Park, PA, (2)Energy Efficient Buildings HUB (EEB HUB), Philadelphia, PA

Thursday, September 11, 1:30 PM - 3:00 PM
Life Cycle Cost Analysis 2
Room: Buckhead A
Applying Monte Carlo Methods to Life Cycle Cost Analysis for ESPC Projects
Anthony Sclafani, P.E., Associate Member, Apollo Solutions Group, Portland, OR

Minimizing Risks of Energy Modeling to Life Cycle Costs
Scott W. Walters, P.E., Member, AMEC Environment & Infrastructure Inc., Kennesaw, GA

Verifying Savings: Model Projections Vs Measured Performance in a Large Scale Incentive Program
Maria Karpman, Member1, Eric Readdy2 and Valentina Rozanova, P.E.2, (1)Karpman Consulting, Glastonbury, CT, (2)TRC, New York, NY

Thursday, September 11, 1:30-3:00 PM
Modeling Tools Market-Reality Session 3: Net-Zero and Low Energy Design
Room: Heritage AB
Thursday, September 11, 3:00 PM - 3:30 PM
Break

Thursday, September 11, 3:30 PM - 5:00 PM
HVAC Component Modeling: Heat Pumps / Heat Exchangers / CHP
Room: Suwanee
Energy Modeling of a Combined Cooling, Heating and Power Plant Using the Evergreen Building Energy Simulation Tool
Xin Hu, Ph.D., P.E., Member¹, Xiang Liu, Ph.D.² and Liangcai Tan, Ph.D., P.E., Member³, (1)PG&E Company, San Francisco, CA, (2)Nexant, San Francisco, CA, (3)HDR Architecture Inc., San Francisco, CA
Potential of Decentralized Heat Pumps to Improve the Financial Viability of a Solar District Heating System with Seasonal Thermal Storage
Mathilde Krebs, Humberto Quintana and Michaël Kummert, Polytechnique Montréal, Montreal, QC, Canada
Simulation Modeling of Earth-to-Air Heat Exchanger (Buried Pipe) for the Performance Analysis of a School Building in Mid-Atlantic Region
Sedighehsadat Mirianhosseinabadi¹, Soolyeon Cho, Ph.D., Member¹, Eun Chul Kang² and Euy-Joon Lee, Ph.D.², (1)North Carolina State University, Raleigh, NC, (2)Korea Institute of Energy Research, Daejeon, South Korea

Thursday, September 11, 3:30 PM - 5:00 PM
State of the Art BIM 1
Room: Buckhead B
Simulation and Optimization of a Multiple-Building Campus Loop with Ground Coupled HVAC System
Shane R. Mason, P.E., Member, Greensleeves LLC, Findlay, OH
Standards Data Dictionary - Extended XML for Modeling
Roger Hedrick, Member, Architectural Energy Corporation, Boulder, CO

Thursday, September 11, 3:30 - 5:00 PM
Modeling Tools Market-Reality Session 4: Existing Building Applications
Room: Heritage AB

Vendor Demonstration: BUILDlab
Room: Heritage C

Thursday, September 11, 6:00 PM - 7:00 PM
Reception
Room: Buckhead A and Heritage Pre-Function

Thursday, September 11, 7:00 PM - 9:00 PM
Dinner and Awards
Room: Heritage AB
Friday, September 12

**Breakfast**

For Hotel Guests: Lennox Dining Room (Hotel Lobby), For Non-Guests Heritage Prefunction in Conference Center

Friday September 12, 7:30 AM-8:00 AM

**Vendor Demonstration: Cradle North America, Inc.**

Room: Heritage C

Friday, September 12, 8:15 AM-10:00 AM

**HVAC Component Modeling**

Room: Buckhead B

- Comparison of Actual Supply Air Fan Performance Data to ASHRAE 90.1 Standard-2010 and DOE Commercial Reference Buildings Part Load Fan Energy Use Formula
  - Parichehr Salimifard¹, Payam Delgoshaei, Ph.D.², Ke Xu, Ph.D.² and James Freihaut, Ph.D.¹, (1)The Pennsylvania State University, University Park, PA, (2)Energy Efficient Buildings Hub, Philadelphia, PA

- HVAC Degradation and Asset Management - A Novel Application of Whole Building Simulation
  - Jianmin Zhu¹, Khashayar Mahani¹, Mohsen A. Jafari, Ph.D.¹, Yan Lu, Ph.D.² and Emmanuel Bisse², (1)Rutgers, the State University of New Jersey, Piscataway, NJ, (2)Siemens Corporate Research, Princeton, NJ

- Dynamic Simulation of Regulation Demand Response by VAV HVAC Systems
  - David H. Blum, Student Member and Leslie Norford, Ph.D., Member, Massachusetts Institute of Technology, Cambridge, MA

- Impact of External Static Pressure on Residential Heating and Cooling Energy Use in Hot Climates
  - Peng Yin, Student Member, James F. Sweeney, Associate Member and Michael Pate, Ph.D., P.E., Member, Texas A&M University, College Station, TX

Friday, September 12, 8:15 AM-10:00 AM

**Occupant Behavior**

Room: Suwanee

- Including Occupants in Building Performance Simulation: Integration of an Agent-Based Occupant Behavior Algorithm with EnergyPlus
  - Jared Langevin, Student Member, Jin Wen, Ph.D., Member and Patrick L. Gurian, Ph.D., Drexel University, Philadelphia, PA

- Pedestrian Simulation Based on BIM Data
  - Hermann Georg Mayer, Ph.D.¹, Wolfram Klein, Ph.D.¹, Christian Frey², Simon Daum³, Peter M. Kielar³ and Andre Borrmann³, (1)Siemens AG, Corporate Technology, Munich, Germany, (2)Siemens Schweiz AG, Building Technologies, Zug, Switzerland, (3)Technische Universität München, Munich, Germany

- A Framework for Modeling Occupancy Schedules and Local Trips based on Activity Based Surveys
  - Tarek Rakha, Cody M. Rose and Christoph F. Reinhart, Dr.Ing., Massachusetts Institute of Technology, Cambridge, MA

- User Related Energy Uses and Their Impact on Heating Demand in Swedish Residential Buildings
  - Hans Bagge, Ph.D., Associate Member, Dennis Johansson, Ph.D., Associate Member and Victor Fransson, Lund University, Lund, Sweden
Friday, September 12, 8:15 AM-10:00 AM

**Codes and Rating Systems 3**

*Room: Buckhead A*

**Energy Use of Commercial Buildings That Comply with Prescriptive Code: A Comparative Analysis**
Cheryl M. Saldanha, P.E., Simpson Gumpertz & Heger Inc., New York, NY

**Inverse Modelling As an Accurate and Computationally Cheap Energy Assessment Tool**
Alfonso P. Ramallo-González, Ph.D., Associate Member, University of Bath, Bath, United Kingdom

**Paving the Road: Common Challenges to Modeling Energy Impacts of Building Codes**
Holly Farah and Allen Lee, Ph.D., Cadmus Group, Portland, OR

**Using Modeling to Evaluate Compliance with Multiple Code Pathways**
Eli M. Caudill and Allen Lee, Ph.D., Cadmus Group, Portland, OR

Friday, September 12, 8:15 AM-10:00 AM

**State of the Art BIM 2**

*Room: Heritage AB*

**Extreme Makeover: Energyplus Edition!**
Amir Roth¹, Edwin S. Lee, Ph.D.², Luigi G Polese³ and Jason Glazer, P.E., Member³, (1)United States Department of Energy, Washington, DC, (2)National Renewable Energy Laboratory, Golden, CO, (3)GARD Analytics, Inc., Arlington Heights, IL

**Making the Round Trip Between Building Information Modeling (BIM) and Analytical Modeling Using Autodesk Revit and IES Virtual Environment (VE)**
Jean A Carriere, Affiliate, Trailloop, Ottawa, ON, Canada

**Strengthening EnergyPlus to Enable Advanced Building Energy Models**
Michael J. Witte, Ph.D., Member¹, Edwin S. Lee, Ph.D.², Lixing Gu, Ph.D., P.E., Member³, Richard Raustad³, Tianzhen Hong, Ph.D., P.E., Member⁴ and Daeho Kang, Ph.D.⁵, (1)GARD Analytics, Inc., Arlington Heights, IL, (2)National Renewable Energy Laboratory, Golden, CO, (3)Florida Solar Energy Center, Cocoa, FL, (4)Lawrence Berkeley National Laboratory, Berkeley, CA, (5)Pacific Northwest National Laboratory, Richland, WA

**Updated Coupling Method and Tools to Address Combined Airflow, Heat Transfer and Contaminant Transport (TRNSYS/CONTAM)**
W. Stuart Dols, Member, National Institute of Standards and Technology, Gaithersburg, MD

Friday, September 12, 10:00 AM-10:30 AM

**Break**

Friday, September 12, 10:30 AM-12:00 PM

**Large-scale Studies / Big Data**

*Room: Buckhead B*

**Building Simulation Modelers - Are We Big Data Ready?**
Jibonananda Sanyal, Ph.D., Associate Member and Joshua New, Ph.D., Member, Oak Ridge National Laboratory, Oak Ridge, TN

**Development of Residential Prototype Building Models and Analysis System for Large-Scale Energy Efficiency Studies Using Energyplus**
Vrushali Mendon, Member and Z. Todd Taylor, Pacific Northwest National Laboratory, Richland, WA
Parametric Analysis Tool to Study the Effects of Energy Conservation Measures on Building Energy Use Across California
Ingrid Chaires, Associate Member, Alexej Goehring, P.E., Mallory Taub, Student Member and David Barker, Arup, San Francisco, CA

Friday, September 12, 10:30 AM -12:00 PM

Moisture
Room: Suwanee
Simulating Water: Supply and Demand in the Built Environment
Fred J. Betz, Ph.D.¹ and Willa Kuh², (1)Affiliated Engineers, Inc., Madison, WI, (2)Affiliated Engineers, Boston, MA

A Data Visualization Tool for Hygrothermal Analysis
Ajith Rao, Ph.D., Associate Member¹ and Vamshi Gooje, Associate Member², (1)USG, Libertyville, IL, (2)Thornton Tomasetti, Portland, ME

Using Measured Data to More Accurately Evaluate Freeze-Thaw Risk When Insulating Solid Masonry Walls
Jason Der Ananian and Sean O’Brien, P.E., Member, Simpson Gumpertz & Heger, Inc., New York, NY

Cooling System by Evaporation of Water in a Fibrous Wall
Adrian R. Katili¹, Abdelkrim Trabelsi, Dr.Ing.² and Joseph Virgone, Dr.Ing.², (1)University of Indonesia, Depok, Indonesia, (2)University of Claude Bernard Lyon 1, Villeurbanne, France

Friday, September 12, 10:30 AM -12:00 PM

Design Firms 3

BEM to BIM: Developing a “Throw-Away” Energy Model
Amber Wood, P.E. and Don Saal, P.E., Associate Member, NORESCO, Boulder, CO

Early Phase Design Energy Modeling to Right-Size the Building Enclosure
Jillian Burgess, The Facade Group, Philadelphia, PA

Energy Modeling Process Efficiency with BIM
Jeremy McClanathan, P.E., Member, CDi Engineers, Seattle, WA

Michael Wetter, Ph.D., Member, Lawrence Berkeley National Laboratory, Berkeley, CA

Friday, September 12, 10:30 AM -12:00 PM

State of the Art BIM 3
Room: Buckhead A

Building Energy Engineering Models and BIM Data: Conflicts and a Research Agenda
Brent Griffith, TBD, TBD, CO

Doing More with Less: Creating High Performing Energy Systems with BIM/IPD
Maxwell Nichols and Anna Morton, P.E., Member, dbHMS, Chicago, IL
Efficient and Effective BIM to CFD
Nelson Marques, Ph.D., Susana Ramalho, Dr.Ing. and Bruno Santos, Dr.Ing., blueCAPE Lda, Lisbon, Portugal

Portfolio-Scale Building Energy Modeling: Applications and Methods
Joseph Deringer, Life Member¹, Peter T. May-Ostendorp, Ph.D., Associate Member² and Brian Coffey, Ph.D.³, (1)Institute for the Sustainable Performance of Buildings (SuPeR-B), Berkeley, CA, (2)Xergy Consulting, Durango, CO, (3)LBNL - BUILDlab - UCL, Ithaca, NY

Friday, September 12, 12:10 PM-12:20 PM
Closing Ceremony

Summary and closing remarks.
Room: Heritage AB

Friday, September 12, 12:20 PM – 1:00 PM
Grab-and-Go Boxed Lunches
Heritage Pre-Function

Friday, September 12, 1:00 PM – 4:00 PM
BEMP Certification Exam
Room: Augusta