Renee Azerbegi
The Next Gen: Planning for a Regenerative and Resilient World
As we move towards increased frequency and severity of climate change threats, it will be imperative for our industry to design for a regenerative and resilient world. The architecture and engineering community is moving towards net-zero energy buildings, but what does it mean to take the next step and be regenerative, restorative, and resilient? Engineers and architects need tools, standards and simulation programs to define the next generation of buildings, after net-zero standards have already become a reality. How do we create net-positive buildings? How do we predict both the carbon impact of our buildings?
9:10 AM - 10:10 AM
Panel 1 (Intermediate)

Open-Source Software: Vision and Reality for Building Energy Modeling
Track: Modeling Innovation
Room:
Chair: Aaron Boranian, Big Ladder Software

1. Panelist 1
   Peter Ellis, Member, Big Ladder Software
2. Panelist 2
   Amir Roth, Department of Energy
3. Panelist 3
   Nora Wang, Dr.Eng, PNNL
4. Panelist 4
   Chris Mackey, LadyBug Tools
5. Panelist 5
   Eric Ringold, kW Engineering

9:10 AM - 10:10 AM
Panel 2 (Intermediate)

Are We There Yet? A New Movement in Advancing the Performance-Based Code Compliance and Above-Code Program Using Energy Modeling
Track: Design Modeling
Room:
Chair: Bing Liu, PE, Member, Northwest Energy Efficiency Alliance, Portland, OR

1. Panelist 1
   Maria Karpman, BEMP, Member, Karpman Consulting, Glastonbury, CT
2. Panelist 2
   Duane Jonlin, City of Seattle, Seattle, WA
3. Panelist 3
   Rebecca Hudson, U.S. Environmental Protection Agency, DC

9:10 AM - 10:10 AM
Panel 3 (Intermediate)

Project StaSIO: Using Graphics to Communicate between Architects and Energy Modelers
Track: Modeling Deep Dives
Room:
Chair: Supriya Goel, PNNL

1. Getting to High Performance through Impactful Questions and Actionable Answers
   Supriya Goel1, Alejandra Menchaca, Associate Member2, Amarpreet Sethi, HBDP and BEMP, Associate Member3, Aman Singhvi4, Rakha Tarek5 and Michael Sawford, Associate Member6, (1)PNNL, (2)Thornton Tomasetti, Boston, MA, (3)DLR Group, Seattle, WA, (4)AECOM, New York, NY, (5)Georgia Tech, (6)EDSL USA, Inc., New York, NY

10:30 AM - 12:00 PM
Seminar 1 (Intermediate)

Lost in (BEM) Translation?
Track: Modeling Innovation
Room:
Chair: Sukreet Singh, Cunningham Group Architecture Inc, Denver, CO

Amir Rezaei¹, Michael Sawford, Associate Member², Andrew Corney³ and Annie Marston, BEMP⁴, (1) CannonDesign, (2) EDSL USA, Inc. (3)Trimble, (4) Ebert and Baumann Consulting Engineers Inc.

2. Beyond Energy: Problem Solving for the Uncommon Questions
Nicolle Liana Peterson¹ and Alejandra Menchaca, Associate Member², (1) Thornton Tomasetti

3. Integrating Energy Model Data Into LCA Baseline
Victoria Herrero-Garcia¹ and Rodrigo Castro², (1) Ambient Energy, (2) Bionova

4. BIM/BEM/BHOM: A Common Language and Platform for BIM/BEM Integration
Colin Edward Skinner, BuroHappold Engineering

5. Data Persistent Two-Way BIM To BEM Translation
Noah Pflaum¹ and Chris Balbach, P.E., BEMP, Associate Member², (1) NREL, (2) Performance Systems Development

10:30 AM - 12:00 PM
Seminar 2 (Intermediate)

Net-Zero Performance Modeling
Track: Design Modeling
Room: Chair: Ben Brannon, ARUP

Adam Barker, Samantha Menard and Craig McIntyre, EQ Building Performance

2. Context for Performance Cost Index 90.1-2016
Linda Morrison, Ambient Energy

3. ASHRAE Standard 90.1-2016 End Use Analysis
Chitra Nambari, Associate Member, Pacific Northwest National Laboratory, Richland, WA

4. Case Study: Modeling to Achieve Zero Net Energy for California Air Resources Board’s New 400,000 SF Southern California Administrative, Laboratory And Vehicle Testing Facility.
David W Conant Gilles, Affiliated Engineers Inc.

5. Driving to Net Zero: What Does It Take for A Student Housing Project?
Kevin Matthew Smith, Glumac

10:30 AM - 12:00 PM
Seminar 3 (Intermediate)

Dealing with Data
Track: Modeling Deep Dives
Room: Chair: Carrie Brown, Ph.D., Member, Resource Refocus, LLC, Oakland, CA

1. Mass Production: M&V Data Clean Up, Error Check and Visualization
Junru Shen, Andrea Frisque, P.Eng., Associate Member and Sara Nikoofard, Stantec, Vancouver, BC, Canada

2. Leveraging Data Analytics and Energy Modeling in Building Energy Design
Taylor Roberts, Associate Member and Eric Loew, Group14 Engineering

Christopher Balbach¹ and Clayton Miller, Ph.D.², (1)Performance Systems Development of NY, LLC, (2) National University of Singapore, Singapore, Singapore

4. A Data-Driven Urban Scale Mobility Model for Estimating Building Occupancy for EnergyPlus
Anne Sabine Berres¹, Piljae Im, Ph.D., Member¹, Kuldeep Kurte, Ph.D.², Melissa Allen, Ph.D.¹ and Jibonananda Sanyal, Ph.D.², (1) Oak Ridge National Laboratory, Oak Ridge, TN, (3) Oak Ridge National Lab, Oak Ridge, TN

5. Enabling Large-Scale Data Collection and Analysis of Existing Buildings with BuildHive
Peter May-Ostendorp¹, Mudit Saxena² and Bach Tsan, P.E.¹, (1) Southern California Edison, Rosemead, CA, (2) Vistar Energy
Making Modeling Work for You
Track: Modeling Innovation
Room:
Chair: Susan Collins, Whole Building Systems, Charleston, SC

1. Automatic Generation of Highly Customizable Energy Models from High Level input Data
   David Goldwasser, Matthew Dahlhausen and Marlena Praprosto, National Renewable Energy Laboratory, Golden, CO
2. Using Agile To Run Your Performance Analysis Team More Effectively - Lessons From Software Design
   Andrew Corney, Trimble
3. Efficient Parametric Workflows for HVAC Energy Modeling
   Mingbo Peng, Thornton Tomasetti
4. Keeping Up With The Trend: Energy Modeling for Every Project
   Megan Gunther, Affiliated Engineers, Inc.
5. A Spreadsheet-Based Interface for OpenStudio
   Matthew Alan Steen, Ambient Energy

Getting the Most Out Of A Building Performance Model: Innovative Ways To Get Answers Quicker
Track: Design Modeling
Room:
Chair: Amir Roth, Department of Energy

1. Improving Pressure Network Model Performance
   Jason DeGraw, Ph.D., Member, NREL, Golden, CO
2. 10X Energyplus
   Tianzhen Hong, Ph.D., Member, LBNL, Berkeley, CA
3. GPU Shading: Not Just for Fortnite
   Mark Adams, Associate Member, ORNL
4. Component Modeling Enhancements in Energyplus
   Edwin Lee, Member, National Renewable Energy Laboratory, Golden, CO

Indoor Air Quality and Thermal Comfort
Track: Modeling Deep Dives
Room:
Chair: Lauren Wallace, The Epsten Group, Atlanta, GA

1. Monitoring-Aided Computational Analysis of Comfort in a Historic Farmhouse
   Ramana Koti, BEMP, Member¹, Sandeep Ahuja² and Patrick Chopson², (1) Lord Aeck Sargent, Atlanta, GA, (2) Pattern R+D
2. Insights from Comparing Radiant Hydronic Systems and Air-Based HVAC Systems Through Energy Simulation
   Amy Allen¹, Gregor Henze, Ph.D., P.E., Member¹, Kyri Baker¹ and Gregory Pavlak, Ph.D., Member², (1) University of Colorado, Boulder, CO, (2) Penn State, State College, PA
3. Natural Ventilation Modeling Workflows and Tool Validation
   Fiona Woods, Jared Landsman and Sengavi Thirupathy, Integral Group
4. Thermal Comfort Evaluation of an Office Space with Integrated Analysis of Thermal Modelling and CFD Simulation
   Sigal Shemesh and Bing Wang, BuroHappold Engineering, New York, NY
5. Fundamentals of Natural Ventilation & Case Study
   Sukreet Singh, BEMP, Affiliate, Cunningham Group Architecture
Modeling Innovations

Track: Modeling Innovation
Room:
Chair: John Bynum, Ph.D., Member, WSP USA, San Francisco, CA

1. New Research on Modeling Occupant-driven Loads
Han Li, Associate Member1, Eric Wilson2, Tianzhen Hong, Ph.D., Member3 and Bing Dong, Ph.D., Associate Member4,
(1)Lawrence Berkeley National Laboratory, Berkeley, CA, (2)NREL, (3)LBNL, Berkeley, CA, (4)University of Texas at San Antonio, San Antonio, TX

2. Improvements to ASHRAE Standard 140/BESTEST Building Thermal Fabric Modeling Test Cases
Joel Neymark, P.E., Member, J. Neymark & Associates, United States

3. Using a Jobs To Be Done Approach to designing simulation software
Andrew Corney, Trimble

Maharshi Pathak, NREL

5. Hacking LEED: The Case for Standardizing Detailed Outputs
Matthew Alan Steen, Ambient Energy

Maximizing Retrofits and Operational Improvements

Track: Design Modeling
Room:
Chair: Marcus Myers, WSP

1. Energy Refurbishment Optimization Under Uncertainties for Social Housing Building
Ansley Barnard1, Marco Manzon1 and Alberto Clarich1, (1)ESTECO, (2)University of Trieste, Trieste, Trieste, Italy

Parastoo Delgoshaei1, W. Vance Payne, Ph.D., Member1 and Mohammad Heidarinejad, Ph.D., P.E., Associate Member2,
(1)National Institute of Standards and Technology, Gaithersburg, MD, (2)Illinois Institute of Technology, Chicago, IL

3. XeroHome: a BEM-Based Targeting Tool for Residential Energy Retrofits
Mudit Saxena1, Peter May-Ostendorp2 and Bach Tsan, P.E.2, (1)Vistar Energy, (2)Southern California Edison, Rosemead, CA

Majid Sapar, Building and Construction Authority

5. An Asset Perspective to Evaluate Potential Building Energy Performance
Abinesh Selvacanabady1, Supriya Goel1, Nora Wang, Dr.Eng1, Juan Gonzalez1, Alex Vlachokostas2 and Kevin Keene1, (1)PNNL,
(2)Pacific Northwest National Laboratory, Richland, WA

Urban Scale Modeling

Track: Modeling Deep Dives
Room:
Chair: Carrie Brown, Ph.D., Member, Resource Refocus, LLC, Oakland, CA

1. An Open Source Software Development Kit For Urban Energy Modeling
Daniel Lee Macumber, NREL

2. Introduction of an Exascale Computing Project: Multiscale Coupled Urban Systems
Tianzhen Hong, Ph.D., Member, LBNL, Berkeley, CA

3. Evaluating the Impact of Building Heat Emissions to Urban Microclimate
Xuan Luo, Lawrence Berkeley National Laboratory

4. Calibration Approaches for Urban-Scale Energy Models
Dalton Jones and Anthony D. Fontanini, National Renewable Energy Laboratory,
Rajan Rawal  
The Global Cooling Prize  
Room:  
Affordable cooling is becoming a global necessity, supporting increased productivity, positive health outcomes, and accelerated economic development. The business-as-usual global increase in cooling demand will see the world go from 1.2 billion room air conditioning (RAC) units in service in 2018 to 4.5 billion units by 2050. Developing countries will see a five-fold increase in demand over the same period with India alone seeing the adoption of about 1.0 billion RACs by 2050. The resultant increase in power demand would place a massive new burden on electricity grids.

9:10 AM - 10:10 AM  
Panel 4 (Advanced)  
Modeling Grid-Interactive Buildings  
Track: Modeling Innovation  
Room:  
Chair: Ellen Franconi, Pacific Northwest National Laboratory, Richland, WA

1. Building Stock Models to Support Evaluating Demand Response Technologies  
Eric Wilson, NREL

2. Advanced Control Methods and Strategies  
Wangda Zuo, University of Colorado, CO

3. Strategies for Optimizing Operation  
Gregor Henze, Ph.D., P.E., Member, University of Colorado, Boulder, CO

9:10 AM - 10:10 AM  
Panel 5 (Intermediate)  
Integrating Graphs and Visualizations with Building Simulation for Informing Building Design  
Track: Design Modeling  
Room:  
Chair: Carrie Brown, Ph.D., Member, Resource Refocus, LLC, Oakland, CA

1. Panelist 1  
Amarpreet Sethi, HBDP and BEMP, Associate Member, DLR Group, Seattle, WA

2. Panelist 2  
Rakha Tarek, Georgia Tech, Atlanta, GA

3. Panelist 3  
Margaret Pigman, Resource Refocus LLC, Menlo Park, CA

9:10 AM - 10:10 AM  
Panel 6 (Intermediate)  
Making the Case for Custom Tool Development: In-house and Beyond
Track: Modeling Deep Dives
Room:
Chair: Daniel Macumber, Member, National Renewable Energy Laboratory, Golden, CO

1. Panelist 1
Kyleen Rockwell, BEMP, Member, HKS, Chicago, IL
2. Panelist 2
James S. McNeill Jr., Student Member, Affiliated Engineers, Inc, Madison, WI
3. Panelist 3
Elizabeth Galloway, Payette
4. Panelist 4
Benjamin Brannon, P.E., Associate Member, Arup, San Francisco, CA
5. Panelist 5
Matthew Alan Steen, Ambient Energy

10:30 AM - 12:00 PM
Seminar 10 (Intermediate)
Improving Grid Interactions and Designing for Power Outages
Track: Modeling Innovation
Room:
Chair: Aaron Boranian, Big Ladder Software, CO

1. Model-based Predictive Control to Reduce Demand Charges with Distributed Photovoltaic System
Yuna Zhang, Ph.D., Student Member¹, Di Lu² and Godfried Augenbroe², (1) Baumann Consulting, (2) Georgia Institute of Technology, Atlanta, GA
2. When Crisis Strikes - Passive Thermal Survivability Modeling
Amir Rezaei, arezaei@cannondesign.com
3. Critical Efficiency: Analyzing and Designing Microgrids to Improve Facility Resilience and Reliability
Coles Jennings and Alex Chapin, Mason & Hanger
4. Combined Day-Ahead Weather and Building Electrical Demand Forecasting
Anthony Florita, National Renewable Energy Laboratory
Rawad El Kontar, National Renewable Energy Laboratory

10:30 AM - 12:00 PM
Seminar 11 (Intermediate)
Enhancing Early Design
Track: Design Modeling
Room:
Chair: Lauren Wallace, The Epsten Group, Atlanta, GA

1. Easy Button: Improve Design with Choice Architecture
Willow Nichols, Victus Engineering
2. Benefits of Total System Performance Ratio- A HVAC System Level Metric
Supriya Goel¹, Michael Rosenberg, Fellow ASHRAE² and Juan Gonzalez³, (1) PNNL, (2) Pacific Northwest National Laboratory, Richland, WA
3. Facilitate Early Design Decision Making, Workflow With Genopt & jEplus
Chinmayee Milind Patil, Xing Chen, Aditya Potipireddi and Porus Sam Antia, Stantec
4. Measuring the Impact of Enclosure Thermal Bridging on Whole Building Energy Models - Two Residential Case Studies
Monica Noelle Maragos, Matthew Hyder and Sebastian Carrizo, RWDI
Benjamin Ross Welle, Roya Razaei and Anton Szilasi, Perkins+Will
Daylighting, Infiltration and IEQ

Track: Modeling Deep Dives

Room:
Chair: Susan Collins, Whole Building Systems, Charleston, SC

1. Evaluating the Time Dependent Valuation (TDV) benefit of electrochromic glazing for T-24 Compliance
Ranajoy Dutta, HBDP and BEMP, Associate Member and Sriranjani Ramachandran, View Inc, Milpitas, CA

2. Enquiry Concerning LEED Daylight Criteria: Daylight Analysis of Different Window Configuration
Sara Motamedi, Ph.D., Member, Interface Engineering, San Francisco, CA

3. Diodes and the Death of Daylighting as an ECM
Sukreet Singh, BEMP, Affiliate, Cuningham Group Architecture

4. Infiltration Modeling in High-Performance and “Low-Load” Buildings
Craig Simmons¹, Lisa Ng, Ph.D., Member² and Josh Talbert¹, (1) VEIC, (2) National Institute of Standards and Technology, Gaithersburg, MD

5. An Integrated Simulation and Artificial Intelligence-Based Framework For Analyzing Indoor Air Quality For Urban Buildings
Mehdi Ashayeri Jahan, Illinois Institute of Technology

Friday, September 27

8:10 AM - 9:00 AM
Keynote

Dave Kang
Integrating Planning, Design, Construction and Operation to Reduce Life-Cycle Cost and Drive Sustainability and Resiliency

Room:
Facilities play a key role in the success of the University of Colorado Boulder’s mission of education and research. Our buildings are expected to serve the needs of students, faculty and staff and, in doing so, they need to be both sustainable and resilient. As our requirements grow, new buildings are planned and older buildings are updated. In either process, life-cycle cost—not first cost—of construction needs to be the new mantra of our facilities teams.

9:10 AM - 10:10 AM
Panel 7 (Intermediate)

Colorado Policies and Energy Modeling

Track: Modeling Innovation
Room:
Chair: Anna McCullough, P.E., Associate Member, Group14 Engineering, PBC, Denver, CO

1. Panelist 1
Christin Whitco, City of Boulder Planning & Sustainability, Boulder, CO

2. Panelist 2
Katrina Managan, City and County of Denver, Denver, CO

3. Panelist 3
Christine Brinker, Southwest Energy Efficiency Project

9:10 AM - 10:10 AM
Panel 8 (Intermediate)

Automating Compliance Modeling: Challenges, Opportunities and Path Forward

Track: Design Modeling
Room:  Room: Bing Liu, PE, Member, Northwest Energy Efficiency Alliance, Portland, OR

1. Panelist 1
Maria Karpman, BEMP, Member, Karpman Consulting, Glastonbury, CT

2. Panelist 2
Larry Froess, P.E., California Energy Commission, CA

3. Panelist 3
Amir Roth, Department of Energy

4. Panelist 4
Muthusamy Swami, Florida Solar Energy, FL

9:10 AM - 10:10 AM
Seminar 13
Advanced Methods for Grid Integration of High-Performance Residential Communities
Track: Modeling Deep Dives
Room: Chair: Lauren Wallace, The Epsten Group, Atlanta, GA

1. A Hierarchical Control System for Enhancing Reliability and Resilience of Residential Communities
Xin Jin, National Renewable Energy Laboratory

Jianli Chen, National Renewable Energy Laboratory

3. Physics-based Gray-Box Dwelling Model for Building-to-Grid Integration Study
Jeff Maquire, National Renewable Energy Laboratory, Golden, CO

4. Optimal Rooftop PV Placement in Net Zero Energy Communities
Rawad El Kontar, National Renewable Energy Laboratory

10:30 AM - 12:00 PM
Panel 9 (Intermediate)
Using Energy Simulation in Net-Zero Carbon District Planning and Design: Case Studies, Approaches and Areas for Further Development
Track: Design Modeling
Room: Chair: Aaron Boranian, Big Ladder Software, CO

1. Panelist 1
Hayes Zirnhelt, Whole System Energy Consulting

2. Panelist 2
Victor Olgyay, Rocky Mountain Institute, Boulder, CO

3. Panelist 3
Matthew Jungclaus, Rocky Mountain Institute, Boulder, CO

10:30 AM - 12:00 PM
Seminar 14 (Intermediate)
Modeling And Mitigating Effects Of Heat Waves At Different Scales
Track: Modeling Innovation
Room: Chair: Paulo Tabares, Ph.D., Associate Member, Colorado School of Mines, Golden, CO

1. Assessing and Reducing Heat Health Risks
Olga Wilhelmi, NCAR, Boulder, CO

2. Indoor Exposure To Heat In The Age Of Mechanical Air Conditioning
Amir Baniassadi, Arizona State University, AZ
3. Robust Asset-and-User-Aware Power Grid Dispatch during Extreme Temperatures  
Salman Mohagheghi, Ph.D., Colorado School of Mines, Golden, CO
4. City-Scale Modeling of Extreme Heat Events Using WRF-UCM Modeling with Bias Correction  
Kristen Cetin, PhD, PE, Associate Member, Iowa State University, Ames, IA

Systems and Components

Track: Modeling Deep Dives  
Room:  
Chair: Megan Gunther, Affiliated Engineers, Inc.

1. Modeling of Wastewater Heat Recovery Heat Pump Systems  
Nick Smith and Steve Dowd, Affiliated Engineers

2. Modeling Zones with Multiple Air Systems - Dedicated Outdoor Air Systems to Air Handling Units  
John R. Kramer, Ambient Energy

3. Modeling of a Novel Dual Purpose Solar Thermal Collector Developed for Both Heat and Cold Collection  
Yao Yu, Ph.D., BEMP and BEAP, Associate Member, North Dakota State University, Fargo, ND

Justin Scott Shultz, EYP Architecture & Engineering

5. When the Client Asks: Can your Model Confirm my Design Day Field Measurements  
Kyleen Rockwell, BEMP, Member, HKS, Chicago, IL