CENTER FOR THE BUILT ENVIRONMENT

Industry Advisory Board Meeting: April 12-14, 2021

Monday, April 12, 10:00 am-11:30 am PDT
Research Update #1 on Design and Indoor Environments

Optional Breakout Discussion Groups: 11:30 am-12:00 pm PDT

Open to Industry Partners, Invited Research Affiliates, and Guests

10:00 am **Welcome and Announcements**
Breakout Rooms

10:20 am **Reasons for Occupant Dissatisfaction in Office Buildings**
Thomas Parkinson, PhD

We will give a summary of a recent analysis of the CBE Occupant Survey database that focused on dissatisfaction with different aspects of workspaces. These findings can help designers and facilities managers identify potential problem areas and prioritize interventions.

10:35 am **Overview and Demonstration of CBE's Thermal Comfort Tools**
Federico Tartarini, PhD; SinBerBEST

We will demonstrate new enhancements to the CBE Thermal Comfort Tool, a free online resource for thermal comfort calculations and visualizations. We will also showcase *pythermalcomfort*, a new freely available Python package that allows users to calculate several thermal comfort indices.

10:55 am **CBE Clima Tool: Online Climate Analysis**
Giovanni Betti, MA, MSc

We are developing an online tool to enable easy access to high-quality graphical representations of EnergyPlus weather files, and to enable broad access to weather analysis (while also providing expert users with powerful analytics and data visualizations) to support early-stage design of climate-responsive architecture.

11:10 am **Interactive Map of Facade Case Studies**
David Lehrer, RA

To support the adoption of advanced facade design strategies and technologies, this online resource showcases useful case studies from around the world, indexed using a taxonomy of facade characteristics.

11:25 am **Closing Announcements**

11:30 am **Breakout Rooms:** Today's speakers will be available to respond in more detail to questions about their talks and to discuss related topics.

12:00 pm **Conclude Day One**

Tuesday, April 13, 10:00 am-11:30 am PDT
Research Update #2: HVAC and Engineering

Optional Breakout Discussion Groups: 11:30 am-12:00 pm PDT

Open to Industry Partners, Invited Research Affiliates, and Guests

10:00 am **Welcome and Announcements**
Breakout Rooms

10:20 am **Reducing Gas Consumption in Existing Large Commercial Buildings**
Paul Raftery, PhD

We will present an overview and exploratory analysis of the data collected to date, as part of a three-year, $1.4M research project. A goal of this work is to improve these systems as they come up for replacement, energy efficiency upgrades or electrification. We will also share opportunities to participate and guide the resources to be developed by this project.

10:35 am **Cost Comparison for Ceiling Fan Integrated Air Conditioning (CFIAC)**
Hui Zhang, PhD; and Loek Vaneveld, Western Allied Mechanical

CFIAC reduces energy costs by operating over a wide range of room temperatures and reduces initial costs by replacing room ductwork and jetting supply air toward ceiling fans that mix and distribute it. This presentation describes cost comparisons based on a completed project which applied CFIAC. The result shows significant cost savings that increase by the degree to which conventional ducts and diffusers are replaced by CFIAC.

10:55 am **Optimizing Radiant System Cooling Using Higher Supply Temperatures**
Carlos Duarte, PhD

We developed EnergyPlus models that use high-thermal-mass radiant systems as the primary source of cooling, then determined the warmest supply water temperatures needed to maintain comfort during a summer day in 14 U.S. and 16 California climates. This knowledge will allow building designers to evaluate if sustainable cooling plant options are adequate, or if they need to couple the systems with additional measures while reducing cooling electricity consumption.

11:15 am **Using Infrared Biometric Sensors to Improve Comfort and Reduce Overcooling**
Hui Zhang, PhD

This presentation will provide updates on the development of a closed-loop HVAC sensor/controller that radiatively detects occupants, occupant comfort and room surface temperature distribution, then uses this information to reduce overcooling by regulating HVAC output. This project is being done in collaboration with Lawrence Berkeley Laboratory.

11:25 am **Closing Announcements**

11:30 am **Breakout Rooms:** Today's speakers will be available to respond in more detail to questions about their talks and to discuss related topics.

12:00 pm **Conclude Day Two**

Wednesday, April 14, 10:00 am-11:30 am PDT
Executive Session

Open to Industry Partner Representatives (two per supporting firm or team; one for small business partners)

10:00 am **Welcome and Announcements**
Director's Message
Overview of 2021-22 research ideas
Remarks from Partner Chair and Vice-Chair

10:30 am **Focus Groups to Discuss Proposed Research Portfolio**
Proposed topic areas, led by CBE research staff:

Breakout #1: Building Systems
(1) Thermal Comfort and Energy Efficiency with Radiant Ceiling Panels (page 54)
(2) Modeling and Evaluating Energy Efficiency and Grid Flexibility of Community Building-vehicle Networks (page 56)
(3) The Contribution of the Built Environment to Thermal Resilience in U.S. Residential Buildings (page 67)
(4) Occupant Satisfaction with Window Views (page 73)

Breakout #2: Human Interactions
(5) Quantify the Relationship Between Visual Complexity of the Indoor Environment and Occupants' Preference and Perception (page 58)
(6) Exploring the Remote Workspace (page 60)
(7) Integrating Smart Personal Comfort Systems and Communicating Thermostats for Sustainable Buildings (page 69)

Breakout #3: Indoor Environmental Quality
(8) CBE Advanced Thermal Comfort Model Interface (page 62)
(9) Impact of Ceiling and Desk Fans on the Spread of Airborne Pathogens (page 64)
(10) Air Speed Profile Measurements in Real Buildings with Ceiling Fans (page 71)

11:15 am **Recap of Focus Groups and Closing Statements**

11:30 am **Conclude Day Three**