

A large, faint watermark of the University of Cincinnati seal is visible in the background. The seal features a five-pointed star above an open book, with the text 'UNIVERSITY OF CINCINNATI' and 'LET THERE BE LIGHT' around the perimeter.

A FRAMEWORK FOR INDUSTRY/UNIVERSITY COLLABORATIVE RESEARCH

About Us

Our Mission

To improve the environmental quality and energy efficiency of buildings by providing timely, unbiased information on building technologies and design and operation techniques.

Our Approach

We believe that research about energy and the indoor environment must go hand-in-hand in order to create transformational change in the building industry. We study promising new energy conserving strategies and technologies, along with how people use and interact with buildings.

We actively participate in the development of new standards and guidelines to remove barriers to effective building technologies, and to speed their implementation. We also provide tools, guidance and training for design, building and operations.

Industry Collaborations

The center was founded in 1997 under the National Science Foundation Industry/University Cooperative Research Center program.

CBE is guided by an Industry Advisory Board that meets semi-annually to discuss research, approve annual budgets, and plan future research. The board represents the diversity of the building industry, including manufacturers, building owners, facility managers, contractors, architects, engineers, government agencies, and utilities.

Our Research

Our research portfolio is based on industry partner feedback, and represents relevant and timely topics in building science research. Our key areas of research are:



Indoor Environmental Quality

We have developed new methods to measure the performance of buildings in terms of occupant comfort, energy efficiency and operations, and we are testing new approaches to providing energy-efficient comfort.



HVAC Systems

We are a leader in HVAC systems research, and are investigating topics such as advanced integrated building systems, underfloor air distribution, radiant systems, and new methods for performance monitoring.



Human Interactions

We are studying how new digital technologies can improve information exchange between building occupants and managers, and influence commercial building occupant behavior in positive ways.



Envelope Systems

We are developing tools and criteria for evaluating facade performance in terms of occupant comfort and energy efficiency. We are evaluating the impact of operable windows, controllable building features, and mixed-mode strategies.



Building Decarbonization

We are providing design guidance, tools and insights to industry stakeholders and policymakers to support the rapid and broad adoption of strategies that reduce both embodied and operational carbon impacts of buildings.

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CBE provides us with **immediate, usable and innovative technical value**, while extending our professional network to a uniquely diverse cross section of professionals. **No other organization consistently expands our horizons like CBE.**

Phil Williams, Sustainable Real Estate and Construction Executive at Google

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Genentech's Building 35 in South San Francisco: CBE's research team is working to reduce energy use in large commercial buildings in collaboration with Genentech and other CBE consortium members.

Collaborations

CBE welcomes firms and organizations to become involved through membership in our industry consortium. This consortium is a rare opportunity to identify information needs and advance research in directions to benefit your organization, without the high costs of in-house research.

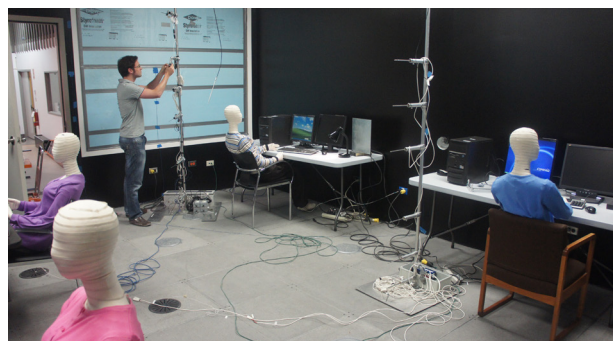
Benefits of Membership

- Participation in semi-annual Industry Advisory Board Conferences (April and October).
- The ability to direct research in areas relevant to your business, and opportunities to directly participate in high-impact research efforts.
- Access to specialized design and performance tools, including occupant surveys (four free per year).
- Networking opportunities with diverse sectors of the building industry.
- Priority access to specialized research tools, facilities, and staff, and the ability to recruit highly trained graduates.
- Advance review of internal reports and research results.
- Acknowledgment in CBE reports, websites, and publicity materials.
- Members' investments are greatly leveraged through research grants from institutional and governmental sources.

Affiliation with UC Berkeley gives CBE's research a high level of credibility within the industry. Industry partners benefit from this research, by using empirical results to influence clients and regulators, and through recognition of their commitment to promoting sustainability and improving our built environment.



CBE's Industry Advisory Board guides research towards relevant and current topics, and provides a unique opportunity for collaboration.



Our research uses simulation, lab, and field study methods, taking advantage of advanced resources both in-house and external.



Our research team is testing new ideas for simultaneously improving energy efficiency and comfort in workplace environments.

Photo: Michael David Rose



Lick-Wilmerding High School
2020 Livable Buildings
Award Winner

Arch: EHDD
MEP: Integral Group

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The design and construction industry fundamentally needs to take a more **rigorous, science-based approach** to designing and operating buildings that really work for our clients. **CBE is leading the way on this critical transformation.**

Scott Shell, Principal, EHDD

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Research Portfolio 2023-2024

Our portfolio is based on the interests and feedback of CBE's industry partners. Below we provide a snapshot of our broad and cross-cutting current portfolio.

HVAC Systems and Building Analytics

- Examining Component Carbon Emissions Using a Brick-Enabled Application in Office Building HVAC Systems
- A Full-Scale Laboratory Test of a Convection-Enhanced Radiant Ceiling Panel System
- A Screening Tool to Identify HVAC Retrofit Candidates Based on Gas Usage Information
- The Impact of Building Occupants on Demand-Side Management

Building Decarbonization

- Embodied Carbon of Building Systems, Components and Products
- Embodied and Operational Carbon Intersections in Buildings

Indoor Occupant Experience and Health

- An Online Tool for Guidance on Mitigating Infectious Aerosols
- Solutions for the Reduction of Heat Stress in Disadvantaged Communities
- Evaluation of Thermal Comfort for an Integrated Radiant Ceiling and Ceiling Fan System
- Window View Quality Index: Experimental Protocol and Global Dataset
- A Comparison of Thermal Comfort in Homes with Heat Pumps and Gas Furnaces

Building Sector Resources

- Suite of Online Building Performance Tools
- CBE Occupant Survey: Maintenance, Implementations and New Features

Noteworthy Match-Funding Projects

CBE funding for is frequently leveraged as match funding for external awards from California's Electric Program Investment Charge (EPIC) Program and other sources. Here we list key awards that expand CBE's portfolio:

- Using A Wide-View Infrared Biometric Sensor to Improve Comfort and Reduce Over-cooling via Closed-Loop HVAC Control (DOE, three-year term)
- California Energy Product Evaluation Hub (EPIC, five-year term)
- Getting Out of Hot Water: Reducing Gas Consumption in Existing Large Commercial Buildings (EPIC, 3-1/2 year term)
- CBE Research Program on Embodied Carbon in the Built Environment (ClimateWorks Foundation, two-year term)



Discovery Elementary School
2021 Livable Buildings
Award Winner

Arch: VMDO Architects
MEP: CMTA Consulting Engineers

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CBE has been a leader in the development and application of POE surveys which Armstrong has found to be very influential in directing owners, designers, engineers and architects **towards the design of better buildings.**

*Ken Roy, Sr. Principal Research Scientist
Armstrong World Industries*

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Our Research Team

CBE's faculty, researchers and managers bring expertise from multiple disciplines — architecture, engineering and data science — to study design strategies and technologies that hold promise for making buildings more environmentally friendly, more productive to work in, and more economical to operate.



Edward Arens
CBE Director and Professor
Emeritus of Architecture



Gail Brager
CBE Associate Director and
Professor of Architecture



Carlos Duarte
Assistant Professional
Researcher



Allison Herbert
Research Coordinator



Charlie Huizenga
Research Specialist



David Lehrer
Communications and
Research Collaborations



Akihisa Nomoto
Postdoctoral Researcher



Therese Peffer
Program Director, CIEE



Paul Raftery
Professional Researcher



Matt Roberts
Postdoctoral Researcher



Stefano Schiavon
Assoc. Prof. of Architecture,
Civil & Environ. Engineering



Hui Zhang
Research Specialist



Our Partners

CBE's partners are leading organizations across the spectrum of the building industry. Partners (as of fall 2023) include:

Sustaining Partners

Armstrong World Industries	REHAU
Azbil	Saint-Gobain
Big Ass Fans	Southern California Edison
ClimateWorks Foundation	Trane
Daikin	Viega
Genentech	View
Google, Inc.	Small Business Partners
Midea	ThermoAnalytics
Price Industries	Sulion

Architecture, Engineering and Construction (AEC) Partners

Affiliated Engineers, Inc.	M Moser Associates
Arup	McKinstry
CallisonRTKL	NBBJ
Clark Pacific	PAE Engineers
DIALOG	Quinn Evans Architects
Harris	Salter
HOK	Sanken
Introba	Skidmore, Owings, & Merrill
Interface Engineering	SmithGroup
JLG Architects	Stantec
KieranTimberlake	
LPA	

AEC Partner Teams

SERA Architects Team

CPP
EHDD Architecture
P2S Engineering
Perkins+Will

Taylor Engineering Team

Atelier Ten
TRC Solutions
Western Allied Mechanical
WRNS Studio



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