



**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.



Sustainability and Whole Building Energy

We are providing useful feedback to commercial building designers and operators through comprehensive case studies that utilize the full range of CBE's research capabilities.

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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.

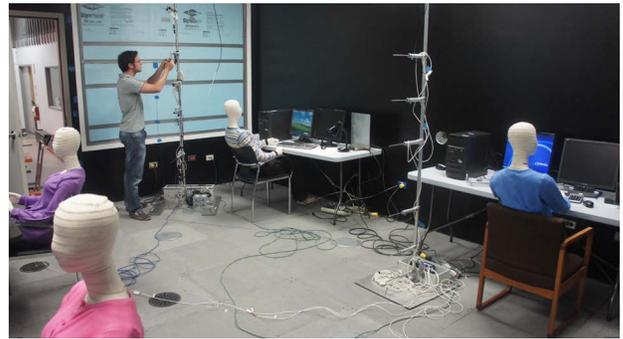
Benefits of membership

- 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 2021-2022

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.

Mechanical Systems Research

- Thermal Comfort and Energy Efficiency with Radiant Ceiling Panels
- Skewering the Silos: Using Brick to Enable Portable Analytics, Modeling, and Control
- California Energy Product Evaluation (CAL-EPE) Hub
- Modeling and Evaluating Energy Efficiency and Grid Flexibility of Community Building-Vehicle Networks

Envelope, Architecture and Whole Building Research

- View Quality Framework for Building Professionals
- Online Climate Report Visualization
- Online Map of Advanced Facade Case Studies

Match-Funding For EPIC Projects

CBE funding for several projects above is leveraged as match funding for these awards from California's Electric Program Investment Charge (EPIC) Program or the U.S. Department of Energy (DOE).

- Skewering the Silos: Using Brick to Enable Portable Analytics, Modeling, and Control (DOE, 3 years, \$1M)
- Using A Wide-View Infrared Biometric Sensor to Improve Comfort and Reduce Over-cooling via Closed-Loop HVAC Control (DOE, 3 years, \$1.5M)
- California Energy Product Evaluation Hub (EPIC, 5 years, \$600K to CBE, \$11M total)
- Getting Out of Hot Water: Reducing Gas Consumption in Existing Large Commercial Buildings (EPIC, 3-1/2 years, \$1.4M grant, \$3M total)

Workplace and Occupant Experience

- CBE Occupant Survey
- Exploring the Remote Workspace
- Quantifying the Relationship Between Visual Complexity of the Indoor Environment and Occupants' Preference and Perception

Indoor Environmental Quality

- Airspeed Profile Measurements in Buildings with Ceiling Fans
- Developing an Evidence-Based Indoor Heat Threshold for Residential Buildings
- Impact of Ceiling and Desk Fans on Spread of Airborne Pathogens
- Advanced Berkeley Comfort Model Web Interface
- Integrating Smart Personal Comfort Systems and Communicating Thermostats for Sustainable Buildings



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 Partners

CBE's partners are leading organizations across the spectrum of the building industry. Partners (as of January 2022) include:

Sustaining Partners

Armstrong World Industries	Saint-Gobain
Big Ass Fans	Southern California Edison
California Energy Commission	Trane
Daikin	U.S. Department of Defense
Ford Motor Company	Viega
Genentech	View
Google, Inc.	Wells Fargo
REHAU	

Architecture, Engineering and Construction Partners

Affiliated Engineers, Inc.	McKinstry
Arup	NBBJ
CallisonRTKL	PAE Engineers
Clark Pacific	Quinn Evans Architects
DIALOG	Salter
Harris	Sanken
HMC Architects	Skidmore, Owings, & Merrill
HOK	SmithGroup
Integral Group	Stantec
Interface Engineering	Syska Hennessy Group
JLG Architects	TEECOM
KieranTimberlake	
LPA	

Small Business A/E/C Member

Red Car Analytics

Architecture, Engineering and Construction Team Partners

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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