

Building Energy and Environmental Systems Laboratory (BEESL)



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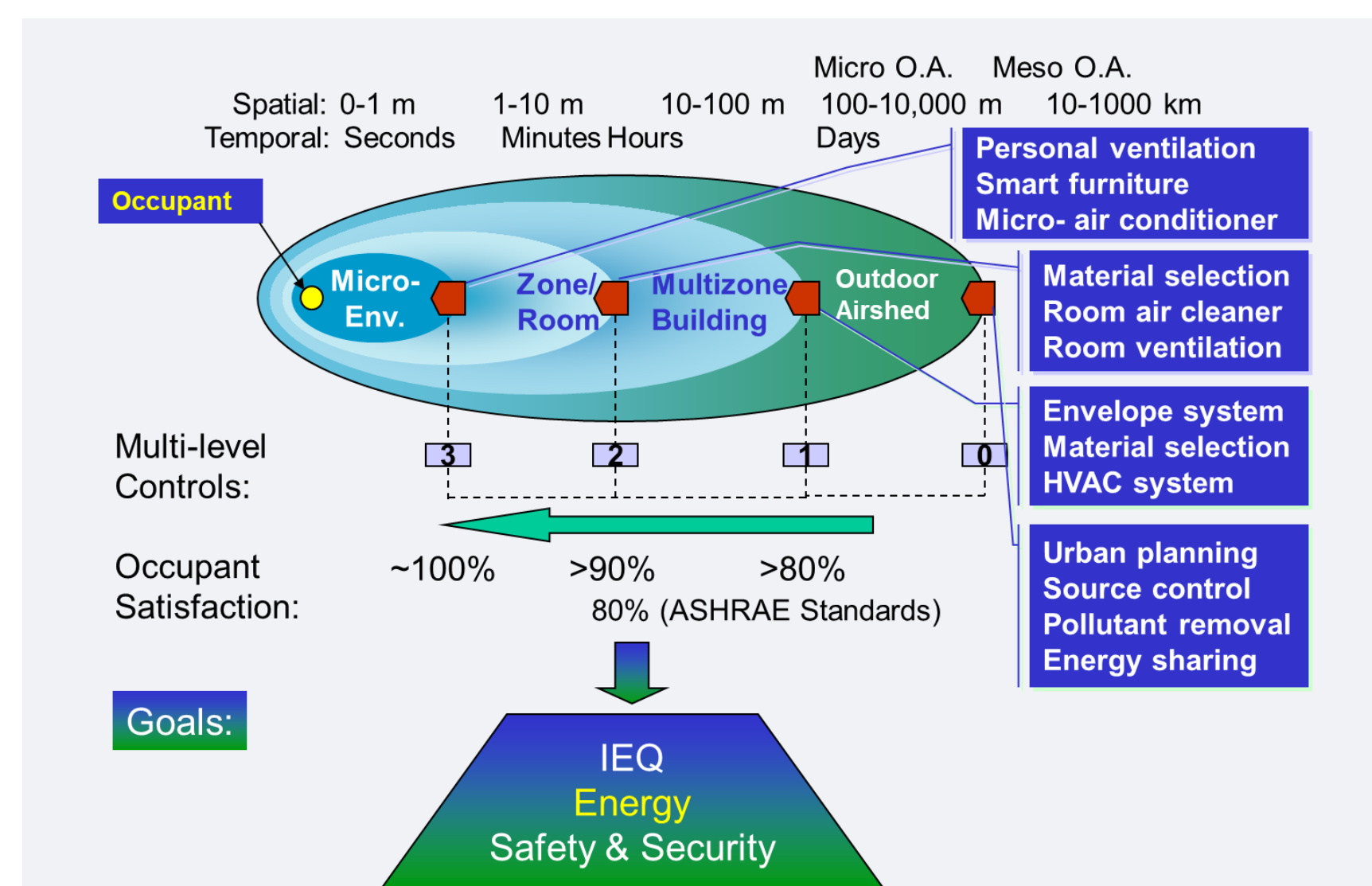
Mission

BEESL's mission is three-fold:

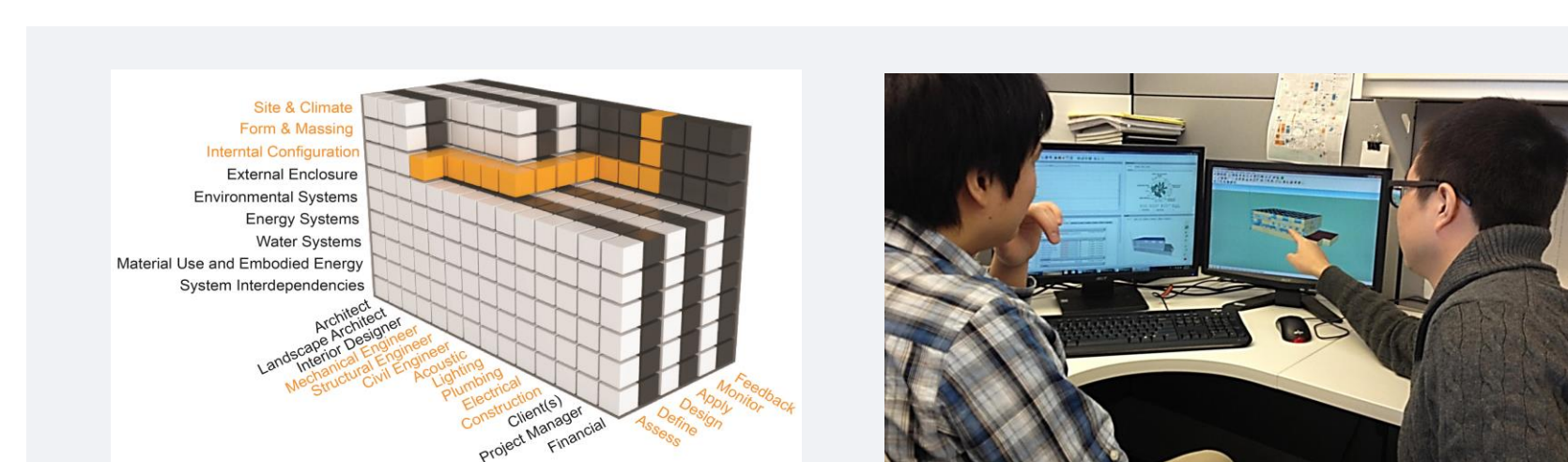
- Advance the science and develop innovative technologies in the areas of indoor environmental quality (IEQ), building energy efficiency (BEE) and building protections by conducting leading-edge academic and industrial research.
- Enhance scholarly learning and professional training for graduate and undergraduate students via integration of research and teaching.
- Help relevant industries in product development and innovation by providing objective and unbiased product testing and evaluation services.

Scope

BEESL's research ranges multi-scale Built Environmental Systems (BES) from nano/micro-scale in porous media to buildings and urban environment and involves engineering, architectural design, human health and performance. Major ongoing research areas include:



Intelligent Built Environmental Systems (i-BES)



Virtual Design Studio (VDS) for Integrative Design

Team Members

Dr. Jianshun "Jensen" Zhang, Professor, Director
Ms. Beverly Guo, Research Associate
Ms. Sabrina Wang, Ph.D. candidate
Mr. Shewangizaw Semahegn, Ph.D. candidate
Mr. Zhenlei Liu, Ph.D. Candidate
Mr. Jialei Shen, Ph.D. Candidate
Mr. Shayan Mirzabeigi, Ph.D. Student
Ms. Xin Guo, Ph.D. Student
Mr. Ahmed Hussein, Ph.D. Student
Ms. Sameeraa Soltanian-Zadeh, Ph.D. Student

Capabilities



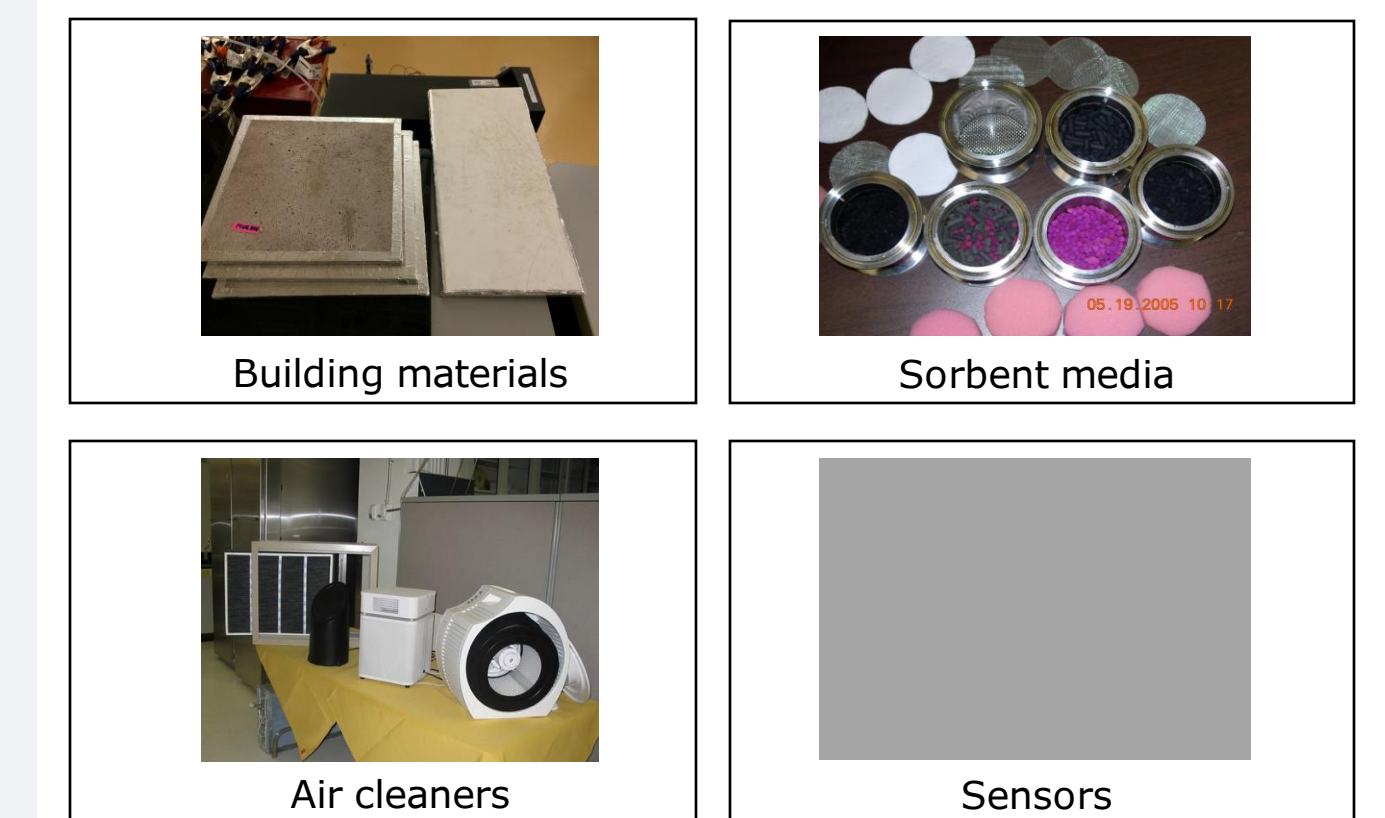
1) Full-Scale Stainless Steel Climate Chamber; 2) Micro, Small & Mid-scale Environmental Chambers; 3) Analytical Chemistry Laboratory and Instrumentations for Real-time Monitoring of Pollutant Concentrations including PTR-MS, Multi-gas Monitors, Aerosol Particle Sizer (APS) and Ultrafine Particle Monitor; Mid-scale Environmental Chambers; 4) Small-scale Environmental Chambers; and 5) Mid-scale Environmental Chambers



6) Full-Scale Stainless Steel Indoor Environmental Chamber; 7) Air Cleaning Technology Test Facility; 8) Building Enclosure Systems Testing Laboratory (BEST lab); 9) Material characterization and Mid-scale Wall Assembly Testing Facility; 10) Building Performance Simulations and Design Tools including Green Design Studio (GDS)

Services

- Material off-gassing testing and evaluation
- Volatile organic compounds sampling and analysis
- Sorbent media/air cleaner testing
- Building material & assembly testing
- Environmental sensor testing and development
- Building performance modeling and monitoring



Projects

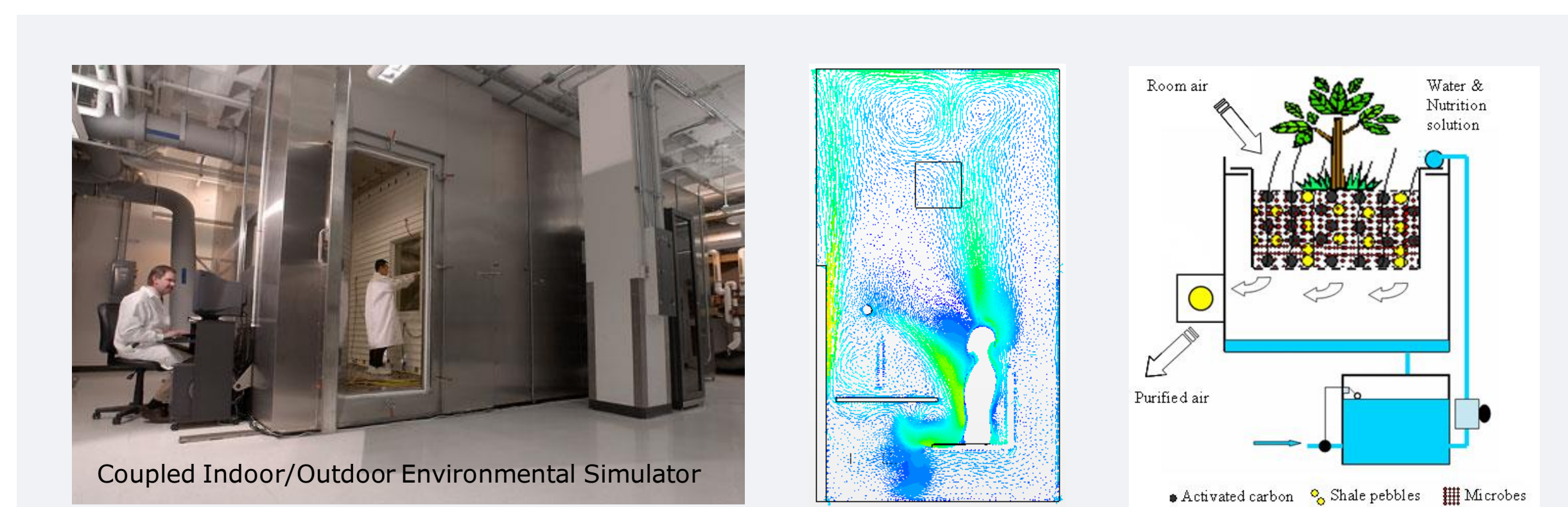
- Indoor air quality Research, Jensen Zhang, Bing Dong and Dacheng Ren, Sponsored by Honeywell Corporation
- Strategies for Mitigating the Risk of COVID 19 and Improving Indoor Air Quality, Jensen Zhang and Bing Dong, Sponsored by Carrier Corporation
- Needlepoint Bipolar Ionization Technology, Jensen Zhang, Sponsored by Carrier Corporation
- VOC sensor testing and evaluation, Jensen Zhang, Sponsored by Carrier Corporation
- Integrated Whole-Building Energy Efficiency Retrofit Solution for Single-Family Attached Residences in Cold/Very Cold Climates, Elizabeth Krietemeyer, Jensen Zhang, Bing Dong, and Nina Sharifi, Sponsored by U.S. Department of Energy (DOE) and New York State Energy Research Development and Authority (NYSERDA)
- Develop and Demonstrate an Occupant-centric Modular Energy Pod for Retrofitting Residential Buildings, Bing Dong and Jensen Zhang, Sponsored by NYSEDA

Outcomes

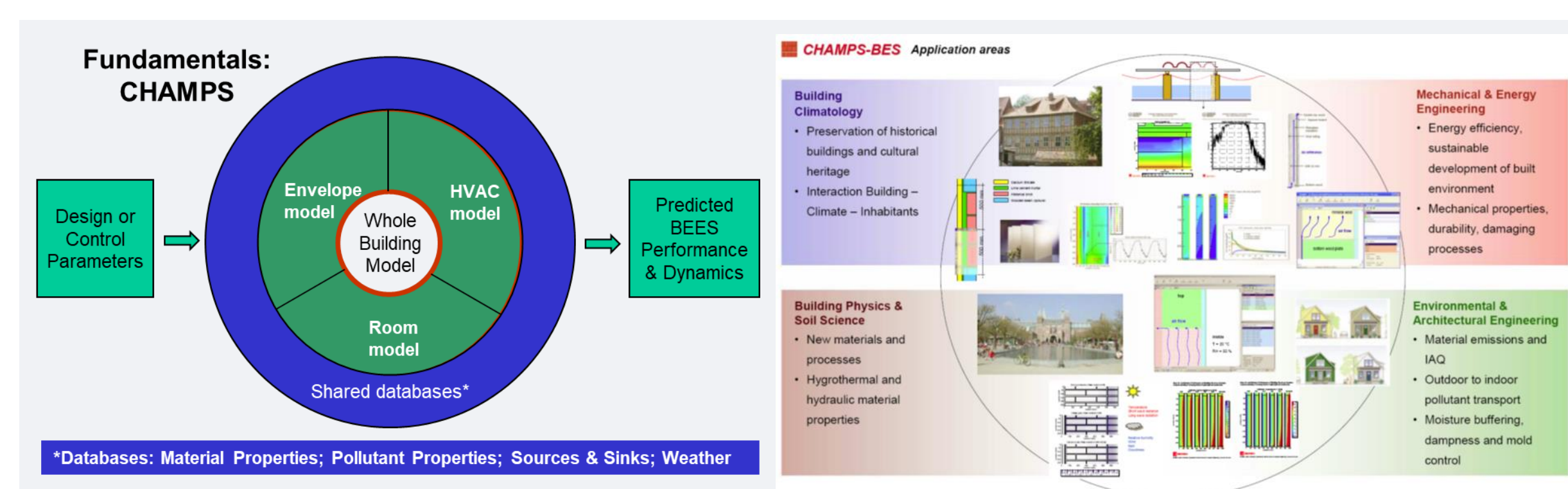
- ANSI/BIFMA Standard Method for Testing the VOC Emissions from Furniture Materials and Systems
- ASTM Standard Guides for Chamber Testing of Material Emissions
- Comprehensive Evaluation of the Indoor Air Cleaning Technology (ACT)
- Model-based Testing and Evaluation Methods for Material Emissions and ACT
- CHAMPS Modeling Framework and Simulation Software
- Selected Publications and Research Reports (See <https://www.researchgate.net/profile/Jianshun-Zhang/research>)

Sponsors

American Society of Heating, Refrigerating, and Air-conditioning Engineers (ASHRAE), Carrier Corporation, National Grid, United Technology Research Center (UTRC), BASF Corporation, CDH Energy, Fortifiber Corporation, Greenfiber Corporation, Honeywell Foundation, Xerox Foundation, Xerox Corporation, BIFMA, Ticona Polymers, Inc., Air Barrier Association of America (ABAA), Oak Ridge National Laboratory, NASA Glenn Research Center, DOE, U.S. Environmental Protection Agency (USEPA), National Center for Energy Management and Building Technologies (NCEMBT), USDA Forest Product Laboratory, New York State, NYSTAR, New York EQS-STAR Center, NYIEQ Center, Inc., NYSEDA, SyracuseCoE



Model-based testing, evaluation and development Building envelope + Material emissions + Ventilation + Air cleaning



Modeling Combined Heat, Air, Moisture, Pollutant and Salt Transport (CHAMPS) in Building Environmental Systems

