Collaborative CHAMPS Development and Applications
(CHAMPS: Combined, heat, air, moisture and pollutant simulations)
Jianshun “Jensen” Zhang
Professor and Director
Building Energy and Environmental Systems Laboratory
Department of Mechanical and Aerospace Engineering
Department of Civil and Environmental Engineering
Syracuse University

Combined heat, air, moisture and pollutant transport and storage play a key role in determining the energy and environmental performance of building systems. This presentation provides an overview of an international collaborative research effort on CHAMPS development and applications. The objective of the collaboration is to develop an integrated modeling and simulation platform for building performance predictions. The platform includes a whole building model (CHAMPS-MZ) that interacts with a building envelope model (CHAMPS-BES), an HVAC model (via interfacing with EnergyPlus), and a room model (CFD or reduced-order room model). Several areas for CHAMPS applications will also be introduced including the developments of: 1) model-based testing and evaluation methods for material off-gassing, air cleaning technologies and building envelope/enclosure assemblies; 2) a “Virtual Design Studio (VDS)” for integrated, coordinated and optimized design of building energy and environmental systems; and 3) an integrated monitoring, fault detection and diagnostic system for building operations. Challenges in CHAMPS development will be highlighted and discussed, and possible areas of collaboration be explored.

Dr. Jensen Zhang received his Ph.D. degree in 1991 from University of Illinois at Urbana-Champaign (UIUC), and B.S. and M.S. degrees from Beijing Agricultural Engineering University in 1982 and 1985, respectively. He has over 26 years of research experience in Built Environmental Systems (BES). His research ranges from nano/micro-scale in porous media to buildings and urban environment, and crosses multi-disciplines involving engineering, architectural design, human health and performance. He has authored/co-authored over 100 technical papers, 1 book, 2 ASTM and 1 ANSI/BIFMA standards, and is a Member of the Editorial Board of International Journal of HVAC&R Research, “The Intl. J. of Ventilation”, “Building Simulations-an International Journal”, Intl. Journal of High-Rise Buildings, and the Intl. Journal of Frontiers of Architectural Research. He twice received National Research Council Canada Outstanding Research Achievement Awards.

Friday, October 12, 2012
11:00 am Seminar in 233 Mudd
Lunch served at 12:00pm
in MECE Lobby