JOE FONG, AIA, NCARB, RID, BPAC, LEED AP (BD+C)

SUMMARY

I have over 30 years working experience in the architectural profession from design and planning through construction. I am an adjunct faculty for the Architectural program at the Prairie View A&M University and the University of Houston; I'm also a former-chairman of the Houston Building Enclosure Council (BEC) in 2014-15, and a former-chairman of the International Building Performance Simulation Association (IBPSA) Houston Chapter in 2017-18. In addition, I was nominated as one of the Rainscreen Association in North America (RAiNA) Education and Performance board members to promote sustainability and technology to the AEC industry in 2020. I have great passion in enhancing building performance with advanced computational software to provide the most optimized design and construction solutions to educate students, architects, engineers, building owners, and occupants.

PROFESSIONAL LICENSE & EDUCATION

Registered Architect TX - #21909, **Registered Interior Designer** TX - #12410, **LEED AP (BD+C)** - #23700
Master of Science in Architecture - Carnegie Mellon University, Pittsburgh, PA. 2004
Bachelor of Architecture - University of Louisiana, Lafayette, LA. 1992

SOFTWARE

Rhino, Grasshopper w/ Ladybug, Revit, AutoCAD, SketchUp, 3D Printing, WUFI, Therm, EnergyPlus, eQuest, DIVA, Flow, FormIt, Climate Consultant, IES VE, ComFen, Twinmotion, Microsoft office

EMPLOYMENT HISTORY

Prairie View A&M University (Adjunct Professor – Design Studio) 2020 - Present
University of Houston (Adjunct Professor – Tech Courses on Climate-Responsive Design) 2014 - Present
Houston Community College (Adjunct Professor – Structural Drafting, CAD & Modeling) 2009 - Present
Tamlyn (Senior Architect, Building Envelope Specialist) 2018 - 2020
Terracon (Senior Architect, Project Manager) 2017-2018
Walter P Moore (Senior Associate, Subject Matter Expert in Simulations) 2011-2017
Carol Vick Architect (Senior Project Manager) 2009-2011
SHW Group (Project Manager) 2007-2009
PGAL (Associate, CAD Manager) 1998-2007
House Reh Burwell Architects (Job Captain, CAD Manager) 1995-1998
Lanham Architectural Design (Design Intern) 1992-1995
Wong & Ouyang Architects HK Ltd (Summer Intern) 1990-1991

SIGNIFICANT PROJECT MANAGEMENT EXPERIENCE

- Consulted in space planning, design development & construction document production for institution, corporate, hospitality and financial facilities
- Evaluated building performance simulated results in energy usage, daylighting, reflectivity, water accumulation, mold growth index, and thermal bridging, etc.
- Enhanced integrated design solutions on thermal, visual, acoustic values with analytical data
- Integrated building envelope analysis, documentation, training and development to design team for medical, institutional, commercial, multi-family, governmental, and aviation projects
- Implemented sustainable key concepts to optimize the energy efficient design and interior comfort based on the life-cycle cost analysis
- Single handedly executed the organization of building and energy codes, life safety requirements, and basis of design for building codes and permit process
- Obtain LEED Gold certification for the Walter P Moore Los Angeles Office renovation project
- Speaker for educational (TAAP), scientific (BEST), and professional (AIA & USGBC) conferences

SIGNIFICANT PROJECTS

Enclosure Commissioning Projects

Prairie View A&M University

- Peer review on Student Recreation Center (2013) and Fabrication Center (2016) for drawings comments regarding waterproofing, thermal performance, and structural evaluation

University of Houston

- UH Cougar Village II (2014-15), and UH M.D. Anderson Library (2012) – Waterproofing and roofing assessment including drawing details & specs review

Texas A&M University: 2013-14

- Northside Residence Hall - Enclosure commissioning from drawings review to construction administration, including ASTM E1105 testing and field visit reports

San Jacinto College: 2014

- Façade assessment on 22 school buildings in 3 campus sites including administrate office, science lab, lecture hall, and classrooms, etc.

Spring Branch ISD: 2007-08

- Buffalo Creek ES, Cedar Brook ES, Treasure Forest ES - Renovations
- Temporary Campus - Expansion

Architectural Design Projects

Building Performance Modeling:

- Tamlyn RainscreenWrap WUFI studies: 2019
- WeWork Thermal Bridging studies: 2018
- Omni Hotel Solar Reflectivity studies: 2017
- CFISD Anthony MS WUFI studies: 2017
- Katy ISD Energy / Glazing studies: 2017
- Frost Bank Vista View Office WUFI studies: 2017
- Dryvit Energy studies on building w/ EIFS:2017
- Jersey Shore UMC Envelope studies: 2016
- UVA Hospital Thermal studies: 2016
- New Orleans International Airport Daylighting / Reflectivity studies: 2015
- UTMB Hospital Daylighting & Energy studies: 2014

Design & Construction Documents:

- Trinity Lutheran Elementary School: 2008
- Las Vegas McCarren Airport T-3: 2005-07
- Carmichael Profession Building: 2005-06
- Harris County Civil Justice Center: 2002-04
- IAH Terminal B Station 5 Walkway: 2001
- IAH Consolidated Rental Car Facility: 2000
- Dallas Street Pedestrian Bridge: 1997
- Diamond Shamrock Headquarters: 1996
- JP Morgan Chase Bank (Woodland): 1995

SIGNIFICANT TECHANICAL PRESENTATIONS

AIA National Convention, Las Vegas, Nevada (2019)

- Moisture Management for Multi-Family, Mix-Use and Light Commercial – “Importance of proper flashing and wall assembly systems and installations”

TAPPA Educational Conference, Austin, Texas (2018)

- Holistic Approach of Building Envelope Commissioning for High Performance Schools

New York Build, New York, New York (2018)

- Energy Efficient Glazing for High Performance Facade

USGBC Gulf Coast Green, Houston, Texas (2017)

- Enhancing your Building Enclosure Systems for Energy, Environment, and Operations

AIA Houston Full Day Continuing Education Seminar, Houston, Texas (2016)

- To Be or Not to Be: An Integrated Approach for Early Design Decisions

Texas Society of Architects Convention, Dallas, Texas (2015)

- What You Don’t See Can Hurt You: Moisture Accumulation in Wall Assemblies – Science Nonfiction Horror Story of Unintended Consequences

National Institute of Building Sciences - BEST4 Building Enclosure Science and Technology Conference, Kansas City, MO (2015)

- A Detailed Study of Sunshades and their Effects on Performance
- Glare Study of Highly Reflective Cool Roofing Membrane

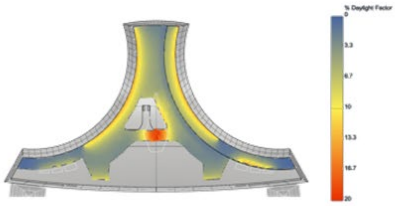
SAMPLES OF BUILDING PERFORMANCE SIMULATION ANALYSIS

ILLUMIANCE STUDY

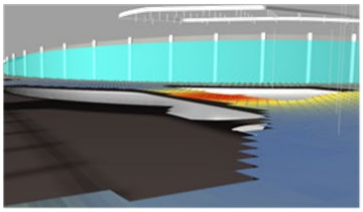
Since the 2nd floor area on the south facing façade has significant daylight penetration to about 30' from the south facade. We further studied the 2nd floor area on the south side with the canopy and evaluated the light intensity in the Winter Solstice (December 21st).

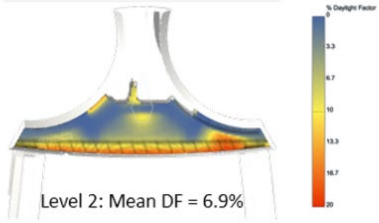
Results:

The results show that there is over 98% of the 2nd floor area has between 179 to 32,220 lux light intensity. There is over 30,000 lux about 30' from the south façade which can bring heat and intolerable glare.

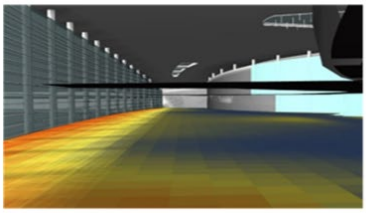


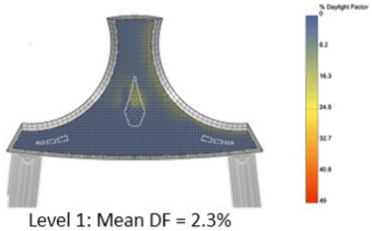
Level 3: Mean DF = 5.6%



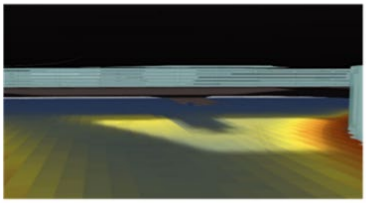


Level 2: Mean DF = 6.9%





Level 1: Mean DF = 2.3%



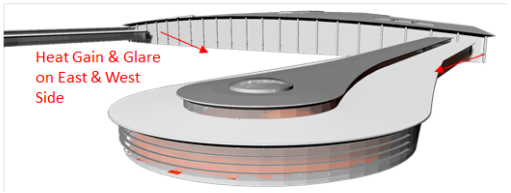
DAYLIGHT FACTOR & GLARE STUDY

Results:

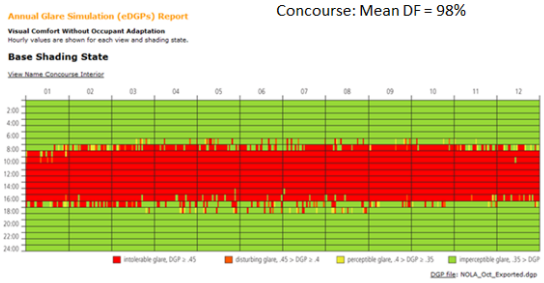
Due to the orientation of the concourse facing East and West, the results show there is over 98% daylight factor and the selection of the glazing and the sunshade should be critically considered to reduce glare and energy usage for thermal comfort. In addition, the results show that the skylight allows penetration of daylight to the floor can create hot spots in certain areas.

Daylighting Factors & Glare Analysis for Concourse

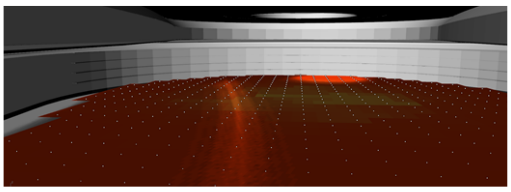
Concourse: Mean DF = 98%



Concourse facing East & West



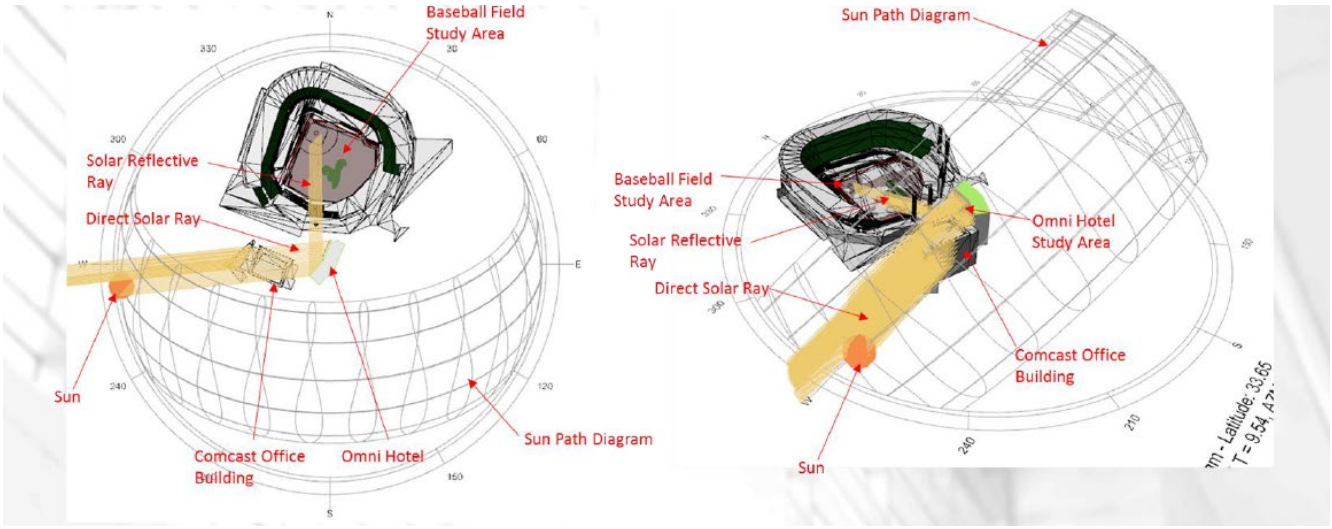
Concourse: Intolerable Glare in Red



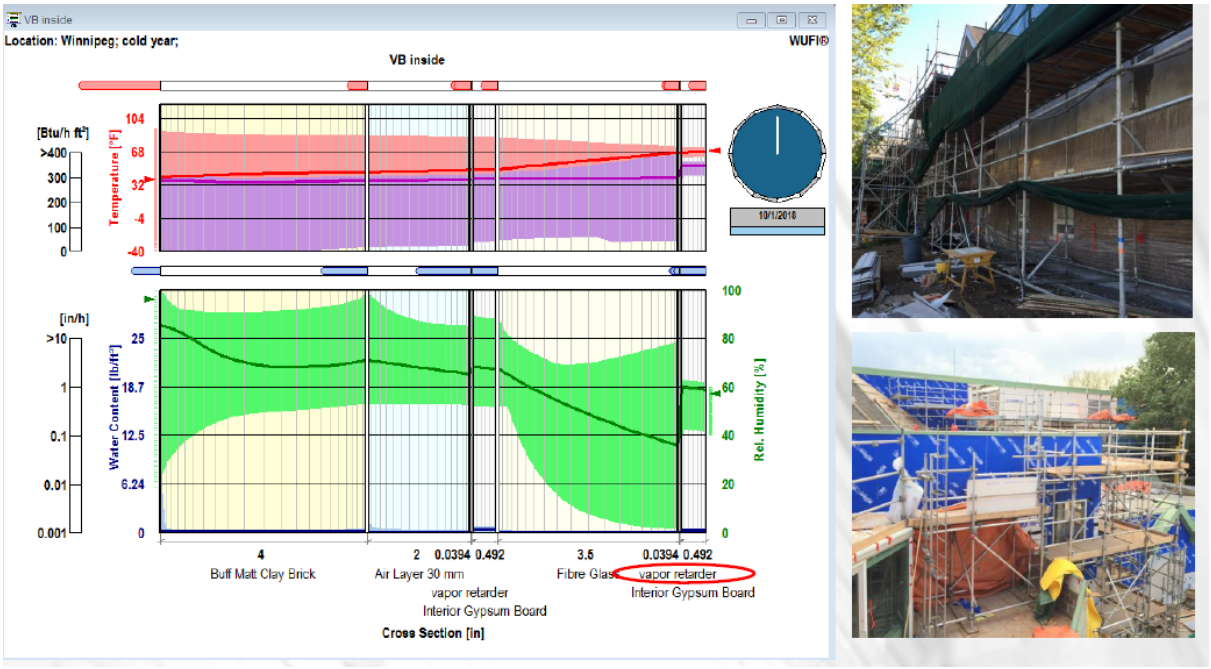
Hot Spot from the Skylight

LOUIS ARMSTRONG NEW ORLEANS INTERNATIONAL AIRPORT

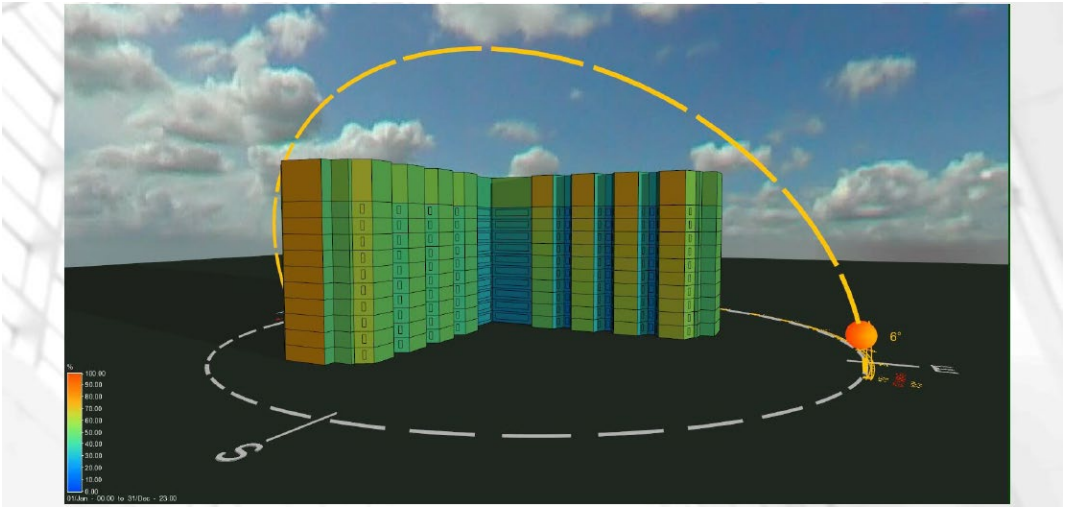
Daylighting & Glare Studies



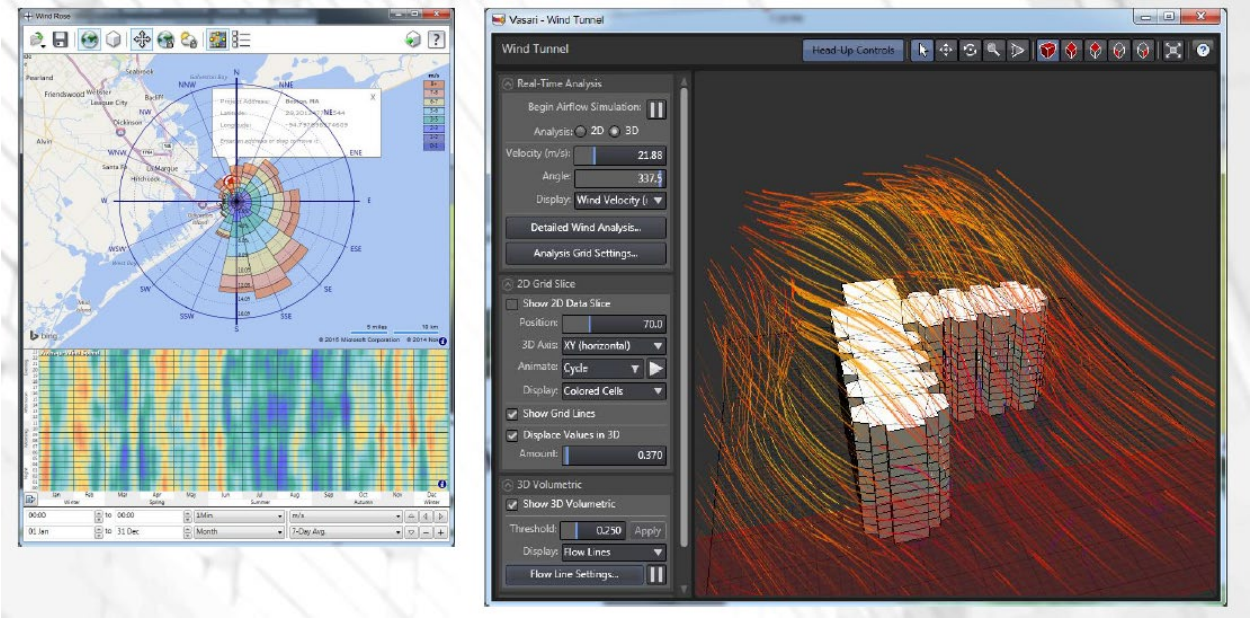
Reflectivity Study



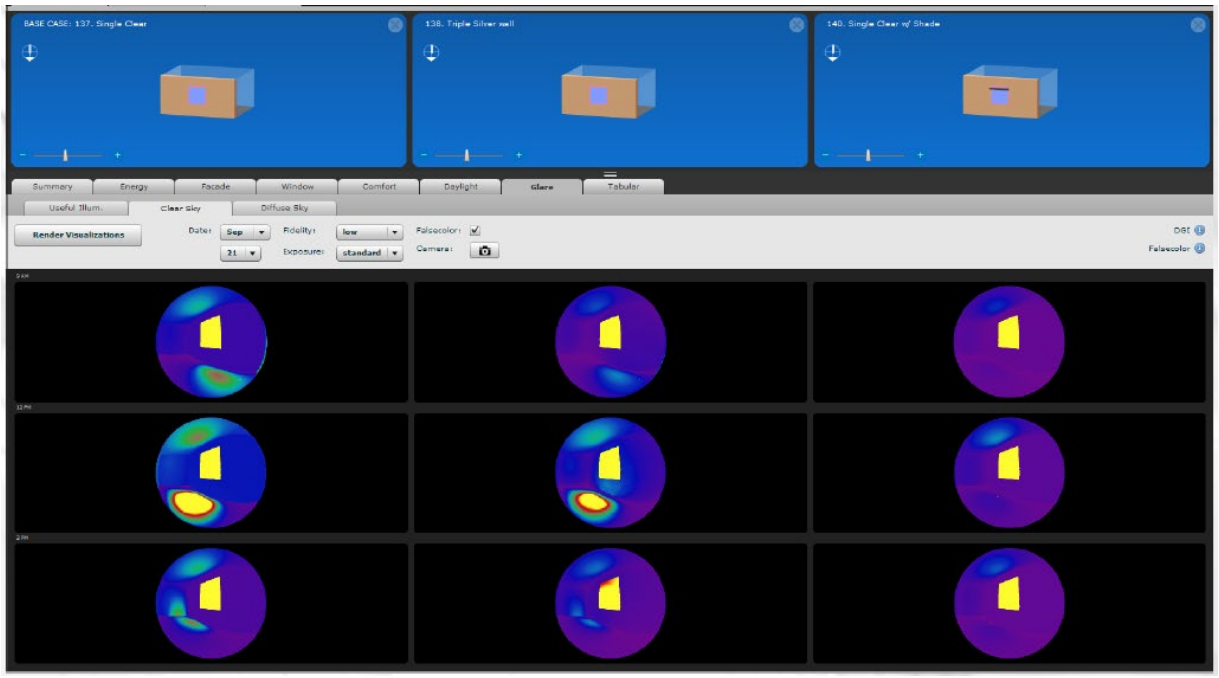
Water Accumulation Study



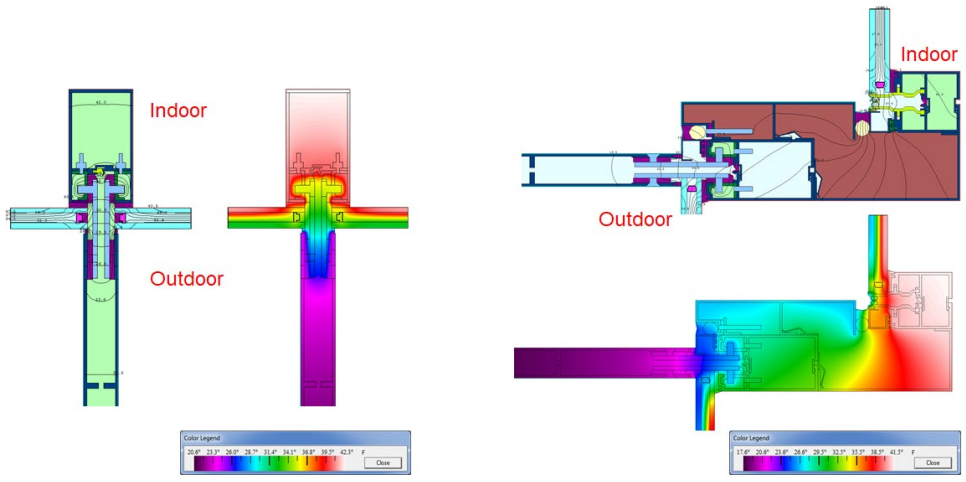
Heat Gain Study



Wind Pattern Study



Glazing Study



Thermal Bridging Study

SIGNIFICANT TECHANICAL PRESENTATIONS

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National Institute of Building Sciences - BEST4 Building Enclosure Science and Technology conference, Kansas City, MO (2015)
- A Detailed Study of Sunshades and their Effects on Performance
- Glare Study of Highly Reflective Cool Roofing Membrane

HONORS & PUBLICATIONS

- **Delivering Success** – Terracon: "Window Selection – Factors that matter for your Building", 2018 https://www.terracon.com/2018/04/09/how-to-determine-the-best-window-type/
- Achieved City of Houston **Green Office Award** with Walter P Moore Green Team, 2016 & 2017
- Researched, investigated, and published for Harris County Facilities & Property Management Division "**Best Green Practices**" Guide, 2010 http://www.hcfpm.net/Facilities/Energy-Management/Best-Green-Practices
- Obtained **Winner of Anderson Award Competition**, Carnegie Mellon University, 2004

TECHINCAL PRESENTATIONS AND LEARNING OBJECTIVES:

Moisture Management for Multi-Family, Mix-Use and Light Commercial – "Importance of proper flashing and wall assembly systems and installations":
Moisture damage contributes to 90% of all building and building material failures; making the management of moisture key to building longevity. This course will discuss the movement of moisture, cover some keys design issues, a better and best solution for moisture control, and how to integrate moisture control with exterior continuous insulation. After the course participants will have more tools for wall detailing.
- Describe how moisture impacts building durability
- Define the mechanics of moisture movement
- Identify common design defects that lead to moisture problems
- Understand the integration of a moisture control layer with exterior continuous insulation

Holistic Approach of Building Envelope Commissioning for High Performance Schools
- Describe Total Building Commissioning (Cx) and how it impacts to the energy performance
- Identify NIBS Guideline 3-2012 Requirements & Section 402 of IECC 2015
- List the typical steps of Building Envelope Commissioning and Understand the duties and roles of a Commissioning Agent
- Demonstrate the use of platforms on performance modeling studies & how to evaluate the results

Energy Efficient Glazing for High Performance Façade

Energy efficient glazing design strategy on the high-performance façade is one of the key factors to impact mechanical systems, not only contributing to reduced operation expense but also to potential equipment downsizing, saving capital costs, reducing peak electricity loads, and maintaining occupant comfort. In this presentation, we'll be focusing how we should consider the selection of the energy efficient glazing units and integrate them as part of the high-performance façade system for codes, cost, and sustainable measures.

- Explain how climate and building components would impact the overall Glazing design
- Discuss how current energy code requirements mandate certain glass selections
- Identify critical elements of the glazing design responsible for building energy consumption and occupants' comfort
- Discover tools and techniques for addressing critical issues for high performance glazing systems case studies that are cost effective and support permitting and approvals

Enhancing your Building Enclosure Systems for Energy, Environment, and Operations

Application of Building Science to Building Enclosure Commissioning (BECx) is essential to prevent the unintended negative consequences which can be caused by design decisions made in a well-intentioned effort to reduce environmental impact and collect of LEED credits. Therefore, BECx should consider the enclosure as one component of a holistic building system. This requires knowledge and application of the underlying building physics and the interaction of the HVAC systems with the building enclosure.

- Discuss the basics of building science that can cause condensation
- Understand how building envelope impacts the performance
- Identify which simulation tools are available for building envelope applications
- Recognize the appropriate simulation tools in different design stages for LEED V4 (BECx)

To Be or Not to Be: An Integrated Approach for Early Design Decisions

Most architects usually hesitate on making design decisions when considering the building performance aspects during the early design stage. These aspects, (i.e. thermal, visual, air quality, and building integrity) are related to environmental impacts and codes requirements. In this presentation, we will focus on how we use the appropriate performance modelling tools to reduce design defects, optimize comfort values, and minimize building cost impact through the building's service life.

- Understand the impact on building enclosure performance with climate and energy codes
- Discuss the crucial factors of energy consumption & operations with integrated building systems
- Recognize which advanced computational simulation tools to enrich building design value
- Identify the appropriate building performance analytical tools for making integrated design decisions

A Detailed Study of Sunshades and their Effects on Performance

Sunshades are popular architectural features often part of the building enclosure design. Its primary purpose is to control the amount of direct sunlight through the building's windows, and offer premium energy savings that can drastically lower the energy usage. However, sunshades can also lead to the possibility of thermal bridging and condensation if not designed and detailed properly.

In order to understand building performance, we first must agree that buildings perform as one unit. To ensure the building can perform well according to its own design, we should be able to evaluate different components in the system which can affect the spatial arrangement, energy usage, occupant comfort, health and safety, and building integrity. As we all know, the exterior enclosure is the first line of defense for the building and it can make a great impact to the aforementioned performance qualities. Unfortunately, there is no single software that can predict the building performance holistically. Most of the time, we have to select the most appropriate simulation tool to verify the performance per the enclosure design, analyze the measurable data, and evaluate the outcome performance result at different enclosure design stages.

In this study, we will be examining sunshade to demonstrate how an architectural feature can affect the following 6 critical design components for a High-Performance Building Enclosure:

- Energy consumption, Daylighting and glare, Thermal bridging, Thermal comfort, Condensation, and Structural integrity

Glare Study of Highly Reflective Cool Roofing Membrane

According to MIT, a survey was generated in regards to the Glare and Daylighting in 2011. Over 80% of participants (architects, lighting designers, and contractors) voted glare to be either an important or extremely important design consideration. Daylighting is intended to provide enough natural light to an occupied space while minimizing any undesirable side effects. Frequently, installing sun shades has become one of the architectural features to control the direct sunlight (from above) into the occupied space. Unfortunately, discomfort glare happens not only from the direct sunlight but it can be occurred due to light reflection (from below) such as reflection from an adjacent highly reflective cool roofing membrane.

A case study regarding glare potential from a roofing system replacement will be discussed. A 40 story high office building has two lower towers attached on either side of a taller central tower. The client wanted to replace the existing red modified bitumen roofing membrane with a new highly reflective cool roofing membrane (high albedo) on the two lower towers. During the roof system selection process, the design team was concerned about possible discomfort due to glare that could be brought into the occupied space at the central tower from the high reflectance of the lower roofs. Although daylighting is a positive design consideration, understanding the performance of the daylighting and glare control is also vital.

This study mainly focused on the possible discomfort that glares generates from the reflection of the highly reflective cool roofing membrane located below the attached central tower. Through the use of simulation tools for performance evaluation, knowledge of the building orientation as related to the sun's path, and understanding of punched window (IGU) properties; we were able to analyze the following items:

- Daily solar exposure, Roof reflectance amount, Daylight luminance at interior, Glare level at various times of day

Simulation Tools for Building Envelope Applications

Building Performance Simulation (BPS) is the practice of using software to dynamically envision the effect of various design elements. The objective of a BPS analysis is to enhance design concept and optimize performance. A wide-ranging approach can be particularly useful for measuring and analyzing the building performance relative to the environmental impact, energy consumption, and occupant comfort.

- Discuss the basics of building science for building envelope components
- Understand how Energy Codes influence the building envelope design
- Identify which simulation tools are available for building envelope applications
- Recognize the appropriate simulation tools for different design stages

Flashing Basics for Building Envelope Systems

This course will identify numerous types of building envelope flashings systems. A discussion of their history, modern materials, material selection criteria, and location will follow. In addition, this presentation will examine the parties who make decisions regarding flashing profiles and design.

- Recognize historical flashing systems.
- Identify current flashing system materials and flashing material selection criteria.
- Identify locations where building envelope flashing systems are required.
- Recognize parties that make decisions regarding flashing profiles and design.