

COLLEGE OF ARCHITECTURE + THE ARTS

Multi-disciplinary Projects for the Built + Designed Environment

Resilient Urbanism Strategies

Mitigation + Adaptation

Energy Efficiency | Monitoring | Benchmarking |

Materials Research | Fabrication

Infrastructure [hard + soft] | Buildings [new + retrofit]

Public Communication + Engagement

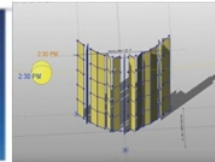
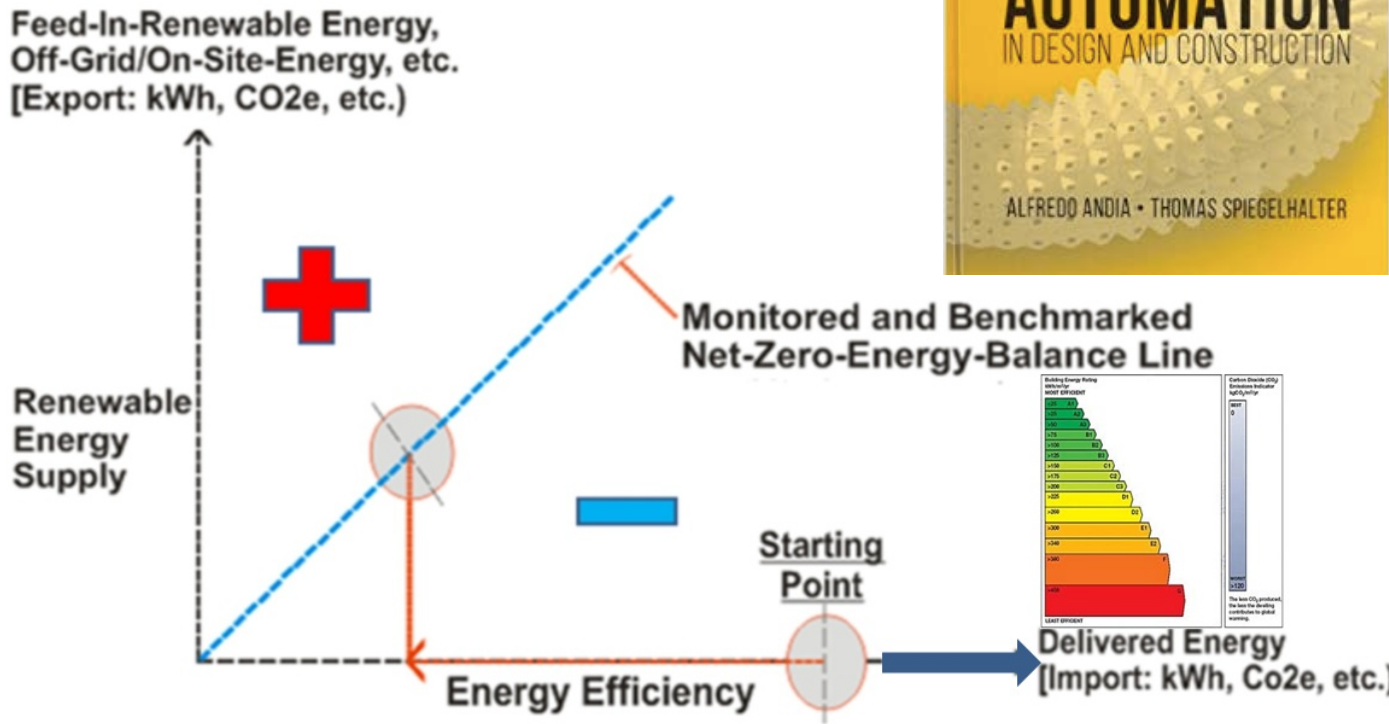
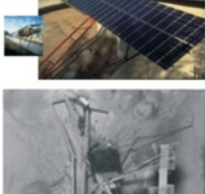
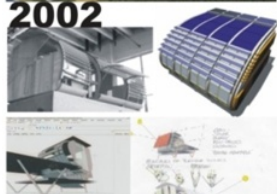
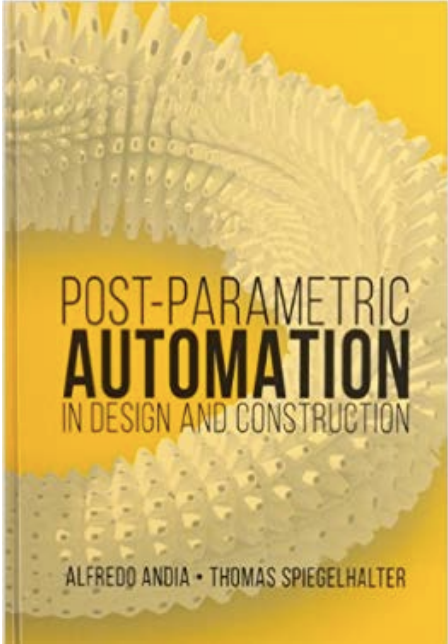
Exhibitions | Symposia | Publication | Entrepreneurship

Funding Partners

NSF | DOE | DOE | TIGER | Knight Foundation

THOMAS SPIEGELHALTER

Associate Professor, Department of Architecture



The diagram illustrates the adapted Net-Zero-Energy (NZE) building design, NZE balance line, and benchmarking flow. The images in the frame show some early pioneered and built solar building typologies by Thomas Spiegelhalter and Associates in Southwest Germany, and in the U.S.A. (Image courtesy Thomas Spiegelhalter, 2016.)

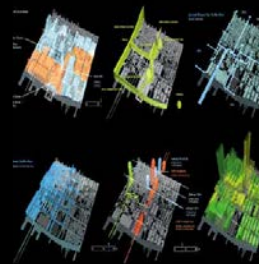
Gianmichele Panarelli

Adaptable technologies

Le architetture di Thomas Spiegelhalter
The architecture of Thomas Spiegelhalter

FrancoAngeli

Architetture della Tecnologia Architecture of Technology



ENERGY & CLIMATE PARTNERSHIP OF THE AMERICAS (ECPA) US DEPARTMENT OF STATE GRANT

CAMILO ROSALES + THOMAS SPIEGELHALTER, COLLEGE OF ARCHITECTURE + THE ARTS



This grant supports work to lower energy consumption in municipal buildings through the development and implementation of energy efficiency standards and policies.

Three municipalities in South America and the Caribbean were selected:
Goiania, Brazil; Valdivia/Los Rios, Chile; Port of Spain in Trinidad and Tobago.

FIU partners with universities in each city: **Universidade Federal de Goias (UFG), Universidad Austral de Chile (UACH), and University of the West Indies (UWI)**



Energy and Climate
Partnership of the Americas



Rapid Energy Modeling Workflow with Autodesk Software

CAPTURE



Digital Photos

CALIBRATE

INPUT ROOMS/SPACES/ZONES

Room Objects
Space Objects
Zone Objects

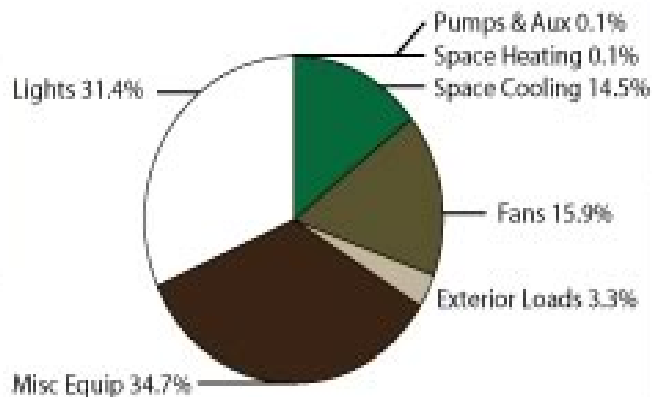


3D Wire Frame Model

MODEL

Autodesk® Revit®

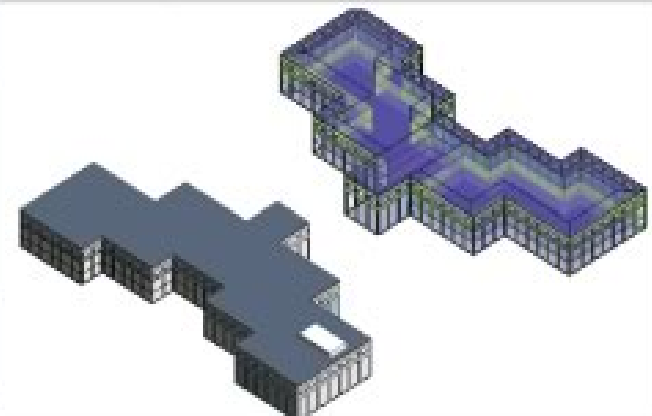
ANALYZE & VALIDATE



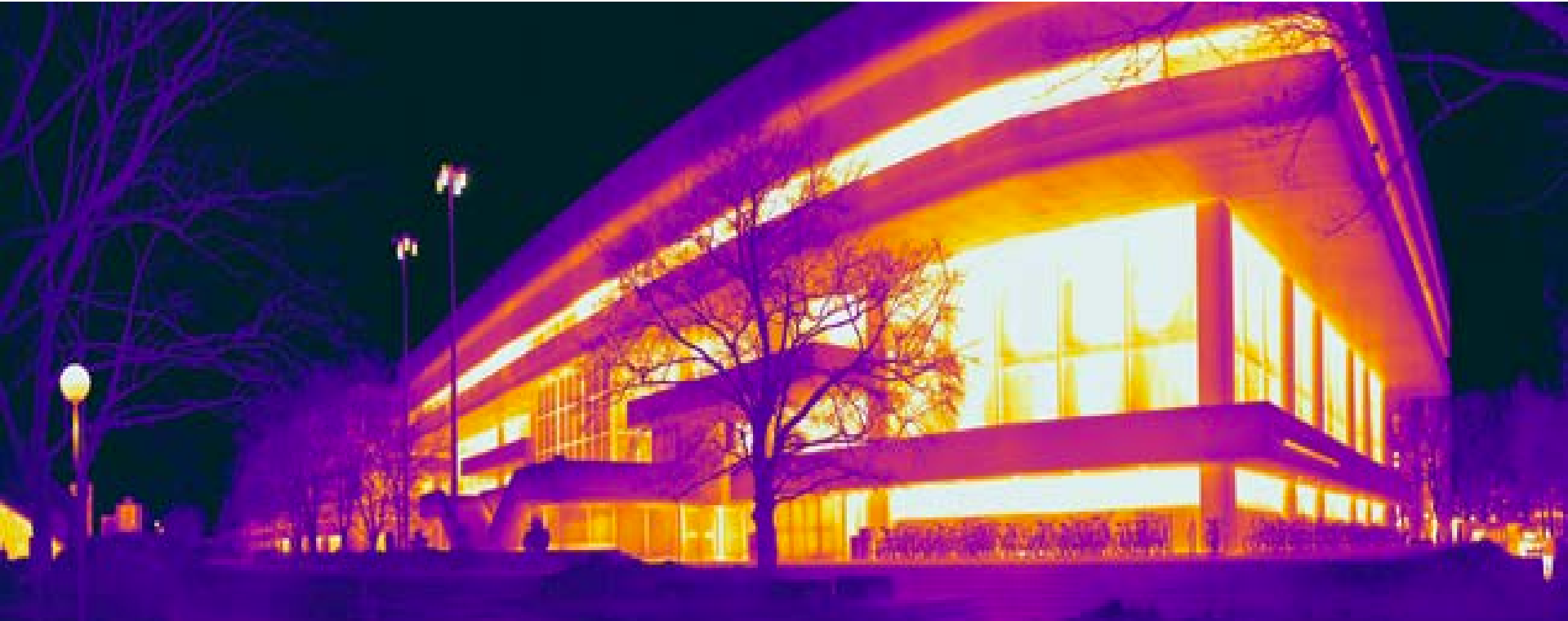
Energy and Carbon Analysis

SIMULATE

Autodesk® Green
Building Studio®



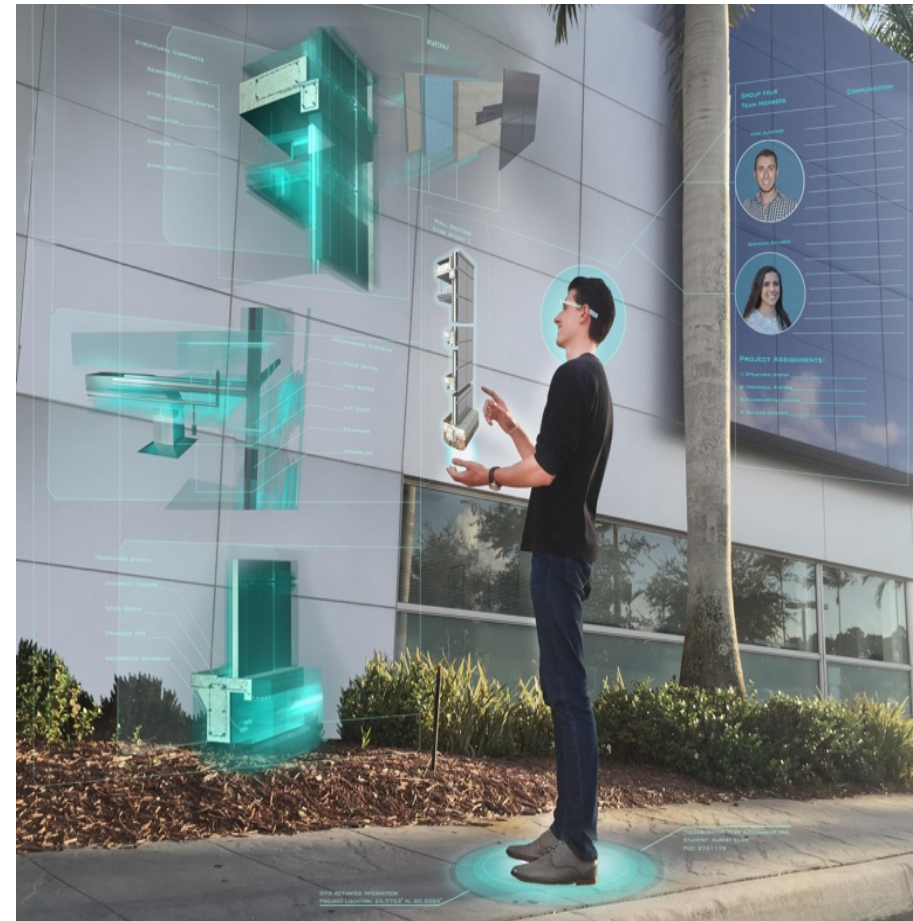
Building Energy Model



Strategies for Learning: Augmented Reality and Collaborative Problem Solving for Building Sciences

NSF Funding 2015-2017

This Interdisciplinary project integrates Augmented Reality with Building Information Modeling (BIM), visual simulations, and interactive lessons to support collaborative learning among Architects, Engineers and Construction students to improve their capacity to design sustainable and resilient Buildings.



Building Systems Integration for Enhanced Environmental Performance

Shahin Vassigh • Jason Chandler

4
[S+E+M+I]

CH2

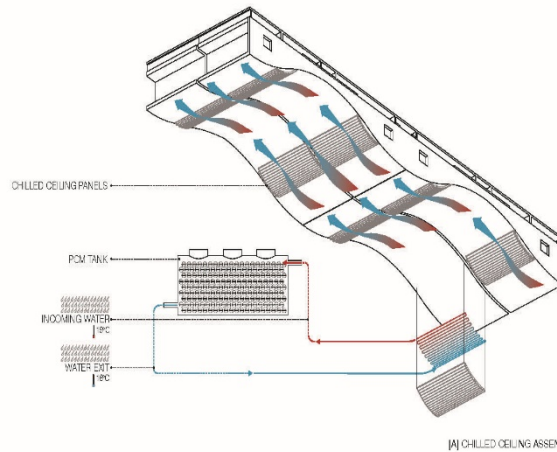
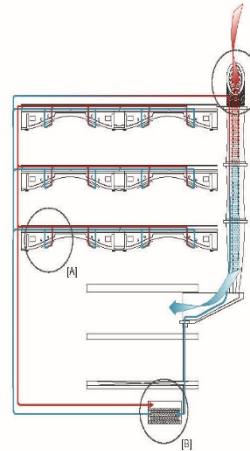
ARCHITECT Jean-Claude Bertrani + Design Inc.
LOCATION Melbourne, Australia
DATE 2006



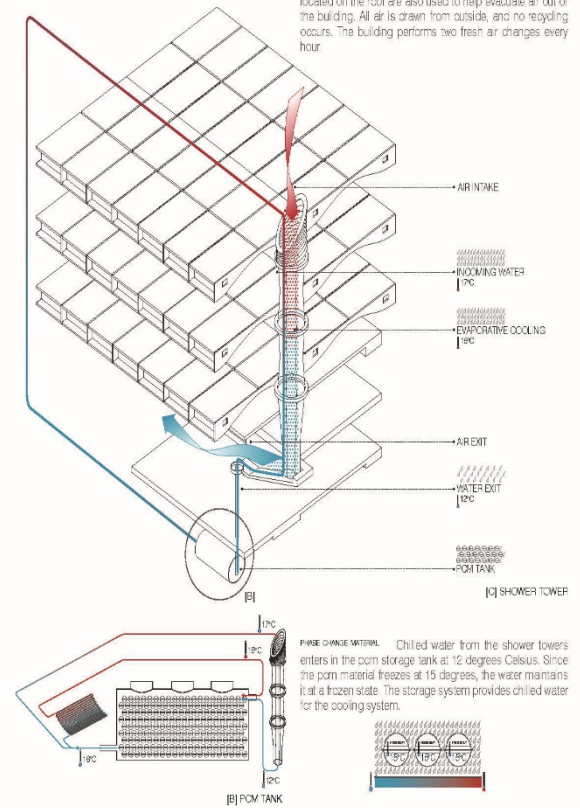
[Text text text] Structure + Envelope + Mechanical + Interiors

ENVELOPE + MECHANICAL

SOUTH FACADE The south facade of the building uses downdraft evaporative cooling. This passive climate control method is used in hot and dry climates to minimize the reliance on mechanical cooling. The system's operating principle is based on producing a downdraft of cool air by spraying fine droplets of water from the top of a tower. As the water falls and draws air it consumes energy to evaporate and it gradually cools. The air is then used for cooling purposes. This system has proven to be extremely effective in many buildings. The CH2's south facade has five attached shower towers composed of light weight fabric material which are a part of a dosed evaporative cooling system. The water used in the system is collected and recycled to achieve more efficiency. At the beginning of the cycle, cooled water stored from a thermal storage is released at the top of the shower towers. The combination of gravity force created by the dropping water, and the downward flow of evaporated cool air due to increasing density, sets up a downdraft in the towers. The cooled air is collected and is directed for cooling the ground floor retail areas. The cold exit water at the bottom of the towers is collected at night into pipes. This water passes through a storage tank containing a large number of metal balls filled with a phase change material (pcm). The pcm freezes at 15 degree Celsius, which is above the temperature of entering water. The water lowers the temperature of the pcm, assisting to keep it frozen. The cooled water is used in the chilled water pipes and is also released in the shower towers in the next cycle.



[A] CHILLED CEILING ASSEMBLY

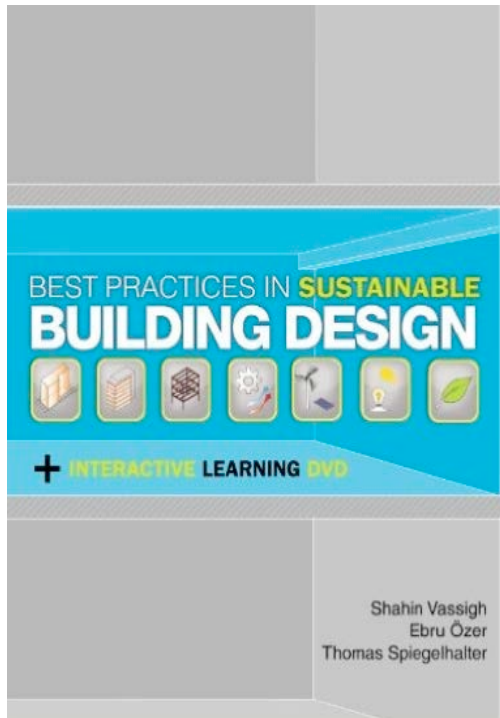


[B] PCM TANK

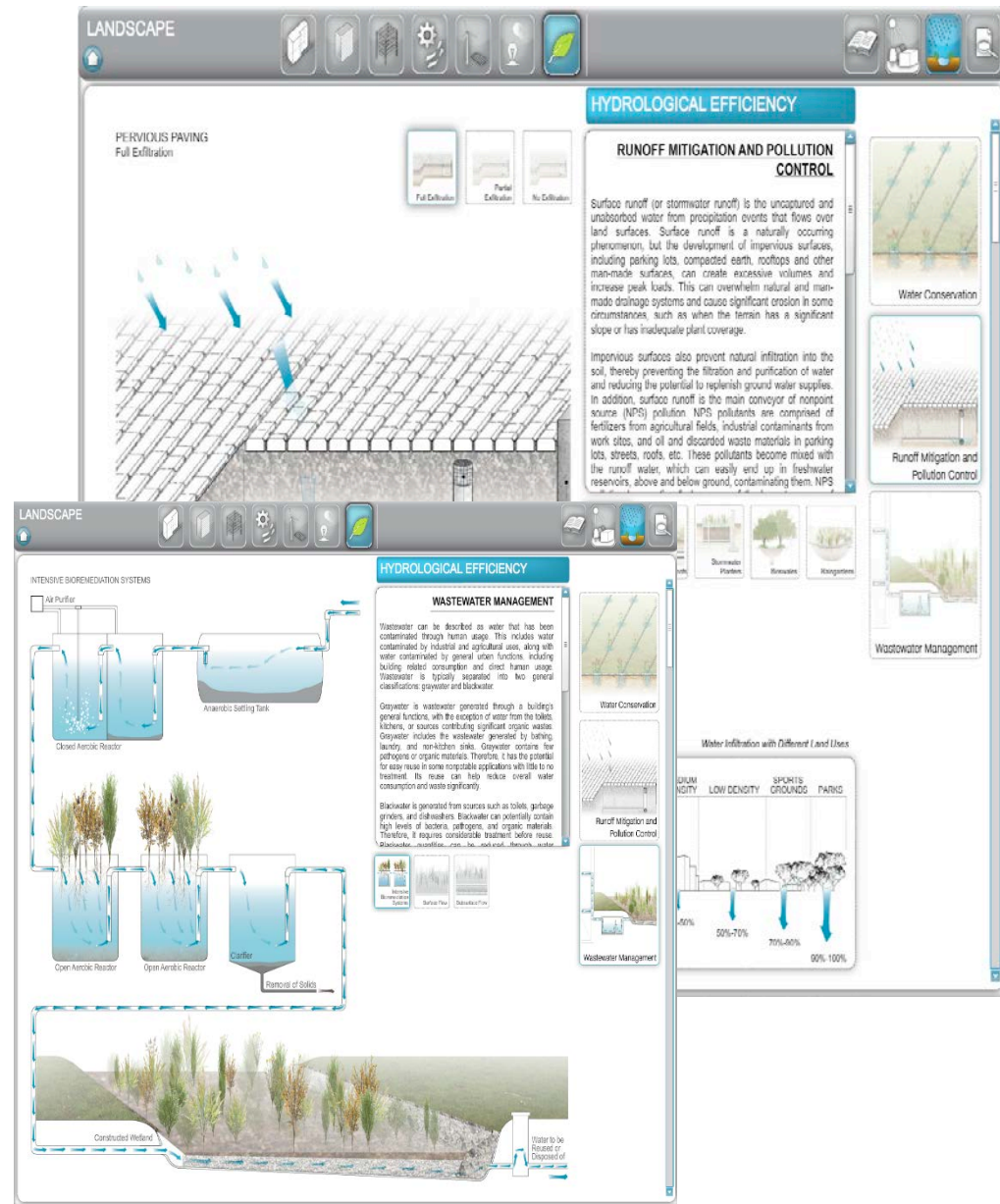
The south facade also contains light-colored air circulation ducts that supply fresh air from the roof and distribute it down through the building. Fresh air is released to the workspaces by diffusers on the floor plenum that are controlled by the occupants. As the fresh air warms, it slowly rises through the gaps on the ceiling and is channeled out of the building through air ducts on the north facade. The wind turbines located on the roof are also used to help evacuate air out of the building. All air is drawn from outside, and no recycling occurs. The building performs two fresh air changes every hour.

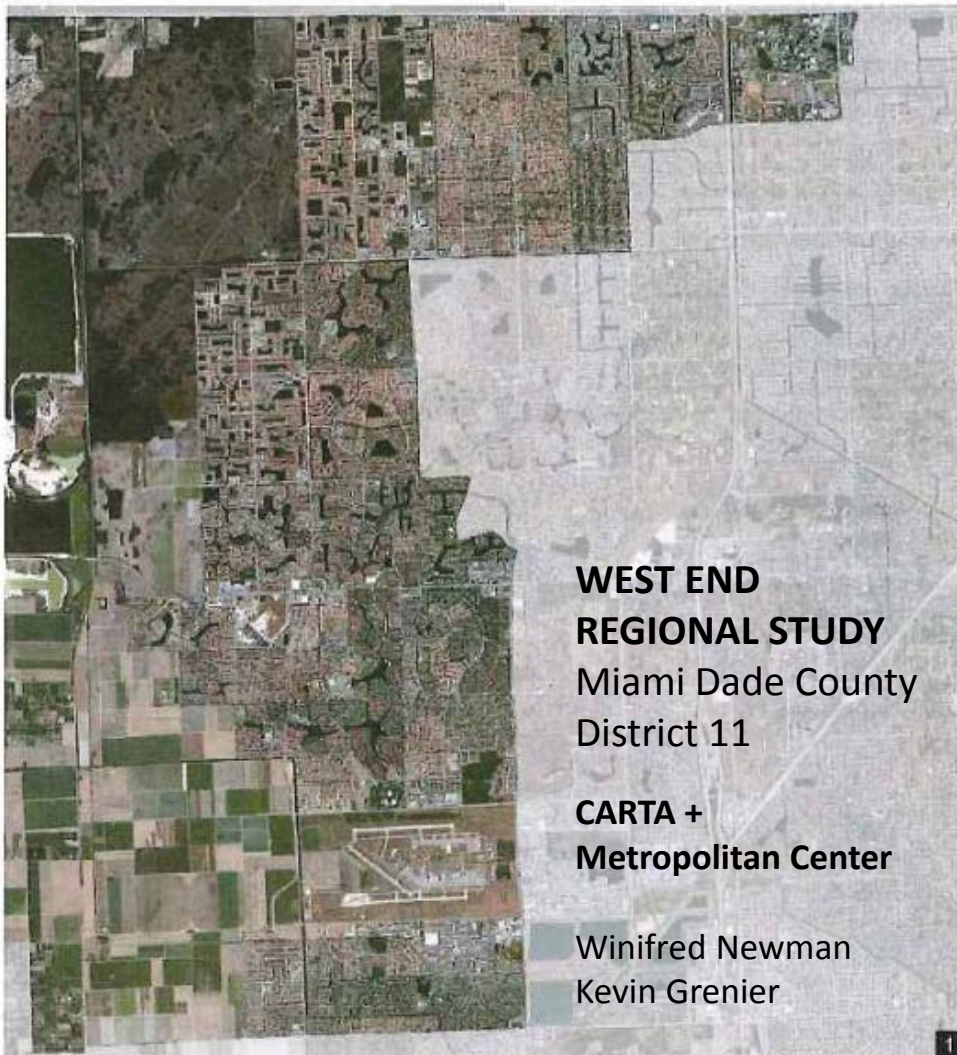
[C] SHOWER TOWER

This book is a compendium of existing built works of architecture that demonstrate best practices and principles of designing and constructing buildings that are both environmentally responsible and architecturally expressive. The buildings selected for inclusion in this book exhibit a high level of sustainability and environmental performance and at the same time are complex architectural proposals.



This book and software are developed to advance the education of climate responsive and ecologically sustainable and resilient building design. It is constructed as an immersive and integrated learning environment, delivering the content in an interactive format.





**WEST END
REGIONAL STUDY**
Miami Dade County
District 11

**CARTA +
Metropolitan Center**

Winifred Newman
Kevin Grenier

Partnering for 21st Century Prosperity

UniversityCity, A Catalytic Local Project
of Regional Significance



FIU | FLORIDA
INTERNATIONAL
UNIVERSITY

Designing for urban runoff mitigation

Landscape design solutions for managing stormwater runoff and protecting against flooding

Ebru Ozer, Associate Professor, LAEUD

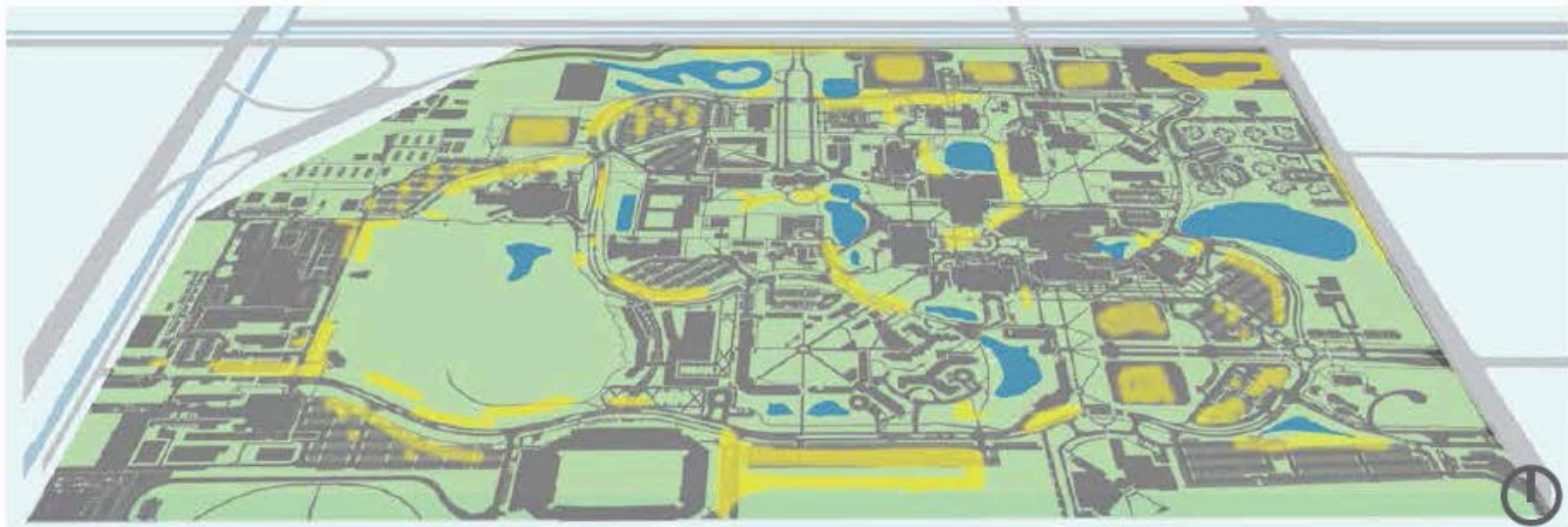
8th European Biennial of Landscape Architecture Exhibit, Barcelona, Spain, 2014 | FLASLA Award of Honor in Planning and Analysis Category for Interweaving Wetland, 2014 | FLASLA Award of Merit in Institutional Category for Surface: Campus Green as Stormwater Treatment Laboratory, 2014 | FLASLA Award of Merit in Institutional Category for Reciprocating Landscapes: Wet, Dry, and In Between, 2014



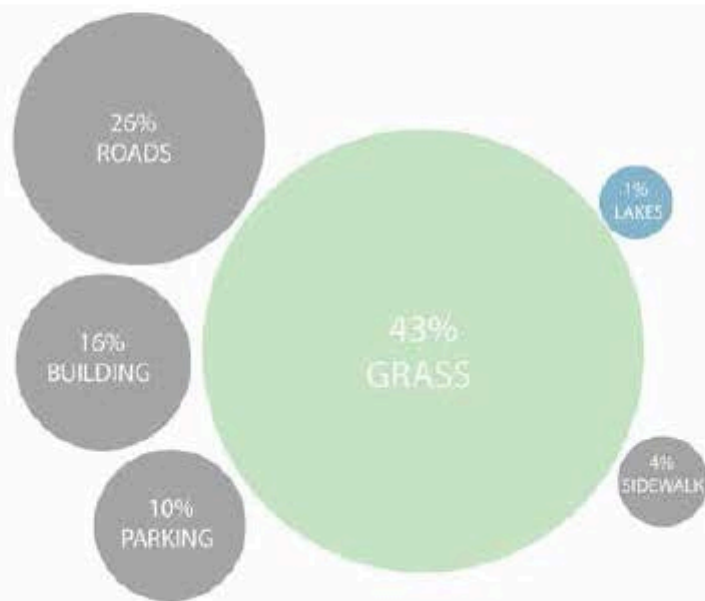
Faculty director: Prof. Ebru Özer - Landscape Architecture and Environmental Urban Design

Students: Gregory Gonzalez, Diego Justiniano, Daniela Menendez, Santiago Olarte, Andrew Pereda, Vanessa Alvarado, Leah Davis, Alfredo Moran, Maria Lopez, Ryan Holmes and Kenia Medina - Landscape Architecture; Monica Ospina - Environmental Studies; Paola Davalos, Natalia Duque, Cynthia Doyon and Andres McEwan - Environmental Engineering; Woby Lang - Sustainability Studies; Kim Moore - Art

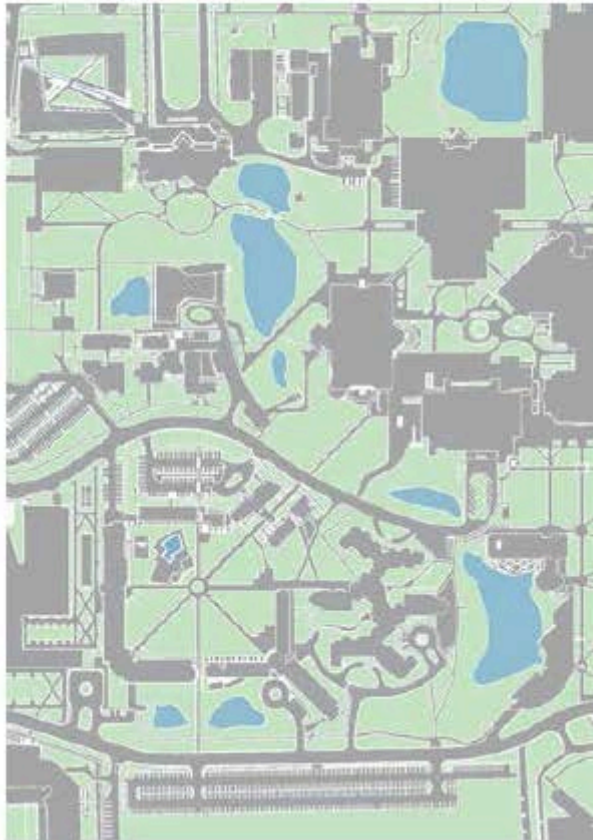
Other collaborators: Stuart Grant - Facilities and Planning, Clara M. Kashar and Ryan Vogel - Office of University Sustainability, Prof. Berrin Tansel, Prof. Shonali Laha, Prof. Anna Bernardo-Bricker - Civil and Environmental Engineering



Permeability Analysis



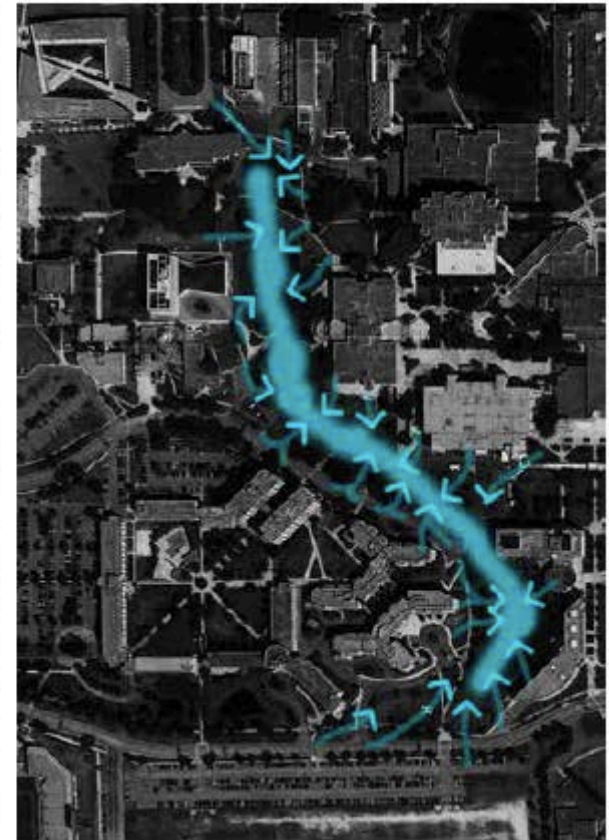
- IMPERVIOUS SURFACES**
 Includes all roads, sidewalks, building foot prints, and parking lots.
- GREEN SPACES**
 Apart from a handful of designed landscapes, these are residual spaces that are simply covered with St. Augustine grass with sparsely spotted with trees.
- BODIES OF WATER**
 All the water bodies are man-made.
- FLOODED AREAS**



Analysis of Permeability



Analysis of Existing Hydrology



Proposed Hydrology

- IMPERVIOUS SURFACES
Includes all roads, sidewalks, building foot prints, and parking lots.
- GREEN SPACES
Apart from a handful of designed landscapes, these are residual spaces that are simply covered with St. Augustine grass with sparsely spotted with trees.
- BODIES OF WATER



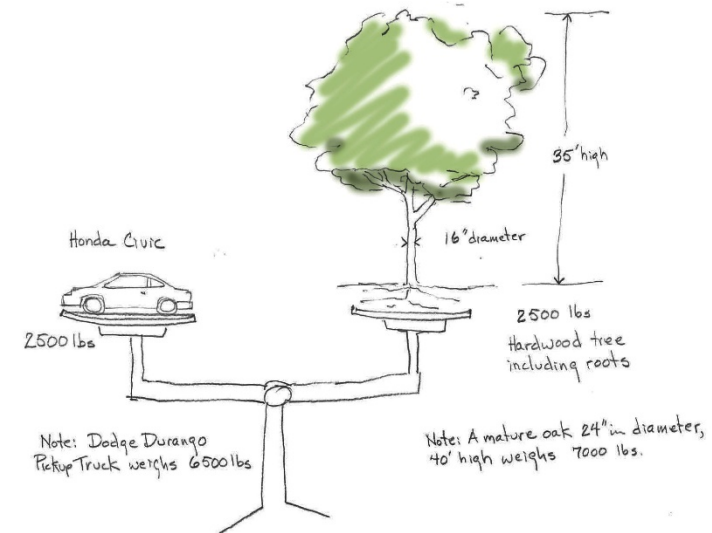
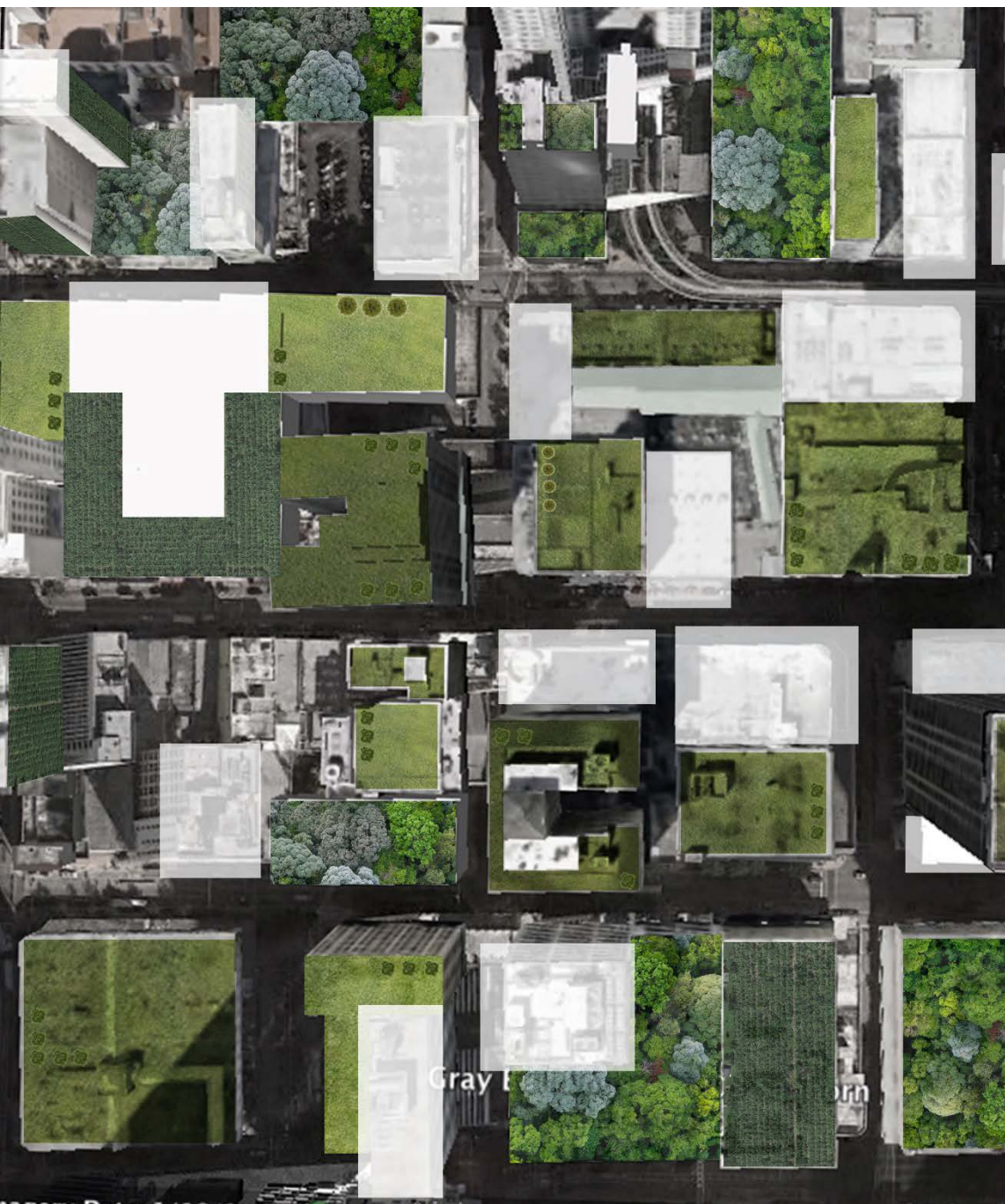
Ideas for a
Green Miami:
Architecture
Design Studios

Gray Read
Nick Gelpi

Google earth

Imagery Date: 1/18/2014 2002 25°46'25.04" N 80°11'21.16" W elev 56 ft Eye alt 462 ft

Marilys Nepomechi,
FIU CARTA,
Copyright 2016



Why not plant forests on the roofs of parking garages? Trees weigh the same as cars

Ideas for a Green Miami Architecture Design Studios

Gray Read
Nick Gelpi



PV CELLS



HORIZONTAL WIND TURBINE



VERTICAL WIND TURBINE



VEGETATION




PERVIOUS PAVEMENT



Carbon Footprint

Base Run Carbon Neutral Potential ⓘ	
Annual CO ₂ Emissions	tons
1 Base Run	31.3
Onsite Renewable Potential	-1,130.4
Natural Ventilation Potential	-2.3
Onsite Biofuel Use	-0.4
Net CO₂ Emissions	-1,101.9
Net Large SUV Equivalent: -100.2 SUVs / Year	

Ideas for a
Green Miami:
Architecture Design
Studios
Highway as energy
farm
Anielka Arguello,
2015



Miami | La Habana: Magic City | Novia del Mar

Marilys Nepomechie | Marta Canavés
Interdisciplinary Collaborations

MARE NOSTRUM / THE FLOOD: An Installation
International Architecture Biennale Rotterdam

Research + Design Exhibition

IABR and Florida International University Grants

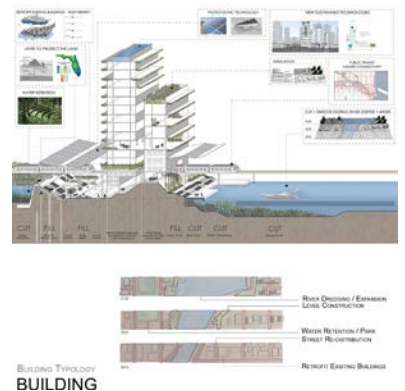
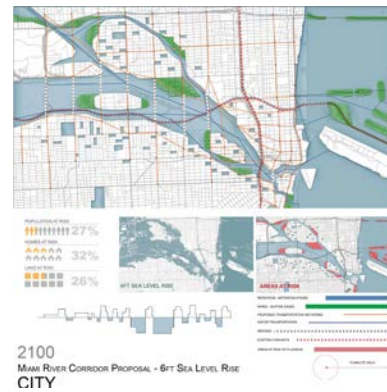
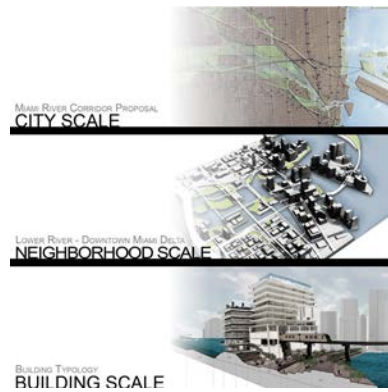
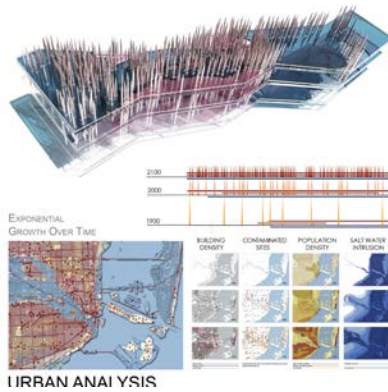
A COMPARATIVE STUDY IN HISTORIC COASTAL DEVELOPMENT

Partnership w/ Tsinghua University | Beijing, China || 5th Place overall: 1st Place Energy Balance + Comfort Zone || 3rd Place Engineering



FIU Office of University Sustainability || 11th Place overall: 1st Place Energy Balance || Florida Foundation for Architecture Award || AIA Miami Design Award || Research Award || State of Florida

U.S. DEPARTMENT OF ENERGY | NATIONAL ENERGY ADMINISTRATION CHINA | SOLAR DECATHLON CHINA 2013
U.S. DEPARTMENT OF ENERGY | SOLAR DECATHLON 2011 || Marilys Nepomechie, P.I. | Principal Faculty Advisor | Organizer





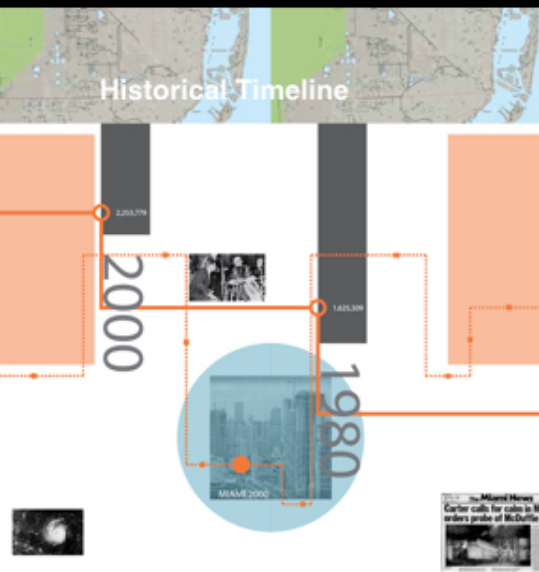
Environmental



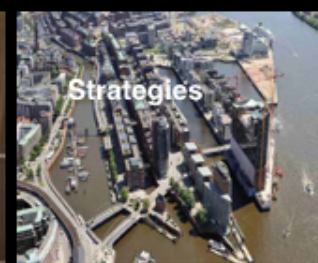
Academic Investigations



Speaking Out
Video Interviews



Miami City Models



Strategies



Miami 2100: Envisioning a resilient second century

Coral Gables Museum

Florida International University School of Architecture

National Science Foundation

the Cejas Family Foundation

CINTAS Foundation

Designing the Resilient City

Panel Discussion

Thursday, February 12, 6pm-8pm

Coral Gables Museum

285 Aragon Avenue, Coral Gables

Panel Moderators | Exhibition co-curators:
Marilys R. Nepomechie, FAIA
Marta Canavés, ASLA, IIDA

MIAMI 2100: Envisioning a Resilient Second Century



BIG

Kai-Uwe Bergmann



OMA

RESIST

Daniel Pittman

DELAY

STORE

DISCHARGE



WEST 8

Daniel Vasini

W x Y WEST8
Nurturing Ecology and Wildlife



Marilys Nepomechi, FIU CARTA, Copyright 2016