2013 ACSA FALL CONFERENCE

DESIGN INTERVENTIONS FOR CHANGING CLIMATES

ABSTRACT BOOK
ACKNOWLEDGEMENTS

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HOST SCHOOL

Florida Atlantic University

CO-HOST SCHOOLS

Broward College
Queensland University of Technology
Brisbane Australia
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COMMUNICATING SEA LEVEL RISE RISK WITH A COASTAL VULNERABILITY INDEX
Keren Bolter, Florida Atlantic University

Global climate change stressors downscale to specific local vulnerabilities, thus requiring unique local adaptation strategies. In southeast Florida, sea level rise (SLR) is of specific concern, both as a present and as an impending threat that requires a localized planning approach. Coastal populations are particularly at risk due to erosion, inundation and storm surge, but interior populations are also susceptible to rising water tables and extended periods of inundation amplified by SLR. Robust SLR adaptation options require significant economic costs that many people may not be willing to pay for if they do not understand the risk. Innovative planning and design approaches can mitigate SLR hazards that are already occurring and are projected to increase in frequency and severity.

A coastal vulnerability index (CVI) is a unique tool that communicates relative risk based on both physical and socioeconomic indicators. This is achieved by multiplying probability by consequence for a collection of spatial units. This study presents a CVI for Broward County, FL that identifies low-lying vulnerable populations by census block group. Physical indicators include elevation and storm surge zone, and socioeconomic indicators include income, age, and population density. The spatial intersection of the physical and social indicators suggested that the vulnerability to SLR in Broward County, FL is not limited to the coastal populations. Results pinpoint areas in which to focus on increasing awareness and resilience to SLR impacts.

CITY OF WATER: ARCHITECTURE, INFRASTRUCTURE AND THE FLOODS OF PHNOM PENH
Shelby Elizabeth Doyle, Louisiana State University

This paper is a summary of research conducted during 2011-2012, funded in part by the Fulbright Program and entitled City of Water: Architecture, Infrastructure and the Floods of Phnom Penh. This work documents the relationships between water, architecture, and infrastructure in the capital of Cambodia, Phnom Penh. The objective of the project is to record the architectural and urban conditions sustained by and subject to the cyclical floods of the city’s rivers, to describe the challenges faced by Phnom Penh as it rapidly urbanizes in a flood plain, and to explore the nature and agency of design in relation to these topics, with a focus on education and outreach as tools for engaging the changes facing Phnom Penh.

The following text traces the methodological challenges of teaching, researching, and working in Phnom Penh. Research was primarily conducted through observation, photographs, drawings, video, and interviews. In response to the lack of available urban data, a tenet of the research was to share all documents, drawings and statistics gathered or produced via www.cityofwater.wordpress.com as an open sourced and public resource.

To address limited information access, a complementary educational and outreach project emerged, the Urban Lab Phnom Penh, during a public festival in Cambodia the 2012 Our City Festival: Urban Currents: Art, Architecture, and Ideas. The Urban Lab was a free architectural summer school for Cambodian university students, an archive of urban research materials (maps, files, books, and articles), an exhibition of student proposals for the future of Phnom Penh, a workshop and exhibition Water Curse or Blessing?! that traveled from Berlin to present 25 projects implemented in Asia, and an installation entitled Mekong Flux that physically graphed upon the city the 10-meter seasonal depth change of the Mekong River.

Additionally, several studio and seminar courses were conducted during three semesters, with selected work appearing in the Urban Lab exhibition: Projecting Phnom Penh: Ta Khmao Strip Studio, Making in Cambodia: Fabrication Seminar, City of Water Studio: Housing, Water, + Transit for Tra Bek Lake, and A Contemporary History of Urban Planning + The Future of Phnom Penh Seminar.

Following the Urban Lab, this work traveled to New York City for a recent exhibition, Water, Politics, And Art, which presented the City of Water research, Cambodian student work, and Parsons student work in the context of the Living Arts City a Parsons initiative of the Season of Cambodia Festival, a performing and visual artists festival.

RAISED STRUCTURES: RECLAIMING THE INTERSTITIAL AS A MEANS ACCLIMATIZATION
Alice C. Guess, Louisiana State University

One of the most common strategies for flood resilience in residential structures is to raise the enclosed building and all horizontal structure above the projected 100-year flood elevation. In some coastal areas this can be as much as an entire story above grade. Typically this space is treated as an elongated crawl space - relegated to partially enclosed storage and parking garages - a gap that must be traversed for entry to the building. But what if this space was given its own architectural expression - reclaimed and realigned as part of the residence itself while still maintaining the interstitial condition that allows the structure to adapt to changes over time? By its requirement that it not be conditioned or fully enclosed does it have the potential to give us back the transitional social space of the front porch? This paper will examine a series of residential projects in coastal South Carolina that present an evolving redefinition of ground floor spaces and their relationship to the structure above and the site itself. Collectively these projects might offer a model for a new space of acclimatization between both indoors and outdoors and public and private - a space that has the potential to act as both a frame and a filter for changes in the surrounding landscape and context.
Permanent inundation of low-lying communities due to climate related changes cause, among other factors, the abandonment of territory, the decay, removal or adaption of existing structures, and the eventual redesign and building of future communities. As nature transforms low-lying territories, current urban models could become obsolete, and there will be a need to implement new urban morphologies tailored to site-specific situations and responsive to the complexity of environmental, human and technological factors.

This research speculates on how the physical nature of low-lying, subtropical coastal communities can adapt to climate related changes, and in particular, sea level rise, storm-surge, and temperature increases. The underlying narrative considers a partial retreat from existing human habitat due to permanent inundation, a transforming local economy, and a slow rebuilding of territories into “climate smart” urban morphologies.

The design of “climate-smart” urban morphologies aims to integrate human and natural systems in a socially and culturally responsive design. The urban environment is conceived as a manifold for the flow of humans and goods, density, and the agglomeration of economies. The growth pattern provides for fluctuations, and the migration and proliferation of the natural environment in relation to long-term climate related changes. Rather than distinct boundaries between urban space and building, the project proposes a strategy of interconnectivity among site, urban design and building by utilizing clustering, gradient massing, fluidity and a sharing of patterns at multiple scales.

The interplay between the architectural and the urban addresses common criteria including, (among others), integration with natural ecosystems and hydro-patterns, land and water conservation, shoreline stabilization, sustainable urban density, public space and pedestrian walkability, rainwater harvesting, energy self-sufficiency, urban ventilation, and multimodal transportation.

The design research method appraises hierarchical relationships among diverse inputs and their feedbacks. Aims and objectives are outlined within sample frames made up of characteristics that are identified from natural, human, and technological criteria. By shifting emphasis among diverse characteristics, a range of project models are studied, their responsive qualities compared, and new projects are proposed as case studies to be further critiqued and tested by environmental scientists, social scientists, economists, transportation engineers, urban planners and policy makers.

With a focus on building and climate, the project constructs potential strategies for the future transformation of urban models and policy. Outcomes from site-specific proposals contribute to the understanding of viable urban alternatives among similar geographic conditions. Topographical, bathymetric maps interactive with morphological models identify transformative situations due to natural forces and become some of the key apparatuses for building strategic design hierarchies and innovative trajectories for the future development of sub-tropical communities. The project also advances an interdisciplinary approach towards the notion of a “managed retreat” of human habitat, a coordinated adaption strategy with the social and environmental sciences, planning and engineering where the built environment becomes more practically oriented to the regeneration of coastal ecosystems and the needs of humans.

Sustainable inhabitation can be defined as prolonged engagement of a physical environment to facilitate human existence without depleting or permanently damaging that environment. Human beings must alter their environments to serve their own needs, but most people never experience the infrastructure, systems and processes that make life possible. As technology and culture become more complex, our simple relationship with the places we inhabit has become equally complex and obscure. Under the pressures of unprecedented energy consumption and climate change, how can we begin to question the way we inhabit a given place – especially rapidly changing deltaic landscapes such as that of the Mississippi River? We must begin to look critically at our relationship with these places and how we use their resources in order to make informed, responsible decisions about how we build and how we live into the uncertain future.

Historically, building existed as a natural response to the way people lived within a specific landscape. In his book The Control of Nature, author John McPhee tells us that the Louisiana landscape “...exists in its present form because the Mississippi River has jumped here and there within an arc about two-hundred miles wide, like a pianist playing with one hand - frequently and radically changing course, surging over the left or the right bank...” The Mississippi River carries one fourth of the watershed of the United States and created the land on which Southeastern Louisiana was built. The region is home to the largest combined port in the world in cargo tonnage between Baton Rouge and New Orleans and is a major producer and processor of domestic oil and seafood. Currently, Louisiana’s deltaic plain is also rapidly changing – losing 30 square miles of crucial wetlands every day due to sea level rise, subsidence and tidal erosion. It exists in a precarious state while the land-building power of the river has been truncated by the levee system that protects the livelihood of human settlement. This region is a critical juncture of natural systems, industry and humanity. How can site-specific events and processes such as natural and man-made geologic systems, agricultural and aquatic practices, plant and animal adaptations and historic settlement patterns inform the tectonics and mechanics of a new means of occupying such a place? The project aims to establish a paradigm for occupying the boundary between land and water, promoting an understanding of our unique relationship to this boundary and facilitating ways to live with it instead of control it. Its intention is to function as a catalyst for community-based sustainability and learning through direct interaction with the landscape and its resources. As such, the project includes mobile dwelling units and a permanent land-based component. Tourism, infrastructure and public venues for leisure, local trade and cultural immersion are key program components. The end-users include tourists, seasonal hunters and fishers, and permanent residents. Other relevant considerations include land-loss prevention, living with water, necessary infrastructure for modern life and how these elements interact with one another and the landscape.

* Poster Presentation
VERNACULAR TRADITIONS

VERNACULAR ARCHITECTURE AND CLIMATE CHANGE
Vandana Baweja, University of Florida

In this paper, I will address how our understanding of vernacular architecture can inform architectural practice adapted for climate change. I will address two key questions: one, how was the relationship between climate responsive design, place-making, and vernacular architecture historically constructed through mid-century modernist discourses? Two, how will our understanding of vernacular architecture and climate responsive design be altered in an age where climate will no longer be a stable and static entity. Vernacular architecture has been constructed as a repository of climate responsive design and the practice of sustainable architecture in the developing world often views vernacular architecture as a pedagogic object of climatic design.


In this paper, I will examine the key manifestoes of Tropical Architecture and Bio-climatic Architecture namely, Manual Of Tropical Housing & Building and Design With Climate: Bioclimatic Approach to Architectural Regionalism. Within these two architectural discourses, studies of vernacular architecture emphasize how vernacular architecture can offer successful models of how architecture is adapted to the climate. These texts rely on the division of the globe into climatic zones such as: tropical rain forest, savannah, tropical temperate, continental, sub-arctic, dry desert, tundra, and semi-arid steppe. I will examine how the relationship between vernacular architecture and climatic regions is constructed in texts on Bio-climatic and Tropical Architecture.

In the second part of this paper, I will look at how current texts on sustainable architecture treat the relationship between vernacular architecture, climatic design, and sustainable architecture. As we construct projections for climate change, which include increased precipitation in dryer areas and diminishing water resources in water rich areas, more extremes and less stable averages of temperature, increased cloud cover, the definition of a climatic zone will have to be revised. I will speculate how we will imagine climate responsive architecture in an age when climate will no longer be a stable and predictable entity and how this will impact our understanding of vernacular architecture as a repository of climatic design and as an act of place-making.

BIOCLIMATIC DESIGN IN CASABLANCA:
DECISION SUPPORT THROUGH BUILDING PERFORMANCE SIMULATION
Shady Galal Attia , Swiss Federal Institute of Technology Goeffrey van Moeseke, Architecture et climat

In this paper, bioclimatic design strategies in vernacular Moroccan architecture have been analyzed for the city of Casablanca. The design strategies were extracted from existing vernacular architecture in the Western Coast of Morocco. All of the vernacular buildings in this region include strategies that are technically, environmentally, socially, and economically valid. However, for the last 50 years, modern buildings were depending on highly subsidized energy prices, which eventually produced obviously an architecture that is energetically and environmentally degrading. Therefore, the aim of this study is to enable architects to re-understand the lessons of tradition, because the way towards bioclimatic architecture should start by understanding vernacular architecture. The paper presents a set of bioclimatic principles addressing (1) urban morphologies, (2) building architecture and (3) vernacular architectural components. They are not intended as a set recipe that must be followed, but have been selected to show the range of bioclimatic and vernacular design strategies that exist to overcome individual problem in buildings. Finally, the study developed a comparative matrix that can support architects with the principles and strategies for bioclimatic design.
EXPLORING THE ENVIRONMENTAL, SOCIAL, AND ECONOMIC IMPACT OF VERNACULAR ARCHITECTURE IN EAST AFRICA

Aimee P.C. Buccellato, University of Notre Dame
Megan Elizabeth Reinccius, University of Notre Dame

The spaces one lives, works, and plays in are essential to one's overall sense of self, community, and well-being. In East Africa, there is little research to date on the role of the built environment in human flourishing, largely because of the idea based in colonialism that great architecture and architectural innovation originates in the developed world. Prominent Nigerian architect David Adjaye along with other up and coming African architects such as Tom Sanya are proving through their research that this fact is simply false. Underdeveloped nations are model contexts for studying the practice of sustainable architecture and urban design due to fundamental financial, environmental, and health challenges related to scarce resources. As Geoffrey Payne, a British architect researching and practicing in India, comments, "developing countries are better placed to face the future than middle income groups...because they...are not dependent on the easy availability of resources and services on which the rich have come to depend" (Payne, 2008).

This paper will present the authors' in situ research of vernacular architecture in equatorial Africa through two case studies conducted in Tanzania: the first in the urban setting of Stone Town, a UNESCO World Heritage site on the island of Zanzibar, and the second in the rural setting of Musa, a village in the foothills of Mt. Kilimanjaro. The methodology of the research includes comparative qualitative analysis of building materials and methods, experiential observation through interviews and firsthand experience, as well as literature-based research sets to provide additional qualitative and quantitative data. Material analyses will compare traditional vernacular methods, specifically wattle and daub and mortared coraline rag stone, to common, non-native modern construction methods, including compressed earth brick and reinforced concrete masonry. Specific material properties, including thermal performance, material embodied energy and embodied water, site impact, and costs associated with long-term maintenance will expand our understanding of these methods and the broader ecological and financial impacts of each. Through a series of interviews and personal experience living in these settings, the authors will also document the way people interact with and perceive the built environment, in both contexts, in order to explore the range of post-occupancy issues: maintenance, socio-cultural factors, health impacts, and comfort.

And finally, if we are to fully address the premise that architecture is a mechanism for communicating ideas and certain lifestyles to the people it supports, namely global eco-consciousness, then we architects, NGO's, and foreign development organizations need to think critically about how we use limited materials and resources. In our increasing globalized world we have the responsibility to learn from a full range of sustainable building solutions, particularly techniques which have sustained and developed over thousands of years by highly resourceful communities in some of the world's most challenging climates.

ARCHIPELAGO CONSTRUCT REDUX

Ingalill Wahlroos-Ritter, Woodbury University

This paper describes a field study studio that immerses students into a particular non-western culture, French Polynesia. The studio methodology, which begins with investigations into indigenous materials and traditional craft techniques, emphasizes the building skin as the focus for design exploration and spatialization of local cultural practices, is intended to alchemically lead to an architecture of site specificity, adaptability, resilience, ecological sustainment and responsiveness to climate change.

Instead of employing a design methodology that begins with an a priori intention of designing for the effects of climate change, we begin by radically restricting the palette of materials our students can use, thereby stealthily making our way into the conversation of envisioning an alternative language for an environmentally responsive architecture. Without making unsubstantiated and grandiose claims, the case studies presented here quietly and often ingeniously propose solutions that respond locally to effects of global climate change: rising sea levels, changing rainfall patterns, ocean acidification, and intensification of tropical cyclones. By deploying indigenous resources, local materials and traditional skills, the case studies redefine cultural identity and generate a hyper-specific, hyper-local architecture.

Studio

By investigating the stuff from which architecture is made and the actions through which people filter these materials, this studio encourages students to translate physical reality of an unfamiliar non-western culture into a unique site specificity. The studio produces a hyper-local architecture using indigenous materials, deployed and transformed through traditional and digital processes. The result is an information and reformation of architecture by the materials of its place.

In a location with a climate as temperate as that in Polynesia, the static concepts of enclosure, threshold, boundary and separation must be discarded in favor of ideas of fluid continuities and dynamic lines of demarcation. The traditional Tahitian concept of transitory habitat is largely derived from this tropical environment, one that causes all materials to rapidly decompose, and suggests a temporary, possibly even dissolving architecture.

We struggle to come to grips with a culture that encompasses an ocean not as an impassable boundary to other cultures, but as an extension of territory, with a radically different and uniquely fluid conception of architectural space. Notions of interior and exterior are further complicated and enriched by ideas of wetness and dryness, stability and fluidity and how architecture engages vastly different surfaces. The studio program is the design of a house in the Society Islands.

Conclusion

Our studio methodology stands in direct opposition to the belief that ecological solutions can be addressed only through global interventions and international conventions. Here, global issues of environmental degradation are addressed not through vast, generic solutions that discount local resources and cultural knowledge, but through research and propositions that are hyper-local and hyper-specific. The end results are architectural proposals that provide a particular place, one that is in direct conflict with the global processes of climate change, with an architectural design identity. This then is the paradigm shift: to engage the supra-global with a quiet, rigorous and restrained methodology and design philosophy of hyper-localism.
TOOLS FOR ADAPTIVE DESIGNS

BUILDING SIMULATION STRATEGIES TO PUSH DESIGN THINKING
David R. Beach, Drury University

There are two interconnected disruptions in the field of architecture: climate change and the economy. Climate change has exposed society’s inability to comprehend the modifications that the consumption and expulsion of carbon have on the ecology of the planet. The economic collapse has exposed the architectural design industry’s inability to adapt their skills to stay relevant in a changing market. Both issues require a deeper study and application of improved skills, technological abilities, and predictive rather than reactive design thinking.

Architecture is directly linked to climate change by the underperformance of buildings. Specifically buildings in the United States consume 36% of total energy, 65% of electricity, 30% of raw materials, 12% of potable water, and produce 30% of our waste (USGBC 2013). “A green agenda did not used to be about fashion, it used to be about survival” (Foster 2007). As a design industry, we have a direct opportunity to make comprehensive change on one third of our nation’s energy consumption problem, and yet we still widely regard building green as a marketable strategy rather than a design imperative for survival. We must improve our skillset to allow for design that evolves through environmental computation to maintain (and build upon) the relevance of architecture and its role in slowing climate change.

The architecture industry is experiencing very high unemployment when compared to other sectors carrying professional degrees, specifically 13.9% unemployment for recent college graduates within the United States. The high rate of unemployment prompted The New York Times article titled “Want a Job? Go to College and Don’t Major in Architecture.” While the architecture industry can certainly blame a weak economy and a slowdown in the construction sector, another reality that designers must observe is the limited scope in the performance of design work relating to buildings. Modifying workflow to include rich data collection and analysis through simulation has to potential to add scope and value to the design process. Specifically, simulation data can provide value to the client by building resiliency in the weather-beaten Louisiana Gulf Coast. Within this pedagogical framework, students had to examine the application of generative parameters selected. Weather systems were reduced to mathematical laws connected to computational components defined by self-organizing forms typical of self-organizing systems, which seek urban adaptability while processing human and climatic feedback, eventually generating morphogenetic urban solutions more consistent with the dynamic qualities of the hosting bionetwork. In order to clarify this methodology, my paper examines the theoretical premises of a design studio that investigated issues of urban resiliency in the weather-beaten Louisiana Gulf Coast. Within this pedagogical framework, students had to examine the application of generative algorithmic solvers such as Galapagos, an evolutionary component built-in Grasshopper™, which generated optimized urban forms relative to the parametric inputs selected. Weather systems were reduced to mathematical variables in order to create patterns of climatic behaviors, which were ultimately interpolated as numerical data. Those parameters - that include storm surge, wind, humidity, and rainfall - were eventually used as inputs connected to computational components defined by self-organizing forms typical of the regional ecosystem.

To amplify the methodological framework formulated by Lawrence Fogel and David Rotten, the final part of my paper evaluates future implications of evolutionary programming as a non-normative way to generate, simulate, and prototype urban scenarios that embody self-adaptation and resiliency. Indeed, evolutionary computation can produce novel techniques that address systemic and ecological issues that are not normally prioritized by traditional design methods. To generate the best probability for urban survival, we ought to discard methodologies based on linear approaches, while considering alternatives that address variance and systemic interface. Computationally strategies seemed to offer an approach more open to complexity, transformations, and new types of scalar exchanges that cause the plan to evolve and variation to arise. It is either interact or die.

INTERACT OR DIE: EVOLUTIONARY COMPUTING AND THE POTENTIAL FOR URBAN RESILIENCE
Pasquale De Paola, Louisiana Tech University

“Given the potential for evolution to optimize solutions to problem, it seems only natural to run to evolution toward the problem of how to best search for those solutions: essentially to use evolution to optimize itself.” – Lawrence Fogel, Intelligence Through Simulated Evolution, (New York: Wiley, 1999), 96.

While evolutionary solvers have come a long way since Lawrence Fogel first proposed them in 1961, their use in architecture and urban design has been limited by stylistic developments that have erroneously identified computational strategies as the ultimate legitimation of aesthetically driven methodologies. Thus, this paper originates from the idea that architectural form ought to emerge from the interaction of non-linear processes that address biogenetic sophistication. Indeed, form does not arise from chaos, but it emerges from a very contingent system based on mathematical laws that justify pattern-making processes. Additionally, I point out that it is only through the use of generative algorithms that we can establish a new operative praxis more adaptable to subtropical issues and climatic instabilities. Considering the evolutionary qualities of this model, how can we design, program, and then transform our built environment so that it becomes completely responsive to the hosting ecosystem and its climatic agents?

My paper proposes the implementation of an alternative process, which discards the indexicality of typical sustainable developments while focusing on the implementation of ecological and algorithmic models of urbanization. This methodology involves an approach based on the generative characteristics typical of self-organizing systems, which seek urban adaptability while processing human and climatic feedback, eventually generating morphogenetic urban solutions more consistent with the dynamic qualities of the hosting bionetwork. In order to clarify this methodology, my paper examines the theoretical premises of a design studio that investigated issues of urban resiliency in the weather-beaten Louisiana Gulf Coast. Within this pedagogical framework, students had to examine the application of generative algorithmic solvers such as Galapagos, an evolutionary component built-in Grasshopper™, which generated optimized urban forms relative to the parametric inputs selected. Weather systems were reduced to mathematical variables in order to create patterns of climatic behaviors, which were ultimately interpolated as numerical data. Those parameters - that include storm surge, wind, humidity, and rainfall - were eventually used as inputs connected to computational components defined by self-organizing forms typical of the regional ecosystem.

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THE UNFLAT PAVILION: A NEW CONTINGENT MATERIALISM
Nick Gelpi, Florida International University

This paper presents a case study pavilion, both as a design process and as a constructed form, which embodies new design methodologies indicating a shift in design tendencies from something ideal towards something more contingent.

The author argues that this emerging tendency is a combination of advanced fabrication technologies as well as an evolving attitude towards our use of materials and how they relate to the environment in the design process, from something ideal and historically based to something contingent and environmentally based. The text compares two contrasting models of practice from recent history which demonstrate differing attitudes toward the utility of design contingency, highlighting projects which institute old techniques of impermeability a.k.a. “The Bulletproofing” of buildings, in comparison to the flexible, resilient, and more modest structures and techniques based on verification in the field.

The paper discusses the project in the context of two different graduate level university seminars, uniting them through material investigations, one related to fabrication and the other related to understanding materials as “soft” matter. The stitching together of these courses through this project, suggests pedagogically how Digital Fabrication functions as a model for research by combining new tools and techniques with a more nuanced understanding of the way materials behave, whereas off the shelf components and systems approach materials from a perspective of standards and averages, not allowing for subtle nuances or adaptations to environment.

The paper highlights several shifts away from an ideal project, as the combination of these various shifts contribute to a discourse based more broadly on contingency. The author delineates 5 objectives of the project including the following shifts in methodology: From Mass to Personal, From Hard to Soft, From Static to Reactive, From Material Neutrality to Material Specificity, and from Flat to Unflat.

The paper documents the process of selecting a specific species of wood from a variety of trees for a combination of factors including being soft enough to be bent, yet rigid enough to act structurally. Collectively these various innovations constitute a shift towards a new design practice which allows for feedback of environment and material. As contemporary practice evolves technologically and climates continue to change, the very nature by which we test and materialize our designs also shift. This project demonstrates how being acutely aware of the behavior of different material species and their properties, is not only more appropriate in this climate, however more advantageous economically and suggestive of new forms. The paper makes the case that this new example of practice does the work of fine tuning form for environment and material, and this work is the focus for understanding this new tendency of contemporary design as a new possibility for responding to a climate which isn’t ideal rather contingent and always changing.

COMBINING OLD AND NEW TOOLS FOR VISUALIZING ENVIRONMENTAL FACTORS: HELIODON AND PLANAR LASER INDUCED FLUORESCENCE
John McDermott, University of Texas at Arlington
Taner Ozdil, University of Texas at Arlington
Mitch Stepanovich, University of Texas at Arlington

Not everything architecture students do in studio coursework is original research some of it is; and what is, is often overlooked and undervalued. The pedagogy of this course is aimed at adding value to original student research by using technology to visually document aspects of simulated sun and wind interactions with student design proposals for buildings and landscapes; and, to share the outcomes of these documented activities. The ownership of research work through limited publication raises student awareness that the ownership implied in authorship also adds additional value to the activity of extracting information from documented work.

A variety of technologies may be used to study environmental phenomenon like sun and wind as critical components to be integrated into designs for buildings and landscapes, this paper focuses on using three. They are: a heliodon, Planar Laser Induced Fluorescence (PLIF) and a cloud-based electronic drop box. These technologies support work in two courses.

Heliodons are among the oldest technological devices for simulating sun penetration and sun shadow patterns. On the other hand, Planar Laser Induced Fluorescence (PLIF), used as a tool to make the invisible patterns that air makes as it moves in, on and about buildings and landscapes visible, is relatively new. The digital drop box, a business software application, is the newest of the three technologies and has been repurposed by our students as an educational tool for communicating.

The drop box was initially envisioned as a one-way course management tool. It has evolved into a student managed forum for inquiry and/or feedback between and among classmates, faculty and the school’s librarian. Regular uploads of images depicting student’s sun and wind simulations to the drop box has become an easy way to subtly encourage critical thinking as a product of peer-to-peer learning. The drop box has facilitated active learning in unexpected ways.

Still photos of building and landscape designs displaying seasonal sun penetration, shadow patterns and air movement simulations are snapshots in time. They inadequately represent the dynamic and complex qualities of the sun and wind. On the other hand, recording sun shadow simulations on the heliodon as short full-motion video vignettes of sunrise-to-sunset interactions between proposed designs for buildings and their surroundings with a web cam or with a digital stereo camera, gives students a convenient opportunity to test their design preconceptions against the simulated reality of the recorded image.

Some fluids can be energized by lasers to glow-in-the-dark or fluoresce. PLIF is an effective means for making the normally invisible patterns resulting from the interaction of air with buildings and landscape elements, visible. Students in this course use PLIF as an analytical tool to help them see the patterns that result when a model or models representing built or natural forms interacts with a fluorescing moving liquid.

Rather than focusing on research methodology, the pedagogy of this course attempts to persuade students to see their documented work as phenomenon in search of an underlying cause.
COPING WITH (CLIMATE) CHANGE

POSTHUMANIZING SUSTAINABILITY
Pasquale De Paola, Louisiana Tech University
William T. Willoughby, Kent State University

Sustainability as an indexical metanarrative—with scorecards, ratings, and credentials—has finally run to an end. In this narrow view, sustainability standards have produced a static framework that ameliorates construction’s negative impact on natural environments by improving efficiencies in the use of materials, energy, water, and transportation. However, these standards overlook the diverse ecological entanglements that exist throughout a building’s territorial strata. Also, these rating systems tend to overlook the in-betweenness of buildings as they act on and are acted upon by other species, urban contexts, and climactic forces. In the commercial sphere of architectural production, we have relied on incentive-driven, human-centered approaches characterized by tables and checklists that do not offer, nor do they address fully, the interactions between emergent systems. Architectural production in an age of climatic change must arrive at approaches that address adaptive systems and biodiversity.

We attempt to reframe the theories that support the inadequacies of today’s sustainability guidelines. This paper explores emerging trends in posthuman theory and Speculative Realism, and considers their potential impact on sustainability as practiced commercially today. We attempt to offer a more fluid framework that avoids the pitfalls of linear systems and human exceptionalism by proposing affectivity, niche-driven diversification, and cohabitation in architecture. We do not address architectures that correlate human agency to the world of things. Instead, we advocate new architectural practices that consider buildings to be just one object in democratic arrangement with other environmental, technical, and biological systems. This democratized conception of nature aligns with what Bruno Latour calls “multinaturalism,” which can lead to plurality and experimentation in approaches to sustainability.

Our purpose is to propose a more responsive approach to sustainability in architecture that avoids oversimplification and reduction to checklists. In order to clarify the qualities of this posthuman approach, we critique current approaches to sustainability practiced throughout the industry, unpack the novel operations and qualities of posthumanist theory, and then argue for a new framework where architecture—like a species of animal—blends symbiotically with its immediate ecological and urban contexts. Architects must transform the regimental constraints of the construction industry’s current treatment of ‘nature’ as a singular concern and redefine it as an adaptive, scalable, and emergent collection of ecosystems that deserves greater novelty and openness in formulating tactics toward sustainability.

SUSTAINABILITY ART: ARCHITECTURE, AESTHETICS, AND ENCOUNTERS WITH CLIMATE CHANGE
William T. Willoughby, Kent State University

“Art is a state of encounter.”—Nicholas Bourriaud, Relational Aesthetics (Dijon, France: Les presses du reel, 2009) 18.

The clarion call for climate change began first with scientists and political activists. Artists and architects came second, but with voices no less loud. It is worthwhile to consider the contributions artists have made to discourse surrounding climate change and how art offers insight to how architects might address a future fraught with shifting weather patterns.

Science seeks conclusive facts through objective means, while capitalism accelerates our consumption of planetary resources. However, art is always alliant to the subject while applying ‘soft power’ upon its public. Environmental art seeks to rekindle humanity’s connection to, or evoke concern for, natural systems. This essay reminds architects of art’s importance in sustainable design and points to the emergence of a ‘sustainability art’ that can catalyze new approaches to sustainable architecture.

In sustainability art, quality of life extends beyond human self-interest to include the rights of ecosystems and biotic communities. Sustainability art explores artistic production through a posthuman framework. Pivotal works by artists such as Agnes Denes’ ecological reclamation art (‘Wheatfield,’ and ‘Tree Mountain’), Mierle Laderman Ukeles’ works with the New York City Department of Sanitation, the collaborative water remediation artworks of Jackie Brookner, and the site-specific and time-bound productions of Andy Goldsworthy all exemplify forms of environmental art responsive to time, season, weather, water, land, social systems, and ecological flows of growth and decay.

Sustainability art disrupts both scientific and capitalistic approaches to environments. Art groups like the globally active ‘Superflex’ from Denmark imply that art can be instrumental to social and ecological change. Superflex’s so-called “tools,” or relational artworks, include ‘Guaraná Power’ (a collaboration with Brazilian Guaraná farmers intended to counteract cooption by multinational beverage corporations), ‘Ecological Burial Contract’ (connected to a UN Climate Change Conference), and ‘Supergas’ (a biogas system developed for an African NGO). Also ‘Ala Plástica,’ an Argentinian art-environmental NGO focusing on the Rio Plata Estuary and Paraná Delta, forges a complex amalgam of activist encounters between art, local politics, and environmental change. Artists and art projects such as these operate similarly to Ivan Illich’s concept of “tools for conviviality” or Nicholas Bourriaud’s identification of “relational aesthetics;” both underscore the intersubjectivities inherent to both art and architecture—producing a socially-charged interstice—a space of human relation that includes our relation to both climate and ecology.

Sustainability art positions political, social, technological, and economic forces in aesthetic confrontation with climatic and biological systems. Humanity’s struggle to cope critically with our role in climate change occupies the central theme of sustainability art. Environmental art and relational aesthetics, as forms of sustainability art, can and have had influence on architectural production. Architectural examples explored in this essay include works by The Living (David Benjamin), C-Lab (Marco Casagrande), and Scape (Kate Orff). This essay underscores the threads that tie architecture to art in a time of climate change by uncovering how art today is casting a new framework for sustainability that can offer lessons for architects.
**MYTHIC OPERATIONS**  
Katherine C. Harvey, Woodbury University

Myth has had an extensive role in the historical reception, alteration and abstraction of places. The explorer, colonizer, and speculator have long utilized myth as part of their repertoire, affecting the future of the spaces they chose to inhabit, with image and story. The transference of myth upon any territory has simultaneously acted to define and deny existing realities and their physical and perceived character, embedding new ways of reading existing and altered terrains. These effects, though indelible are often covert, layered by history, time and the acceptance of their precepts. Additionally the protean nature of myth enables it to adapt to shifting contexts, perceptions and the available forms for dissemination. In this way it continually constructs experience, not beholden to verifiable realities, it creates its own, being malleable for replication and reinterpretation.

Florida has a long relationship with myth as an agent of physical and perceptual manipulation. A trajectory of myth-making in Florida can be identified throughout its history: beginning with early European explorers and their pre-disposition to identify the emblematic paradise of Eden, to a 19th Century elite leisure class, an auto-touring generation, and finally to a contemporary condition of privatized paradise. This trajectory exhibits early projections of pre-established histories and aspirations upon the discovered landscape. These projections evolved and were activated as the landscape was more widely viewed and experienced. What were once situated elements of the landscape in its natural springs, lush forests and abundant wildlife were increasingly extracted, simulated, and fragmented allowing myth to adapt to more fleeting desires and contemporary measures of convenience.

This paper intends to unravel how the operations of myth have both constructed and transformed the Floridian landscape, development, and urbanism. It will investigate a dynamic and ambiguous set of relationships between myth, the landscape, and the history of occupation.

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**THE SUN WILL SHINE BRIGHTER EVERYWHERE: ARCHITECTURAL RESPONSES TO OZONE DEPLETION AND INCREASED UVR LEVELS – IMPLEMENTING TORONTO’S SHADE POLICY**  
George Thomas Kapelos, Ryerson University

The impact of climate change reaches beyond sub-tropic regions and catastrophic events. In the case of one indicator, ultraviolet radiation (UV), the sun is shining more brightly (and dangerously) everywhere, with a potentially devastating consequence. Direct linkages between rising CO2 levels, ozone depletion and increased UV exposure have accelerated the incidence of skin cancer. This is now a world-wide public health concern.

Skin cancer, resulting from environmental UV, can be almost totally prevented, and shade is a key component of prevention. Initially, research on skin cancer prevention though design was centred in Australasia; more recently, however, concern has grown in boreal regions. In Toronto, design professionals are addressing this expanding field of research and practice, which unites disparate voices from health, public policy, landscape, forestry, urban design and architecture to speculate on new ways to inhabit the public realm in light of global climate change and resulting threats posed by UV.

This paper presents one design research project in Toronto – a collaboration of a school of architecture, the city’s public health agency, its parks department and a local coalition of cancer prevention advocates – where architecture and technology are supporting public policy with the aim of mitigating climate change impacts, while promoting public health and creating a healthy and well-designed public realm. The Toronto project applied tools developed in Australia for creating supportive shade environments in eight Toronto playgrounds. Subsequently, in a design studio, students investigated responsive environments and applied interactive design methodologies to propose a sun-safe infrastructure in a one park. Consequently, outcomes were applied to support public policy and communications strategies for creating safe shade in public places in Toronto. The paper will describe the project’s context, including the inter-relationship between climate change, skin cancer and UVR and Toronto’s response.

The paper brings together a number of questions. First, on the specific issue of UV and climate change, is there a way to design effectively for sun safety, and how is this one issue incorporated into a larger design strategy for a changing climate? Second, based on Toronto’s experience, how can architects work with others whose interests are aligned, on the broad question of climate change, and how can we apply our knowledge and skills on an issue-by-issue basis? Further, is this an appropriate strategy, or should more comprehensive approaches be pursued? What are the lessons on collaboration from this Toronto project? How can design influence public health and climate change policy? What is the design studio’s potential for confronting the multitude of issues around climate change? How will architecture or an urbanism of the future look, in the face of the onslaught of climate change? Finally, can the outdoors be safe, well designed and fun too?
TOWARD A NET ZERO

MITIGATE, ADAPT, SUSTAIN: EMERGING WORKFLOWS AND DESIGN PROTOCOLS FOR SUBTROPICAL CARBON NEUTRAL H2 CITIES
Thomas Spiegelhalter, Florida International University

Worldwide, the level of man-made Greenhouse Gas (GHG) emissions reached a record high - approximately 31 billion tons in 2012. Members of the United Nations Intergovernmental Panel on Climate Change (IPCC) claim that this was almost certainly the largest jump in any year since the Industrial Revolution. Coastal regions in hot and humid climate zones are in particular vulnerable to risks imposed by climate change. Sea level rise, storm surge, energy demand increase, land use changes and infrastructure losses, migration, freshwater shortages and water-borne diseases will continue to impact coastal societies. The question is how can we prevent the tendency of climate-induced sea level rise and how can we adapt better to these unstoppable changes? How can we mitigate the impacts and sustain our built environments?

There are some answers for the building sector: the mandatory European Union’s nearly Net-Zero-Energy-Building 2018-2020 regulations for all new public and private owned buildings and the voluntary U.S. American Institute of Architects’ (AIA) 2030 carbon neutral building challenge mark a change toward various educational and practice oriented resource tools that address minimizing Greenhouse Gas emissions. All these initiatives try to reverse the negative impact of temperature increase and climate change. However, the general planning perception in the U.S. that efforts to adapt to climate change might reduce the commitment to limiting GHG’s and result in more challenges in the long term in addition to decision-makers’ preference to short-term and low upfront cost options.

We know the need for change is crucial despite conflicting goals in developing long-term core tasks for governments, society, and business. Another challenge is that the divide between sea water level rise adaptive planning, real estate losses and re-adaptive infrastructure economics, construction and coastal city retrofitting has resulted in increased policy and master planning delays and costs. Another reason is that the lack of participatory information processes and technology, scenarios modeling with prognostic design coding techniques are not well integrated or are missing completely.

This essay explores parallels between computational and performance based developed urban design and nautical engineering practices in the subtropics – here represented by successful projects of leading architecture and engineering firms specialized in sea water level rise adaptable H2 carbon-neutral city design coding and flood mitigation.

The essay interprets how the future of computationally developed H2 carbon neutral architecture will affect and assist policy making, life-cycle design and industrial practice through parametric-topological and/or algorithmic ‘What-if” scenario modeling of new coastal cities and buildings. The examples will demonstrate that a paradigm change to view water as a ‘site opportunity’ will help to identify adaptive re-use strategies and will envision how to accommodate adaptable structures for (sub-) tropical living and working within flooding and tidal inundations.

The findings suggest that these participatory, ‘what if’ scenario tools offer new visions and workflows in the Human-Computer-Interaction (HCI) with Swarm Intelligence (SI) driven sensor infrastructures and manufacturing systems for designing, producing, assembling, and benchmarking, retrofitted or new, adaptable and subtropical carbon neutral cities.

DOES PASSIVEHOUSE HAVE A HOME IN THE DEEP SOUTH?
Corey Saft, University of Louisiana - Lafayette

There are over 50,000 PassiveHouses around the world, but well less than 1% of that number are in the United States and few enough to count on one hand are located in the hot/humid climate zone. If you mention the PassiveHouse strategy to local builders they shake their head ‘no’ and say ‘you don’t want that tight a house in this climate’. But the spray-foam insulation that is increasingly typical in new construction often delivers an equally tight envelope. On many accounts, the Passive House strategy is simply a thoughtful, if not responsible, way of doing what is already standard operating procedure.

Does PassiveHouse have a Home in the Deep South?

STRATEGIC DECISION MAKING FOR ZERO ENERGY BUILDINGS IN JORDAN
Shady Galal Attia, Swiss Federal Institute of Technology

This paper presents the results of combined economic and computational study of different integrated passive and active design strategies for the Jordanian residential building sector. A representative house prototype, located in Amman is selected as a case study for the zero energy design and performance objective. The aim of the study is to investigate the potential of achieving thermal comfort and delivering thermal and electrical demands for existing buildings on site for different Jordanian Cities. Jordan has a semi arid climate with an annual total irradiation above 2000 bankable kWh/m2 per year with approximately 3000 hours of full sunshine. Therefore, different passive and active design strategies are discussed and compared to reach an annual net zero energy demand for the existing building stock. In order to achieve zero energy buildings certain strategies are examined. For example, internal loads reduction, envelope insulation in addition to the installation of solar water heater and photovoltaic. Based on a month-by-month demand analysis, internal loads and envelope performance are analyzed in order to explore the existing economical potential. Simulation software HEED is used to examine the strategies proposed to achieve annual net zero energy performance for a prototype. The final result of this study compares the potential and constraints of each strategy and ranks them based on economical feasibility. For the considered location and weather conditions the prototype can provide thermal comfort for occupants and meets the zero energy objectives. The research also proofs that some strategies are cost effective rewarding with a payback period ranging from 2 to 7 years.
SUSTAINING CULTURE

POST-VERNACULAR “GEOGRAPHY” NETWORK: A TOOL TO BUILD AND REBUILD SUSTAINABLE CITIES IN LATIN AMERICA

Diana Maldonado, Universidad Autónoma de Nuevo León, Mexico

In the last three decades of the twentieth century, Latin America has experienced a rapid increase in urban population, the needs of new inhabitants exceeding the capacity of governments, and the formation of informal settlements becoming common. Academics and practitioners of the disciplines of human spatiality identified this “new geography” as “popular” or “unplanned” development, recognizing that it has some interfaces with the vernacular but does not constitute a “tradition” itself. The result is that such “geography” has been underrepresented in the scholar discourses; even though the global urbanization forecasts estimate that by 2030 Latin America will be 80 percent urban. The intervention proposes for the squatter settlements have been based in a binary opposition strategy, on one hand, the professionals trying to obtain total control of the urban-architectural processes, and the control of everyday life. In contrast to social housing production (participatory process) that proposes the improvement of the settlements by the dwellers. The efforts have been many, but much more are needed. According to a 2012 Report (ONU-Habitat/ ECALC), 111 million people live in Latin American squatter settlements (urban vernacular geography). This paper looks for another alternative to break the binary opposition primacy, proposing a post-vernacular “geography” network, which will allow us combining rural and urban traditions as lessons, and considering the remapping as the key piece to improve the measuring systems to the quantitative and qualitative deficit of settlements. Nowadays, Latin American cities are facing serious problems related with the growing demands of their population, such as food, housing, transportation, drinking water, waste treatment; in addition to the alarming environmental degradation and its consequences. The nature of human settlements and the proposals from professionals need to be rethinking. The post-vernacular network represents a deconstruction and reconstitution of its original referent, a different kind of vernacular engagement, a third option that criticizes and reinvigorates the conventional approaches. Using case studies from Mexico and Argentina, I propose that from the post-vernacular geography network, both scholars and informal actors will find other way to engage with the natural-cultural environment, and perhaps, work together for spatial justice.

TACTICS OF ENGAGEMENT: A DISCURSIVE VIEW OF ARCHITECTURAL TACTICS WITHIN INFORMAL URBANISMS OF LATIN AMERICA & SOUTH ASIA

Sarosh Anklesaria, Syracuse University

In the next twenty years subtropical and tropical countries will account for 95% of urban growth and a large portion of this growth (nearly half) will be driven by non-formal architectures. Already by 2006, a billion people or a third of the world’s urban population lived in squatter.1 With the emergence of neoliberal, late-capitalism, architectural discourse has moved away from addressing the ‘crisis of mass housing’ - a subject that was clearly canonical during postwar modernist reconstruction. In the decades following postwar reconstruction the site of the ‘crisis of mass housing’ progressively shifted territories, to the global south. It became increasingly apparent that the prototypical postwar housing block typology, originally formulated in Europe, was not only prohibitively expensive for the global south but was also hopelessly inadequate in dealing with the sheer scale of the housing deficit. It was under these circumstances that self-help housing emerged as a preferred alternative to mass public housing from South Asia to Latin America. Self-help housing promised to integrate the design and planning expertise of the professional architect with the innate benefits of harnessing community resources and drastically reduced costs of construction. As self-help evolved it encompassed a broad spectrum of typologies with varying degrees of involvement from architects.

This paper traces the trajectories of two ends of a broad spectrum of self-help housing by an analysis of four projects in the subtropics 1) PREVI The Experimental Housing Project in Lima organized through an elaborate international architectural competition 2) Villa El Salvador, a squatter community founded in the 1970s that grew through self help practices. 3) Aranya, Indore in India - a site and services project by the famous Indian Architect B. V. Doshi and 4) The Slum Networking Project in Indore where innovative infrastructure practices were deployed. The study focuses on the shifting degrees of architectural involvement within these projects - in particular the role of the architect in shaping, predicting and at times prescribing not only the design of the housing unit but also aspects of growth and temporal change. The study contrasts the architecturally involved self-help projects with ExNihilo conditions (which grew out of nowhere) to ask questions of architectural agency and posit the future involvement and efficacy of architecture as it relates to informality. Over time these two very different paradigms of self-help housing (of prescriptive architectural master-planning vs. infrastructural intervention) have evolved such that their contemporary conditions are much more similar than their origins would have us imagine. Instead of having diverse futures as one might have anticipated, their urban trajectories have been convergent over time. An analysis of nascent and current scenarios can help glean various insights into this phenomenon and in doing so locate the larger question of shaping architectural agency for the informal city of the future.

SUSTAINING CULTURE (CONT.)

THE PATH TO A BETTER INTEGRATION: IDAHO REFUGEE’S RESETTLEMENT HOUSING PREFERENCE
Xiao Hu, University of Idaho

Every year, more than 50,000 foreign refugees moves to the United States and are assigned by the US federal government to resettle in different states to start their new lives. A few hundreds of them come to Idaho annually. Although the base is small, Idaho tops the list of all states with the largest percentage increase of foreign refugees in the past five years. The number has been nearly quintupled from 263 in 2003 (US Dept. of Health & Human Services, 2007) to 1,183 in 2009 (US Office of Refugee Resettlement, 2010). Since 1983, more than 14,000 refugees have resettled in Idaho, most of whom are living in the urban areas of the Treasure Valley and Twin Falls.

Housing is a central component of the resettlement experience of refugees. A positive housing situation can considerably facilitate many aspects of social integration. Research demonstrates that housing plays a more fundamental role in social life than occupation and education. For refugees, obtaining safe and comfortable housing is a key anchor point for making a new start at a time of enormous physical and psychological upheaval. In addition, refugees’ experience of housing search, housing ownership, spatial use, and community development reflects the process of their social integration, which enriches the cultural and racial heterogeneity of our society.

The refugees’ early housing experience is crucial because the array of housing choices made and the barriers encountered are likely to reverberate through other, non-housing facets of their daily life. However, very little research has been done on housing issues of refugee resettlement in this country. Hence, for those refugees living in Idaho, little is known of their various housing experience, needs and concerns, especially the early experience when they first arrived in Idaho. This poses a critical research problem in architectural and urban studies. Refugees’ resettlement housing brings a new and unique pattern into our research and outreach focuses on urban housing and sustainable community.

This paper examines the refugees’ housing choices and preference based on interviews and survey data. Many of the refugees come from tropical or sub-tropical countries but they are assigned to relocate at the northwest of the US. Some research findings indicate very different usage patterns from different ethnic groups. The result of this study actually reveals the cultural influences on residential architecture and informs the society about the diversity of preferred residential patterns by different cultures, which is actually often ignored by our mainstream housing developers and designers.

KENNEDY HOMES, AFFORDABLE HOUSING—A NEW PARADIGM*
Margi Glavovic Nothard, Glavovic Studio

In April 2012, the Department of Housing and Urban Development, Office of Policy Development and Research, for the first time, included “Using Housing as a Platform to Improve the Quality of Life”, as a research goal out of four primary goals in its Strategic Plan. Cited as priorities, was education, early learning and development, improvement of health, economic security and self-sufficiency, in various low to very low income population groups.

Kennedy Homes, Florida, provides a case study demonstration project on how housing can improve “quality of life”, creating a new paradigm for affordable housing. National and regional examples are reviewed for comparative climate sensitive and architecturally distinctive affordable housing references, with emphasis on the creation of multi-dimensional public, semi-public, private and semi-private, “collective and individual” spaces with an emphasis on architecturally significant project design as a basis for change.

At Kennedy Homes, local and regional confluences of climate, financial and urban constraints provide for a population of individuals and families of between 28% and 60% of area median incomes in Sailboat Bend, an historic district of Fort Lauderdale, Florida. Located on a significant urban corridor linking downtown and I95, the eight and a half acre site is a transit oriented greenway project exploring landscape and site as an historical redevelopment construct. Kennedy Homes is rooted in an architectural tradition of regional subtropical modernism with local construction techniques and a strategy of efficiency and innovation for affordable design. This USGBC LEED Gold for Homes project, currently being completed, includes adaptive use non-residential structures, eight new two to five story Senior and Multi-family residential buildings in a verdant two city block, including 132 unit urban sustainable courtyard environment of one, two and three bedroom units and community facilities.

Concepts and alignments are paired to provide measurable outcomes. Process and product, city and site, global and local, community and individual, modules and standards are explored in relation to the individual and the whole, the historical and contemporary, the city and the unit. Complex relationships between public and private spaces, safety and security, measured and balanced between the celebration of views, intimate spaces, and notions of place are inspired by the Florida Everglades and paired with urban form, climate responsiveness and traditional housing typologies. Concepts and solutions for volume and scale within the mega block and the unit are explored within the framework of conventional and modular construction systems and historic preservation.

Kennedy Homes proposes inclusive design oriented sustainable affordable housing with demonstrable outcomes for “quality of life” and the greater good.

* Poster Presentation
Camino Nueva Vida is a design project in Las Pintitas, Mexico, just outside of Guadalajara. The development is an education center to teach vocational skills, entrepreneurship, management, community building and life skills. The neighborhood of Las Pintitas is high poverty, high density, high crime, and low opportunity. The project goal is a facility that embodies a sense of opportunity through education, community, and a clear direction for a new life. The design goals for Camino Nueva Vida (currently under construction) focus on engaging the client and the community through the impact of services provided within the building, the configuration and functionality of the spaces, and the construction of the development. It was decided early on that the palette of materials would be as exclusive as possible to items available within the community of Las Pintitas, both in terms of products and labor. Pulling inspiration from the traditional vernacular of the Hacienda, the project would also focus on the use of natural passive systems, rooftop planter gardens, and the development of skilled labor to become self-sufficient with a low carbon footprint and the potential to move “off the grid” over time. The process began with simulation in the programming (discovery) phase to drive formative qualities and spatial relationships by building quantifiable data to inform the design potential within the local climate.

The core design idea for Camino Nueva Vida came directly from the client who wanted the design to stay in the vernacular of the Hacienda. Looking specifically at the Hacienda typology, it is important to note several key concepts directly influencing the project’s design: First, the Hacienda was a self-sufficient design, meeting all the core needs within the development. Camino Nueva Vida was designed with the spatial capacity to provide all of the food for the employees, students, and visitors as well as the ability to grow enough food to generate income. The capability of providing all power requirements (the current design takes advantage of passive systems) are currently being developed, as well as water retention, storage, and filtration. This will take the focus off of consumption within the development while emphasizing the quality of providing for the community. Second, the Hacienda combined productive activity with living spaces. All the spaces are designed with an emphasis on action, activity, and multiple uses. This creates an economy of size, will allow for future growth, and will seek to accommodate general activities over specific functions that will not be permanent as the services within the building begin to shape the community. Third, the project diverges from the Hacienda by reversing the physical and organizational pattern of the inner courtyard as an exclusive space for the Haciendado. Preserving the inner courtyard’s location maintains a familiar typology, while opening the courtyard on the major circulation axis evokes a sense of opportunity and equality.

* Poster Presentation
MATERIALS RESEARCH
Donna Kacmar, University of Houston

Materials understanding is becoming more directly linked to architectural practice and to architectural education. Large-scale mock ups, prototypes of portions of assemblies, and design-build academic programs connect design decisions to understanding specific material properties. Tactile and visual qualities of a material are but a small fraction of the information regarding building materials that is available to and useful to designers and students. This paper investigates existing material classification systems, varied reliable sources of information, and some on-going materials investigations and encourages educators and building designers to be more familiar with the implications of their material decisions as we design for an increasingly changing world.

We see our materials database and research projects as a bridge that connects students with area professionals on matters of innovative materials and sustainable materials. We receive little internal funding and therefore must seek grants for particular research projects. We have completed an analysis across twenty sustainable criteria for eight material applications for a new day care building. This work allowed the architect and building owner to select the materials that best aligned with project’s specific sustainability priorities. We are currently completing a carbon analysis for an office building under construction and tracking the carbon emissions used in the construction of the building including: manufacturing and transportation of building materials, waste, on site energy, and transportation of workers. This analysis will allow the developer client to be more strategic with carbon emissions for future projects.

We have also documented and cataloged building materials made within 500 miles of our city in order to serve as a resource to area professionals doing work in the area. We have also recently completed a database of local manufacturers and fabricators; this is a valuable resource to our students as well as area architects and designers.

Additional programs that connect students with area professionals include: monthly materials newsletters, lectures, exhibits, and tours of local manufacturing sites. Part of our mission is to get students excited to know more about building materials and their visual and tactile qualities. We also know that we have a responsibility to increase their technical understanding of materials and the implications of their material choices on this fragile environment.

LAMINATED BAMBOO STRUCTURES FOR A CHANGING WORLD
Hollee Hitchcock Becker, Catholic University of America

Many subtropical locales are subject to cyclone force winds, earthquakes and floods. Many have high population growth rates and informal settlement aggregation that create problems of safety from lack of infrastructure and lack of adherence to building codes.

These same locales are capable of growing bamboo. Bamboo is generally known as a highly sustainable building material due to its rapid growth cycle and high rate of crop yield. By laminating bamboo, it also becomes a material that is stronger than laminated wood.

In developing countries, and indeed in industrialized or post-industrial countries as well, the creation of a local economy that could provide adequate housing solutions in disaster-prone regions would benefit entrepreneurs and disaster victims alike. This paper discusses the design implications of lateral-force resistant and flood adaptive buildings using laminated bamboo structures. Designed as modules stacked up to four levels in height, calculations show laminated bamboo capable of resisting simultaneous 200mph winds and a 9.0 earthquake. The modular construction allows for rapid placement of at-risk or destroyed housing.

A methodology for the lamination of bamboo in areas of low or no infrastructure is developed and evaluated for specific locales. The propagation of bamboo with varied bloom cycles is discussed in relation to soil management and pest control. Finally, a comparison of laminated bamboo to western framing is conducted as a method to compare material use for specific designs.

RETURNING TO THE EARTH - ANALYZING AND DESIGNING EARTHEN STRUCTURES FOR SUSTAINABLE DESIGN
Daniel Butko, University of Oklahoma
Kianoosh Hatami, University of Oklahoma
Lisa Holliday, University of Oklahoma
Matt Reyes, University of Oklahoma
Chris Ramseyer, University of Oklahoma

Most of society is probably aware that certain design decisions and construction practices in recent generations have not always been environmentally friendly and likely contradict the ever-growing public and private obligation to sustainability. Industry professionals, corporate researchers, community programs, and academic curricula have begun to embrace technology as a vehicle to formulate and compose better building practices and healthier materials, but sometimes historical methods of construction can be a catalyst for innovation and advancement. Various lost, misunderstood, or abandoned materials and methods throughout history can serve as viable options in today’s impasse of nature and mankind. Similar to the 19th century resurgence of concrete, there is a developing interest in earth as an architectural material capable of dealing with unexpected fluctuations and rising climate changes in various locales. Much can be learned by revisiting this type of building practice.

When earth construction is discussed, most thoughts immediately gravitate toward kivas or adobe structures. The demographics and economic status of some earthen structure inhabitants have created stereotypes that influence what most people think of earthen architecture. There seems to be a stigma or connotation primarily associated with developing nations or poverty stricken areas and a popular misconception that earth is an inferior or unstable material. Most people do not realize there are methods of processing soils into a stable building material capable of a symbiotic relationship with various climatic and environmental conditions. The thermal mass of earth allows slow transfer of thermal energy unlike other building materials such as wood and metal stud framing and glazing components susceptible to thermal transfer. Earthen construction provides a natural method to balance temperature and humidity issues usually addressed by mechanical heating and cooling systems.

Innovations using Compressed Earth Block (CEB) have been developed and researched over the past few decades and recently the collaborative focus of attention for faculty and students of various departments within The University of Oklahoma College of Architecture and College of Engineering. The team of students, community programs, and university faculty has joined together to prove the structural, thermal, economical, and acoustical value of CEB as a...
viable material for residential design. The result is a multidisciplinary research project to design and build a CEB residence in comparison to a conventionally wood-framed version of the same volume and layout on adjacent sites. This paper explores the collaborative nature of educating both students and society about the necessity for earth as an alternative building material within climatic variations, varied natural disasters, and increasing environmental concerns.

MOCKING THE MUSEUM - FULL SCALE MOCKUPS AS DESIGN LABORATORY FOR NEGOTIATING LOCAL CLIMATE AND CRAFT
Nick Gelpi, Florida International University

As the new building for the Miami Art Museum, now titled the Perez Art Museum of Miami, is nearing the final stages of construction, a separate set of buildings are being demolished on site. These smaller buildings line the western edge of the site and indeed were more costly per square foot than the museum itself. These buildings were in fact also designed by the renowned architecture firm Herzog and DeMeuron but the general public will never see them, rather they will only see evidence of them in the final building.

These buildings are the full-scale mockups where the architects and contractors came together to collaborate on moving forward with construction. Much like the dress rehearsal the day before a theater opening, the mockups aren’t the final version, rather they are an anticipation of the final version, like a workshop intended to resolve idealized design with locality. Not to rethink the project conceptually, rather to anticipate contingency based on how some ideal representation will be translated into reality, a series of fine tunings, in this case based on local craft, environment, climate science, material science and economics.

While the shape of the building may remain the same, these mockups are the site for significant amounts of decision-making and collaborations between architect and contractor, architect and material, and between the building and the environment itself. Ultimately these collaborations belong on site, they map the particularities of design that are difficult to represent, negotiating an idealized representation of this project within a subtropical climate, a task difficult to complete from Switzerland, where the offices for H+dM are located. Quite simply much of the design has to be built to be understood, as the built version takes on a life of its own. One might say these structures are actually alive, behaving differently in the sub tropics than in Basel Switzerland.

Increasingly, buildings are designed for their climates, and perhaps based on these changing conditions; a new type of drawings is demanded of architecture. These mockups are a site of collaborative drawings as craftsmen from various trades draw directly on the mockup in various forms, such as the hammered surface texturing on the Museum mockups.

These mockups become a type of materialization in flux, Contingent Constructions which take on a life of their own as a place for inquiry and verification. The culture of evaluation and range occurs here. Also built just to see what will happen to them. The author makes the case that these mockups are not only a scientific empirical study of material behavior but also a cultural one specific to various regions and climates, ultimately suggesting connections between various cultures and their climates. The paper takes the form of a Journalistic study of the decisions that had to be mocked up, and decided on site as a new type of drawing demanded by changing climate, culture and practice.

BAMBOOKLET: A GUIDE TO BAMBOO*
Marta Anna Nowak, AN.ONYMOUS
Iman Ansari, AN.ONYMOUS

Bamboo is an exceptional material. It can grow in almost any climate, but it is native to the tropical and sub-tropical areas. Although it is a very light material, bamboo is stronger than steel in tension, and more resistant than concrete in compression. Bamboo can be used at any stage of its growth, from early stages as a food, paper, and clothes, to its later stages for furniture, scaffolding, and finally as a building material.

As a plant, bamboo has remarkable ecological properties. It grows naturally without requiring fertilizers or pesticides, and it can capture carbon from the atmosphere and release 35% more oxygen than equivalent stand of trees. Additionally, because of its high nitrogen consumption, bamboo roots help mitigate water pollution by removing toxins from contaminated soil. And because bamboo regenerates within only two to three years - compared to trees that can take up to 10-20 years - it can serve as an alternative material to wood. In addition to its unique material characteristics, bamboo performs exceptionally well and survives under extreme conditions, such as fire, earthquake, cyclone, and even nuclear blasts, but also has the ability to prevent earth erosion, water run off, and mud slides.

But above all, bamboo is a highly sustainable material, not only because of its exceptional ecological properties, but also due to its socio-economic value. Because of its rapid growth, harvesting bamboo can be quite frequent and the return on investment comes much quicker. As a result, bamboo plantation projects are economically more appealing especially for farmers with little capital. In addition to that, because of its lightness and ease of handling, bamboo can serve as a social agent in creating jobs and empowering women in under-served communities.

Today, the complex nature of our problems – climate change, scarcity of our resources, and rapid urbanization - require a transdisciplinary approach. We need to re-think housing models, neighborhood typologies, energy and infrastructure, mobility and transportation, and finally building materials and construction technologies. In fact the building and construction industry is a major contributor to climate change and a key player in sustainable development. According to the International Energy Agency, buildings account for up to 40 percent of the total consumption of energy. But oftentimes a small-scale change, such as exploring materials and construction technologies, can have a larger impact on potentially addressing some of the pressing issues of our time.

But despite all this, we still know relatively very little about bamboo. There are over 1500 species of bamboo worldwide, yet the theoretical knowledge and practical application of bamboo have largely remained localized and have not been disseminated. Our research presents itself as a guidebook, which provides the basic introduction in using bamboo, and combines the contemporary knowledge on plantation, harvesting, treatment, and handling of bamboo, together with its application in construction and design. “BAMBOOKLET” promotes the application of bamboo as an ecological as well as socio-economic agent for sustainable growth and development in low-income communities especially in the tropical and sub-tropical areas worldwide.

* Poster Presentation
There is little disagreement that climate change is linked to population increase and human activity. Central to the process of climate change is a mismatch between carbon emission, primarily caused by combustion of fossil fuels, and loss of plant life that can absorb and store carbon. Because tropical climates contain a high concentration of vegetation that can process carbon, loss of tropical forest is pivotal when considering strategies to stem climate change. Tropical forests are also being deforested at a greater rate that forests in non-tropical climates. This presents a political dilemma as forests in developed economies were largely deforested centuries ago, and are not likely to be replenished in the near future. Tropical forests are disproportionately located in developing countries where they are being razed for agriculture, roads, and buildings.

Suggesting that tropical economies should not convert forest land into productive agricultural land is difficult since development of agricultural land has played a significant role in the growth of most advanced economies. However, when developing economies have limited potential to maintain competitive agricultural sectors, arguments can be made for developing dense urban economies that focus on value-added activities such as trade and manufacturing. Cities offer greater potential for optimization of human capital than non-urban areas, greater mobility, and greater opportunity to reap the benefits of a global economy. There are also ecological reasons for encouraging urbanism. In Green Metropolis, David Owens argues that dense cities are greener that non-urban settlements because they are land-efficient, encourage non-vehicular mobility, and make material accumulation difficult.

A country that would benefit from increased density Barbados which is located at the southeastern edge of the Caribbean Sea. Barbados has a small land area with a functioning sugarcane sector that faces stiff competition from Brazil where large scale harvesting is more profitable. Sugarcane production is complemented with tourism, off-shore financial services, and small-scale manufacturing. Barbados can continue to rely on sugarcane and tourism as the primary drivers of the economy although they offer little potential for growth. In light of these factors should Barbados continue to support low-intensity development? Is encouraging urbanization as an economic and ecological strategy feasible in this former tropical colony?

There are factors in the favor of densification in Barbados. Its largest city Bridgetown, has a port capable of handling large vessels, and historical buildings that extend to its colonial past. Barbados also has a well educated population and low crime rate. This paper explores how Barbados, which has high levels of automobile use, can invest in its capital city, discourage sprawl, and minimize road development. It investigates reasons for increasing public transportation options, encouraging development density, and how historic buildings in Bridgetown can be included in a larger vision. Consideration will also be given to the notion of returning land that was deforested by the British for plantations to its natural state. The paper will provide examples of local building typology, typographical features, and land-use patterns.
TRANS-DISCIPLINARY COLLABORATION TO SOLVE TRANS-DISCIPLINARY PROBLEMS

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The problems facing the sub-tropical region today and into the future are indeed complex. Before we propose solutions, we must first begin to understand the multiple complex conditions that affect our changing world. The Professional sphere, although adapting, is still not prepared to react to these issues across disciplines. The Academic sphere, where we both conduct research and educate the future professions, is even less adept at crossing disciplines. This paper will discuss and critique a new trans-disciplinary sponsored research that seeks to better understand the problems through both research and education.

The (program name) is dedicated to professional project development and project-based student learning to address the complexities of restoration and preservation in the Louisiana Coastal Zone. The program is a collaboration between researchers, faculty, and students from across the University; Coastal Ecology and Engineering, the School of Architecture and Design; School of Geosciences; Department of Sociology, Anthropology, and Child & Family Studies; Department of Civil Engineering; and our NASA Regional Application Center.

For just one year, we have been creating a new training framework that is trans-disciplinary and systems-oriented to link disturbances, land-use transformations, and climate change to natural processes and human system adaptation, with special emphases in the Atchafalaya Basin and Chenier Plain. The (program name) emphasizes how principles of landscape, ecosystem, and human dynamics can be incorporated into elements of systems design: trans-disciplinary techniques for reducing environmental vulnerability, enhancing ecosystem resilience, and promoting cultural sustainability. Our student and faculty fellows design sustainable systems in the natural and built environments with adaptations that reduce vulnerability associated with diverse scenarios of coastal hazards, habitat degradation and global environmental change. These challenges provide a laboratory to develop new designs that reduce risks to both social, economic and natural resources, with a sound basis for making major societal decisions (policy) that are focused on adaptations through sustainable regional and land-use planning.

The disparate disciplines of coastal and social sciences, engineering and architecture, Geographic Information Systems and remote sensing, and regional planning and policy are working to integrate natural and social systems and reduce vulnerability by focusing on properties of ecosystem adaptation.

The (program name) leads faculty and students toward the following objectives:

1. Provide an integrated academic home for the emerging programmatic needs of systems design in the Louisiana coastal zone (e.g. ecosystem restoration, regional planning, and water resource management);

2. Facilitate an integrated multidisciplinary educational model that integrates undergraduate and graduate student activity;

3. Develop student-driven collaborative research projects involving at least three of the following fields of study: coastal science, environmental science, landscape architecture, traditional architecture, civil engineering, systems engineering, environmental engineering, sociology, anthropology, political science, economics, and Geographic Information Systems.

MATERIALS INVESTIGATIONS*

Donna Kacmar, University of Houston

Materials understanding is becoming more directly linked to architectural practice and to architectural education. Large-scale mock ups, prototypes of portions of assemblies, and design-build academic programs connect design decisions to understanding specific material properties. Tactile and visual qualities of a material are but a small fraction of the information regarding building materials that is available to and useful to designers and students.

We see our materials database and research projects as a bridge that connects students with area professionals on matters of innovative materials and sustainable materials. We receive little internal funding and therefore must seek grants for particular research projects. We have completed an analysis across twenty sustainable criteria for eight material applications for a new day care building. This work allowed the architects and building owner to select the materials that best aligned with project’s specific sustainability priorities. We are currently completing a carbon analysis for an office building under construction and tracking the carbon emissions used in the construction of the building including: manufacturing and transportation of building materials, waste, on site energy, and transportation of workers. This analysis will allow the developer client to be more strategic with carbon emissions for future projects.

We have also documented and cataloged building materials made within 500 miles of our city in order to serve as a resource to area professionals doing work in the area. We have also recently completed a database of local manufacturers and fabricators; this is a valuable resource to our students as well as area architects and designers.

Additional programs that connect students with area professionals include: monthly materials newsletters, lectures, exhibits, and tours of local manufacturing sites. Part of our mission is to get students excited to know more about building materials and their visual and tactile qualities. We also know that we have a responsibility to increase their technical understanding of materials and the implications of their material choices on this fragile environment.

* Poster Presentation
RESTRING A GLOBAL IDENTITY: BRANDING SHANGHAI BY “DE-POLITICIZATION” & “WINDOWISM”  
Xiao Hu, University of Idaho

The rapid and dynamic development of globalization and the soaring economic wealth have transformed the image of Shanghai significantly in the past two decades, resulting in the increasing complexity of architectural representations with imported forms and styles.

Historically, Shanghai is not only seen as the entrance to China, but also as China’s window onto the rest of the world. Its geographic position facing outward to the world allowed it to become China’s most cosmopolitan city, which adopted and adapted ideas from overseas well before its staid inland counterparts. For a long time, the architectural styles at Shanghai reflect the city’s openness to outside influences. Architectural forms in this city, like the Bund, actually are symbols that stress the representation of the existence of Western forces and influences. As a result, the city of Shanghai also becomes the window through which the whole China sees the West. The strong tie with the Western existence has shaped the local culture and life style and also become a significant essence of the city’s identity. However, the identity of Shanghai also reminds many Chinese of the colonial period – China’s declining power and the Western growing control. Therefore, there is an inevitable conflict existing in Shanghai’s identity – national humiliation vs. cosmopolitan.

Since the 1990s, Shanghai has regained the role as China’s paragon of modernity, and also as the harbinger of China’s future. Depoliticization becomes the main strategy of reforming the identity of Shanghai. On one hand, Shanghai needs to re-stress its long history of being the most cosmopolitan city in China and having the strong tie with the West. On the other hand, the city wants to showcase China’s economic and political rise as a nascent superpower via Shanghai’s urban transformation. This move leads to the emphasis of symbolic architectural language for the purpose of branding the city.

During the past two decades, Shanghai has completed dozens of landmark buildings with unique forms and big scales. Although those buildings have various architectural approaches and design features, all of them are more like displays of city images than exciting spaces that innovatively improve the quality of urban environment and people’s lives. The whole urban transformation of Shanghai is actually oriented by strong consumerism and “windowism”. Every building is seeking to bigness and highness which can be easily achieved by physical forces. However, it is hard to see any revolutionary design or innovative concept in Shanghai. The prevalence of symbolic buildings in Shanghai, in fact, reveals that the social life of Shanghai is for “look”, not for “live”.

This paper examines the relationship between urban transformation and the political & social forces at Shanghai with a focus on the shape of Shanghai new identity during the recent two decades’ development. This research uses Shanghai as a case study to investigate how the globalization and local contexts influence the shape of urban identity in a non-western process.

MIAMI-SINGAPORE: ESTABLISHING A HIGH-RISE DIALOGUE BETWEEN UNLIKELY TROPICAL SISTERS  
Eric Firley, University of Miami  
Philippe Hennorat, University of Miami

On a global scale, natural disasters, ecological threats and densification needs are not altogether new phenomena. What is new, is the intensification of the issue and its propagation to the affluent western world. Interestingly, this happens at the same time as the economic, social and financial dominance of this western world is challenged, many former dependent states and colonies experiencing a final push for economic, but also intellectual emancipation. Such tendencies can also be perceived in the field of architecture, and today, the US or Europe seem as much influenced by new concepts or adapted re-imports from the Middle or Far East, as is the case vice versa. For “us”, the developed countries, - over decades used to dictate trends from a comfortable position of abundance and stability -, globalization has changed the paradigm of how new concepts arise and flourish, ultimately much more than for the developing world. The aim is an understanding of that functioning and a reappraisal of - in the double-sense - foreign experiences and conceptual potpourris as a design development method. The question should hence be discussed, if these methods - partly caused by political pressures or chronic lack of resources - could help improve our own built environment’s ecological performance and resilience.

The authors, an urban designer and a specialized engineer, decided to narrow the case to the high-rise building, and to implement a comparative study between the port cities Miami and Singapore, both situated in a (semi-)tropical climate and therefore experiencing similar conditions and demands. Even economically and culturally, despite the Asian city-state’s far higher productivity and recent colonial past, both places share common features, may it be the importance of the tourist sector, the population’s extreme diversity, the gateway character, or the cities’ young age and remarkable speed of development. The latter point is of specific scientific interest, providing comparably easy research conditions, in which the major development flows and disruptions, as much as socio-political influences and international architectural exchanges can still be retraced. The choice of the residential tower typology as a fairly recent architectural invention further accentuates this tendency towards parametric isolation, still symbolizing - for the good or for the bad - a break with traditional and vernacular construction knowledge. However, the main reason for the focus on tall buildings is the (alleged) ecological advantage of densification, a claim that is still contested, but aggressively marketed in the case of Singapore.

What stands behind this new generation of « green towers », and how does it compare to the simultaneous development of its Floridian counterpart? Is there a lesson to be learned from the fact that the above-mentioned ecological issues had an earlier impact on Singapore’s planning history? Do governance questions really matter, or are the occurrences of neoliberal urbanism everywhere the same? What are the major typological differences in the use of high-rise, and why is the Miami-case more often confronted to Dubai, Vancouver and Hong Kong, than to its tropical sister?
GODZILLA VS. MECHAGODZILLA: RADICAL URBAN STRUCTURES PAST AND FUTURE
Damon Caldwell, Louisiana Tech University

As global society barrels forward into a future of pervasive climate change and potential upheaval, architecture will confront the notion of more and more sites existing as sub-tropic environments. Coupled with increases in population numbers and densities, radical proposals for urbanism and urban ecology are re-emerging as a serious arena of speculation in architectural discourse and education in the form of new hyper-structures. Their often explicit environmental infrastructure accepts a new notion of city existing in a wetter, warmer future.

Progressive urban solutions to man’s relationship with the larger environment have flourished previously in architectural history. Economic, technological, and political skepticism during the 1960’s and 70’s led to many visionary utopian and dystopian speculations, across a wide range of cultural and engineering feasibility. The works of Archigram, the Metabolists, Yona Friedman, and others serve as exemplars for the variety of communalist ideas of this time. Much of this design work was branded as too heroic for the idiosyncrasies and excesses of late twentieth century existence, but now have potential utility as seeds of future urbanity.

This paper seeks to examine current hyper-structure proposals and trends in a parallel comparative framework with mid-20th century urban mega-proposals. The Evolo competition and works of Vincent Callebaut, Rem Koolhaas, and others serve as exemplars for modern revolutionary urbanism in the face of tropic and sub-tropic expansion.

By examining the explicit and implicit assumptions and strategies embedded in these proposals, a greater understanding of new versus resurfacing ideas emerges. Lines of comparison include: utilization of difficult sites and the impact on resources; integration with vs. separation from nature and site; building in a garden vs. building as garden; formal and qualitative implications of individuality vs. community; industrial vs. biomimetic technology and structure; and centralizing (water, energy, food) resource production and recycling. The resulting investigation establishes critical lenses of evaluation for new notions of urban density, based upon their potential architectural, cultural, and environmental prerequisites, utilities, and implications.
ENCOUNTERING ECOLOGICAL, URBAN SOLUTIONS FOR THE FUTURE

Matthew Teti, North Carolina State University

As architects, we consider urban fabric as the juxtaposition of texture and passage—the solid/void graphic interplay that creates a whole and often unique, architectural identity of the city in plan. In Latin America, the Laws of the Indies of 1573 mandated founders to build a vast network of grid plan cities and towns with central plazas, around which centralized religious, civic, and mercantile architecture defined the core of the urban fabric. While many Latin American cities were founded ex nihilo, Mexico City, formerly Tenochtitlán, a major population center and cultural capital, existed a priori to the Spanish American, urban experience. The following question arises from the investigation: what useful knowledge about urban planning, architecture, and ecosystems did the Laws of the Indies eradicate with its cultural and architectural mandates?

In Tenochtitlán, in The Valley of Mexico with 1,000,000 inhabitants when Cortés arrived in 1521, we find striking results. Not only did the grid-plan-plaza proportions of the Laws of the Indies pale in comparison to existing Aztec architecture and urban planning, but the grid of Mexico City, placement and height of its central, ceremonial and religious buildings, nearly exactly overlay a plan already in place before Spanish arrival. Furthermore, the Aztec passage grid of Tenochtitlán remains today, intact, albeit modified in purpose, in many cases, from ancient canals into current streets—a process spanning from Spanish arrival to the city until the late 19th century. In other words, the city has been dried out.

Originally, Tenochtitlán was an abundant, island-city in a network of interconnected saltwater and freshwater lakes. Aztec planners created these vital waterways as integral to the existence of its cultural, physical, and spiritual, urban identity, rather than draining the water and excluding it from the urban experience. Sectional drawing describes the indigenous understanding of the interconnection between architectural figure, landscape, water, passage, and the cosmos. The canals served as productive gardens or chinampas, as major and minor passage, as general irrigation and potable water sources, as food source ecosystems, all elemental to Mexico-Aztec creation myth. Most importantly, they provided a civilization with a sustainable fuel to exist.

In light of an effort to prepare our coastal, sub-tropical cities we may look to the past, in Tenochtitlán, for precedent of architecture and planning that elevates water as one of the primary, integral components of a productive, sustainable, urban fabric—a fabric intermixing people, water, landscape, and urbanism into a viable ecosystem. A sectional fabric contributes an ecologically sustainable, urban fabric—a fabric intermixing people, water, landscape, and urbanism into a viable ecosystem. Further inclusion of water as one of the primary, integral components of a productive, sustainable, urban fabric—-a fabric intermixing people, water, landscape, and urbanism into a viable ecosystem. A sectional fabric contributes an ecologically sustainable, urban fabric—a fabric intermixing people, water, landscape, and urbanism into a viable ecosystem. Further inclusion of water as one of the primary, integral components of a productive, sustainable, urban fabric—-a fabric intermixing people, water, landscape, and urbanism into a viable ecosystem.

PLENUMS: THE CIVIC QUALITY OF AIR

Kevin Moore, Auburn University

Robert Sproull Jr., Auburn University

“At this moment...of international scientific techniques, I propose: only one house for all countries...In winter it is warm inside, in summer cool, which means that at all times there is clean air inside at exactly 18°.” - Le Corbusier, Precisions on the Present State of Architecture and City Planning

Comfort created the American suburb. A consistent pattern of land allocation based on automotive convenience now extends into repetitive and unvarying interiors. In fact, a steady-state objective for interior air assumes consistent conditions are ideal. When one recounts pleasurable encounters in buildings and landscapes, however, it is obvious the desire for homogeneity is grossly incomplete. Thermal variety, especially when coupled with luminous and acoustical variation, supports more generous and complex architectural experiences.

Based on universalizing (and averaging) concepts of convenience and comfort, contemporary space is a largely a ubiquitous inhabitable zone sandwiched between a field of carpet and a grid of suspended ceiling tiles. Floor and ceiling coordinate space as a consistent effect of air conditioning, fluorescent lighting, acoustic absorption, fire detection and fire suppression. Such space is serviced by a plenum, a zone of uninhabitable air. But if inhabitable air is considered a plenum and understood by its broader definition—a space completely filled with matter—then architectural space can be conceived through the technical and aesthetic qualities of air—heat, sound and air-scattered light.

This paper will present a study of two nearly identical suburban libraries in a small subtropical American city. Located in diverse neighborhoods—one affluent, the other underserved—the renovations proposed by undergraduate students enrich subtle physical differences to engage critical differences in context. Meaningful variety between and within the libraries is studied as qualities of air. Air is often indistinct, but a public library accommodates diverse activities with distinctly different thermal, acoustical and lighting requirements. As design research, students visited several iconic buildings by architect Eero Saarinen (1910-1961). Like Saarinen’s Irwin Union Bank (1954) and Miller House (1957), the existing libraries are a basic 100’x 100’x 9’ plenum of air. Unlike the libraries, however, the Saarinen projects structure a complex and mutable variety. To propose a similar richness, students developed an informed position on interior and exterior materials including furniture, lighting, textiles, trees and even alternatives to an asphalt parking lot. Drawings and models focused on defining environmental effects such as thermal zones, acoustic shadows and reflected lighting.

While each project proposes a new image, the icon-making of Eero Saarinen concedes to renovations that are more similar to the direct physical experience of his work. In this way, contentious differences between the libraries are approached optimistically and obliquely as invisible yet profound effects of air. Each library can become a place of multiple private experiences rather than a singular representational vision. Recent experiments in environmental variety have led to the hyperactive personalization of space through new user-controlled digital technologies. Unfortunately, these experiments have not loosened the preeminence of comfort. Public space assumes a crucial stubbornness, the submission to a pleasurable inconvenience. Subtle variations in thermal, luminous and acoustic qualities of air can elicit curiosity and discovery, creating public places with a renewed civic identity beyond imagery. As a mutable but obdurate medium, air is insistently experiential and delicately collective.
AT HOME IN THE SUBTROPICS: RICHARD NEUTRA AND THE HISPANIC PATIO

Brett Tippey, Kent State University

By the mid-twentieth century the ancient prototype of the atrium had been resurrected and adapted for modern residential architecture, in part thanks to its unique ability to ventilate and illuminate interior spaces. It was also especially practical for mid-century housing in subtropical cities because it provided exposure to the natural elements while simultaneously abiding by the constraints of urban density and the modern middle-class requirement of a high degree of privacy.

To develop a modern interpretation of the atrium house, the leading European architects of the 1920s and 1930s typically studied the residential architecture of Classical Rome and Greece; the works of Le Corbusier and Mies van der Rohe of the 1920s and 1930s clearly represent this course. However, Richard Neutra turned primarily to the architecture of the Hispanic tradition, which he discovered upon arrival in Southern California in 1925, and during his subsequent travels through Latin America. The Hispanic version of the atrium—the fully enclosed patio—is slightly different than the Roman or Greek atrium, primarily because of its abundant vegetation, its nuances of light and shadow and its use of water as both reflective material and cooling agent. By reviving these elements in modern architecture, Neutra’s appropriation of the Hispanic patio resulted in houses that were especially suited to the climate, culture and tradition of the American subtropics.

By focusing on the houses he designed during his first years in Southern California (1925-1939), this paper will uncover the increasing use of the Hispanic patio in Neutra’s work. It will trace this evolution through the following projects: the 1923 Zehlendorf Housing in Berlin, the 1932 VDL Research House, the 1934 Beard House, the mid-1930s Agricultural Workers Housing (never constructed) and the 1939 addition to the VDL Research House. It will also cite later examples, such as Neutra’s 1955 Kronish House and his 1953 Hafley-Moore Twin Houses, to demonstrate the enduring importance of this architectural prototype throughout his professional career. Original Neutra texts, in which he described his own work and his preference for the Hispanic patio, will serve as primary sources. The paper will also consult unpublished documents including manuscripts, office memos and travel sketches that are kept in the Neutra Archive at UCLA.

SKIN TREATMENT: SUBCUTANEOUS AND SUPERFICIAL ENHANCEMENTS TO A LEGACY CURTAIN WALL*

Gabriel Kroiz, Morgan State University
Pavlina Ilieva Morgan State University

This paper coincides with the completion of the actual project for the south and west facades of a 20,000 sf two-story office building in suburban Baltimore originally completed in 1961.

‘Skin Treatment’ will look at a project for the curtain wall of 1961 office building in suburban Baltimore. It is an ordinary building of its period with ordinary problems like poor thermal and solar performance and a general need for TLC. As a child of the 60’s this building exhibits a visual composition of solids and voids rooted in the international style and implemented globally in the postwar years in which the voids in the style’s compositional binary are broadly translated into building systems as a curtain wall. While the iconic flat roof and its attendant leaks might have taken the brunt of the early building systems criticism of the modern movement, EPDM and other membranes have settled this issue leaving a more significant legacy of problems presented by the ubiquitous single pane, non-thermally broken aluminum curtain wall for today’s building owners and designers to wrestle with.

In looking at the legacy curtain wall, one is caught between the ongoing expense of ‘fueling’ the solution to the underperforming curtain wall through the continuous operation of the buildings mechanical systems or of ‘grafting’ a new insulation rich skin which will likely alter the patient/building beyond recognition. Sustainability, not to mention energy codes limits the first option and an appreciation of modernism or at least its historic significance as it passes the 50 year mark is cause for concern with the second option.

‘Skin Treatment’ involves both ‘subcutaneous’ and ‘superficial’ modifications to the building which address both the performance and the image of the legacy curtain wall. The ‘subcutaneous’ enhancements take place beneath the skin and include the application of additional low ‘e’ glazing, sealant and insulation producing significant gains in the systems thermal performance including a tripling of the buildings ‘R’ value equating to a 20% energy savings for the building overall. The ‘superficial’ and arguably more interesting of the performance enhancements take place above the skin and include the application of additional low ‘e’ glazing, sealant and insulation providing significant gains in the systems thermal performance including a tripling of the buildings ‘R’ value equating to a 20% energy savings for the building overall. The ‘superficial’ and arguably more interesting of the performance enhancements take place above the skin in the form of a perforated metal rainscreen. The rainscreen both leaves the legacy curtain wall intact in an act of preservation and shades the surface of the building from direct solar gain. The act of penetrating one façade to support another provides the designer opportunities to reconfigure the building appearance as a form of aesthetic renewal that preserves rather than erases the original skin off the building.

The ’skin treatment’ is presented as a sensitive approach to one of Modern Architecture’s common ailments not only with regards to improved comfort and performance, but also sensitive to what it doesn’t require including the need to dispose of an existing system or purchase a new one.

* Poster Presentation
COASTAL CURRENTS

NON-STRUCTURAL VS. STRUCTURAL: STRATEGIZING LONG-DURATION COASTAL PROTECTION IN SOUTHERN LOUISIANA
Meredith Sattler, Louisiana State University

The state of Louisiana is losing a football field of land every hour (2012, coastal.louisiana.gov) due to subsidence, erosion, and sea-level rise. This land loss occurs at the thick, flat, earth/water interface of the Mississippi Delta where nutrient rich sediments and fresh waters mix with the Gulf to create one of the most productive deltaic estuaries on the planet. Most of the state’s population centers, including New Orleans, Lake Charles, Houma, and Morgan City are also sited within this highly managed hybrid ecological-infrastructure deltaic zone in order to capitalize upon the rich natural resources this working coastline provides. In 2012, the state issued its most comprehensive Coastal Master Plan to date, which was developed utilizing state-of-the-art hydrological and ecological modeling and designed to guide planners and policy makers. This essay examines the planning process that resulted in the Plan’s bias for structural protection, questions the lack of emphasis on nonstructural measures, and proposes a more appropriate framework for designing and implementing nonstructural measures in populated sub-tropical dynamic deltaic geographies across the globe.

The State of Louisiana 2012 Coastal Master Plan determined specific risk reduction and restoration projects the state would appropriate funds to implement over the next fifty years. This Master Plan employed a quantitative modeling process to generate predictive data about the future morphological and ecological conditions of the coast. This data was then optimized in a hybrid quantitative and qualitative planning tool to determine which constellations of projects would produce the most ecologically, culturally, and financially effective outcomes. The plan is a timely example of a rigorous analytical and research driven planning process that grapples with the uncertainties of climate change, sea level rise, and catastrophic storm behaviors increasingly affecting sub-tropical coastal communities, particularly those located within deltaic systems.

Despite its rigor, the plan falls short in its vision and assumptions about the nature of a sustainable developed coast. The delta is an intensely dynamic landscape, driven by dramatic short-term (pulse) and chronic long-term (press) disturbance regimes (2010, Collins et. al.) such as hurricanes, flooding, salt water intrusion, petro-chemical pollution, and subsidence, in addition to some of the highest relative sea level rise rates in the U.S. (2012, NOAA). These disturbance regimes are particularly destructive to functional infrastructure to not only protect but also to enhance communities.

Research into sea level rise and the dynamics of severe weather events has allowed us to assess the exact nature of the risks to homes, businesses, infrastructure, and industries throughout the region. This work has enabled planning and design for a layered network of structural and non-structural alternatives for community and regional protection. Floodplain maps, land use, and related studies have outlined the requirements to be met in protecting the Houston-Galveston region against storm surge and flooding. They have also formed the basis for the development of a regional plan based on a comprehensive set of local coastal protection strategies. A full range of possible levee alignments and gate structures have been proposed to protect the economic heart of Galveston Island, communities along the western shore of Galveston Bay and the Clear Lake area and, of critical importance, the Port of Houston and industries located along the Houston Ship Channel. Non-structural protection strategies include the proposed million-acre Lone Star Coastal National Recreation Area, to be located along the Texas coastline from Matagorda Bay to High Island.

This paper will be focused on one aspect of the above-described proposals—the development of designs for structural protections for the Houston Ship Channel (including design proposals for the world’s largest tidal surge gate) and the adjacent heavily populated west shore of Galveston Bay. It will include discussion of a competing proposal for a single hundred-mile long barrier island levee. It will describe land use planning and the design of multi-functional infrastructure to not only protect but also to enhance communities.

This paper will describe local proposals that respond to the global forces of climate change, sea level rise and continuing development. These design interventions, if adopted, will fundamentally alter the character and future development of an entire subtropical coastal region.
Environmental challenges such as climate variations and sea level change amplify inherent conflicts between rigid conditions of urbanized environments and the constant evolution of social, cultural, and economic systems. Based on this premise, in Designing to Avoid Disaster: The Nature of Fracture-Critical Design, Thomas Fischer calls designers to re-think the way in which we conceptualize and build as he argues that in the last decades, human-designed systems have become so efficient and productive, that they are not able to adapt under unforeseen circumstances - "causing them to collapse back to a state of less efficiency, but greater diversity and resilience."(1) The implications this argument has for architecture are twofold: on one hand, it questions the traditional architectural product: a static built object which performs under stable conditions but is not good at adapting to change. On the other hand, it challenges the standardization of regulations and academic systems based on the premise that the architect's professional objective is to give form to ever-changing, passive and inactive structures. In fact, as it produces in-flux territories, sea-level change has been defined as the “ultimate planning challenge”.

The Chesapeake Bay is one of the three most vulnerable regions to sea-level change in the country. Its sea-level rise rate doubles the global average and it looses more than 580 acres of land per year due to erosion and other processes. Cities and towns along the Bay are primary examples of sites in constant change. With this in mind, a joint Architecture and Landscape Architecture studio was organized and carried out in 2012 and 2013. The Maryland Department of Natural Resources' A Sea Level Rise Response Strategy for the State of Maryland (2) provided a focus for the course, which looked at the role of the profession under such conditions. The approach included processes of outreach and community engagement and the understanding of technology, data, and previous research that resulted in a series of design projects, initiatives and policy suggestions for the communities of Cambridge, Vienna and North Beach, MD.

This paper illustrates the importance and challenges of interdisciplinary studios that explore bottom-up approaches to urban projects related to territories of change. It describes the structure of the research venture and evaluates the outcomes as it seeks a redefinition of architectural and urban design and their current academic models.

WHAT THE BIRDS OF THE CITY TELL US ABOUT SUSTAINABLE DESIGN
Gray Read, Florida International University

On Lincoln Road in Miami Beach Raymond Jungles’ everglades garden has gained a resident heron, a green heron that plies the edges of the ponds stalking gambusia, small fish, which dine on mosquito larvae. This native garden ecosystem in the most celebrated part of Miami Beach has a highly engineered life support system for ponds and cypress trees, which have become part of urban life. The heron is one of the most catered-to birds on Lincoln Road, among many other species that have found a place there. A flock of Carolina parakeets nest in a cabbage palm and eat palm nuts, figs and other fruits. Boat tailed grackles, starlings, and sparrows forage for seeds, bugs, lizards, and the sugar packets at restaurant tables. Occasional flocks of ibis and sometimes a seagull land on their way to their nightly island refuge, yet they find little to eat. And a few pigeons strut the road, cruising for bread scraps.

These birds and other more specialized species could mark our way toward sustainability. Many ecological studies show that the number and diversity of wild birds in urban areas serves as an index of the quantity and type of vegetation as well as the health and continuity of ecosystems. This correlation is particularly important in South Florida where mitigating the heat island effect and providing shade at the street level is vital to creating a walkable, sustainable city. In addition, South Florida has one of the richest and most diverse bird populations in the country and provides crucial habitat for migrating birds as they make annual journeys north and south. Integrating bird habitat into all aspects of architecture and urbanism becomes increasingly crucial as South Florida is increasingly challenged by climate change and sea level rise. Extending architectural design to include habitat vegetation could be a positive result of our response to climate change, improving the quality of life even as cities become carbon neutral.

In this project, an architect and ornithologist worked together to survey the species of birds that now inhabit the Lincoln Road area in Miami Beach and the types of existing habitat. We then speculated on strategic planting and design modifications that could open the area to a greater diversity of species. For example, Lincoln Road has several mature shade trees that attract passing warblers, grackles and other species. However, if small trees and shrubs that produce berries were added to the design, then the area would offer a more complete habitat to a range of mixed-edge birds including cardinals, orioles, and catbirds, which are now missing. To integrate this vegetation into the design of buildings as well as landscape is one of the design challenges of sustainability, particularly in South Florida.

SOIL AND SURFACE – A PLACE OF INHABITATION THROUGH A PROCESS OF RECLAMATION
Bradford Watson, Montana State University
Sean Burkholder, Kent State University

“If it resembles something, it would no longer be the whole.” Paul Valery

How do we define a place by the processes that shape it? More specifically, what role does “terrain”--both natural and fabricated--play in not only the definition of space, but the engagement of these formative processes? Complicating the matter, what qualities are needed for that place to be inhabitable when it is bounded by toxicity? How do existing and new processes create an environment of desire within an existing tragedy, while being projective about future environmental change? These questions set up the premise for a studio-based investigation of Butte, Montana, instructed by faculty of Architecture and Landscape Architecture.

Once among the largest and fastest growing cities west of the Mississippi, this community has declined since the 1920s in population and since the 1950s in prosperity. The value of this place was established in geological time. The existing land was stubborn to relinquishing its resources requiring the insertion of hard rock mining strategies that followed a logic of geology, not legal descriptions, that altered the trajectory of the region and environment. Through the process of extracting materials, the evolution of place has been significantly altered requiring a co-evolution of inhabitation. Those who remain on “the richest hill on earth” and those that are downstream along the Clark Fork River will forever be influenced by America’s largest super fund site.

Through a series of student projects, this paper documents the strategies employed within the landscape to create place responding to the context of Butte based on natural and manipulated environmental processes. The paper discusses the importance of understanding environmental conditions on a specific site within the context of a larger system and how subtle manipulations can alter an existing process and have profound implications both locally and regionally. While the projects vary in scale, each calls into question the normative legal borders that ecological systems ignore, yet are managed by. Each project is formulated through research into existing methods of reclaiming the land locally and case study analysis of precedent work examining specific conditions are part of a larger system. The goal of these investigations is to better understand the implications of small moves within a larger condition and to examine the opportunities created by not restoring a place to a previous condition, but by reclaiming it to perform in a new and informed way.
DELTA RANCH -- A MODEL FOR RESILIENT HOUSING ON A DELTAIC COAST

Carrie Knott, Louisiana State University
Jori A. Erdman, Louisiana State University
James Sullivan, Louisiana State University
Steven Hall, Louisiana State University

Ranch -- ety.: “country house,” from American Spanish rancho “small farm, group of farm huts,” from Spanish rancho, originally, “group of people who eat together,” from ranchear “to lodge or station,” from Old French ranger “install in position,” from rang “row, line.”

Coastal communities around the world are experiencing an accelerated rate of environmental change that will continue far into the foreseeable future. The effects of this change mean that previously occupiable landscapes will become less hospitable to human inhabitation and that the plant and animal life will change dramatically. One response to these changing conditions would be to retreat. Another response would be to create a more resilient model for human inhabitation. We chose the second response and used the idea of a ranch as an for the coastal condition we explored.

Our paper will present the research and results of a design project for a deltaic coastal condition. Our project integrates the disciplines and expertise within architecture, coastal bioengineering, and coastal plant science to develop solutions for structures that can sustain themselves and the coast. Specifically, we have designed a habitable structure that utilizes (1) architectural passive sustainable strategies to remediate climatic conditions for habitation, (2) bioengineered oyster reefs for harvest, coastal protection and land building (3) and coastal plants for coastal protection, land building and to develop a productive ecosystem for the structure.

To begin the project research, each discipline asks relevant questions. For architecture, these include 1) how do the ecological systems of coastal XX provide a model for resilient architecture design; 2) how may a habitable structure leverage the dynamic ecological environment to become sustainable over time? For bioengineering, these include 1) what are the growth rates for oysters in a given area; 2) how can a bioengineered oyster reef affect the strength or stability of associated structural elements? For plant science, these include 1) what are the growth rates of specific coastal plants in a given area; 2) how do plants provide land building and retention capacity; and 3) how do they affect strength/stability of habitable structures.

The final project reaches back 50 years in time to find applicable study data for the plants and animals, as well as 50 years into the future to predict the how the structure and integrated plant and animal life work together towards resilience and longevity. The design integrates adaptive thinking and design strategies to develop a quasi-permanent core and frame, as well as provisional adaptive technologies that can respond to the various weather events and change over time. The plant and animal life are critical components of the overall design as they provided structural integrity, microclimate thermal conditioning, and nutrition. In turn, the human inhabitants must steward and care for the plant and animal life in order to assure their continued existence. A ranch is generally understood to be a large area of land that is used for agricultural purposes including animal and plant cultivation. As a landscape, ranches are not as controlled as a farm and imply a form of stewardship. The Delta Ranch brings the underlying concept of a ranch to coastal XXX. The Delta Ranch will cultivate dynamic animal and plant habitats through human occupation and structures in a reciprocally beneficial environment.

EDGE CONDITIONS AND THE CENTRALITY OF ARCHITECTURE: EMERGING TECHNOLOGIES, MULTI-DISCIPLINARITY AND DESIGN RESPONSES TO CHALLENGES FACING THE TEXAS – LOUISIANA GULF COAST

Jeff Carney, Louisiana State University
Thomas Colbert, University of Houston

The rapid growth of global population and continuing urbanization are pressing commerce, industry, people, and fragile ecosystems together in unprecedented ways. Adding to the squeeze, rising sea levels, increasing instability of weather, and technological change are forcing fundamental alterations in traditional lifestyles, historic settlement patterns, and design practices. Efforts to cope with these challenges are transforming the role of architecture and its relationship to disciplines that have until recently seemed quite remote from the field. Nowhere is this more clearly evident than along the world’s coastal edges. In these locations the confluence of large tracts of inexpensive wetlands and natural resource industry job growth are attracting millions of people to dangerously low lying areas even as many coastal landscapes are subsiding and sea levels are rising. Shocks to the networked flows of population, technology, and water in the world’s coastal regions have led to disastrous consequences - consequences that are likely to continue to become more serious and more widespread in coming years.

In the course of the dramatic reorganization of the means and methods of analysis, design, and construction that are now shaping the built environment, especially in coastal regions, the architectural profession has much to gain or lose. The profession faces a growing identity crisis as both urban centers and rural communities are increasingly threatened, undermining the very foundations of contemporary practice. However, this threat is matched by an encouraging re-centering of design thinking in the realms of architecture, engineering, biological sciences, and planning. What seems to be emerging is a truly multi-disciplinary model of design practice with architects playing a central role.

The tremendous challenge faced by the sub tropical Texas – Louisiana Gulf Coast is leading to innovative inter-university programs connected through intra-university networks. This paper will present two distinct trans-disciplinary engineering, scientific research, planning, and design groups that are making an impact in two different parts of the Gulf Coast. Networked linkages are now emerging between these groups allowing them to speak broadly across an expansive region without sacrificing the specificity of environmental, economic, social, and spatial change unique to each. From their unique university locations these groups explore the potential of emerging design and analytical technologies to address conflicts. The paper will present design projects that exemplify the potential of this new model of research practice and the innovative new tools that serve it while exploring the potential for this new design model to build capacity within, and link between major research universities.
LEARNING FROM ENVIRONMENTAL ENERGIES AND BUILDING FORM IN THE GULF REGION*

Joe Colistra, University of Kansas
Nilou Vakil, University of Kansas

This project presents a recent architectural design studio experience in which students in the Middle East were asked to design a Scientific Research Facility in the desert oasis city of Al Ain in the United Arab Emirates.

Coupled with a seminar entitled, Environmental Energies and Building Form, the studio investigated vernacular habitation patterns and craft of ancient desert dwellers in order to develop techniques for inhabiting this harsh environment.

In contrast to the incredibly incongruous development patterns of contemporary Emirati urban environments such as Dubai and Abu Dhabi, students recognize and appreciate the lost cultural and building traditions that were lost due to a shift from maritime industries to oil production. These building techniques have been examined and reinterpreted to align with modern construction and ways of living.

To frame this investigation, hybrid conceptual models were created. Rooted in the process of making, the models are hybrid in nature because they are roughly the size and scale of the assigned building program but unlike an architectural model, they are not meant to represent larger architectonic assemblies.

Students are asked to imagine a construction partially authored by the site; and in so doing, create a proposal that is extremely site specific and therefore inherently sustainable. The “graining” of the landscape or the fabric of the natural context is revealed as an ordering system that is not constrained by the limitations of imagining their projects, first and foremost, as buildings.

The process allows students not only to challenge counterintuitive notions of sustainability but also forces them to make things with their hands and bodies. Students engage in craft at a large scale; one that allows them to understand the muscular memory of making something that moves beyond an intellectual exercise alone.

The vernacular techniques examined have allowed people to exist in the region for tens of thousands of years and include courtyard house typologies, Arish (palm) construction, Bedouin weaving, Mashrabiya screens, Dhow boat-making, sand baffles, sewing of lateen sails, wind towers, qanat tunnels, and falaj channels, to name a few.

Through a variety of modeling approaches such as soldering, welding, casting concrete, working with carpentry tools, or CNC routers, the students create an objet d’art that stands autonomously to reveal and reconcile site forces such as sun direction, prevailing winds, watershed and erosion, ecological patterns, and zoning/contextual constraints. The piece establishes sensibilities in solving site strategy, programmatic configuration, building systems, form, and materiality.

Beginning with orthographic projection, architectural drawings are produced that encode programmatic relationships and an architecture emerges from these sensibilities that aspires to be both environmentally sensitive while maintaining cultural authenticity.

* Poster Presentation
COASTAL HYBRIDS: COUPLING ECOLOGICAL PRODUCTIVITY WITH ANTHROPOCENTRIC WASTE STREAMS TO REGENERATE AND ENHANCE COASTLINES
Keith Van de Riet, Florida Atlantic University

The world’s coastlines are experiencing unprecedented levels of stress from global economic growth in the form of urban development, land reclamation, aquaculture and the concurrent pollution these alterations bring. Simultaneous to this, by constructing human habitat in coastal zones, hundreds of thousands within these communities fall victim to environmental catastrophes each year (tropical storms, tsunamis or environmental degradation). The economic damage from these events extends into the billions of dollars annually, leading some to question the viability of continuing to build-out coastlines with conventional structures in these hazard prone areas. Furthermore, the existing urban landscapes within these vulnerable coastal zones will be forced to adapt to these threats with a number of solutions, some of which may incur significant social, economic and political adjustments.

This research project proposes design interventions at a number of scales that integrate living systems within engineered structures to create reinforced living shorelines. These integrated natural systems are further enhanced through a strategic alignment of anthropocentric waste streams to amplify the growth and diversification of a hybrid (urban-natural) ecosystem. The research takes a site located on the west coast of Florida as point of departure, and develops a framework that parameterizes the relationship between human impact on the environment and a remediative strategy utilizing living systems. The project uses local data on nutrient loading in Lemon Bay to determine an appropriate foundation for ecological activity through an articulated shoreline. These integrated natural systems are further enhanced through a strategic alignment of anthropocentric waste streams to amplify the growth and diversification of a hybrid (urban-natural) ecosystem. The research takes a site located on the west coast of Florida as point of departure, and develops a framework that parameterizes the relationship between human impact on the environment and a remediative strategy utilizing living systems. The project uses local data on nutrient loading in Lemon Bay to determine an appropriate foundation for ecological activity through an articulated shoreline.

By capitalizing on both the natural system’s inherent capacity for regenerative growth and human desires for waterfront property, an integrated solution may present opportunity to increase ecological activity through an articulated shoreline. Through this lens, the design challenge amounts to a relative balancing act between nonlinear ecosystem functions and simultaneous “performance” of economic development and human opportunity. These emerging solutions require a number of well-integrated researchers and experts to project multiple plausible outcomes for local and widespread interconnected social and environmental systems. In this regard, the conventional “all or nothing” preservation approach is in a sense antiquated, and the pending environmental collapse requires a new multidisciplinary research paradigm capable of modeling complex hybrid biomes (human-environmental). These “biomechanical” landscapes might not be easily assessed within conventional economic models but instead require advances in collaborative research to redefine “value” as a multi-faceted metric of human wellbeing and environmental health. Ultimately, our civil coastal landscapes must integrate adaptable and resilient infrastructure that capitalizes on the inherent regenerative capacities of ecological systems as a benefit to humankind while simultaneously addressing the need to increase diversity and improve environmental integrity.

TRASH TECTONICS: EXPERIMENTATIONS IN THE TRANSFORMATION OF WASTE
Seth McDowell, University of Virginia

The objective of this essay is to trace the evolution of the trash tectonic from the ready-made fascinations of modernism to the current practice of upcycling. This lineage of waste transformation is the foundation for an undergraduate architecture research studio at the University of Virginia’s School of Architecture, entitled Trash Tectonics. Trash Tectonics focuses on the transformation of waste, excess and the ordinary into new spatial and material realities. In this studio, students work predominately at full scale to investigate material prototypes and assemblies developed from collected waste products. Material transformation is employed as a life extension technique for detritus. The work presented here are results from the Spring 2013 studio. The essay will evaluate the experiments of this studio and speculate a future trajectory for the methods of upcycling in architecture.

Upcycling is the procedure of converting waste materials or useless products into new materials or products of better quality or for better environmental value. It is a concept introduced by William McDonough and Michael Braungart in Cradle to Cradle where the goal “is to prevent wasting potentially useful materials by making use of existing ones.” This is a process of re-appropriation that is dependent upon jettisoning functional associations in an attempt to find new possibilities that improve upon past stigmas. To upcycle an object you must remove it from its contextual base and repurpose it as an improved condition.

This exercise of upcycling is directly associated with the “ready-made” object, a preoccupation for many artists of the early twentieth century. The conception of the ready-made by Marcel Duchamp, positioned the found object as a raw material for intellectual contemplation. Kurt Schwitters, Duchamp’s cohort in Dadaism, incorporated the discarded object as a component of aesthetic construction. Using collage, Schwitters moved beyond object contemplation and exploited detritus as a facilitator for composition.

The act of re-appropriation initiated by modernism and the likes of Duchamp and Schwitters created a visual acceptance, and perhaps even an aesthetic desire, for the materiality of trash. Collage became the mode of operation because it was a technique of stitching, pasting, and slapping together materials ripped from their everyday functionalities. Second-hand, found material became romanticized for the rustication, disfigurement, and embodied cultural narrative.

Today, the artist or designer working with the re-appropriated object tends to focus more on a narrative of material transformation. Much of this work builds on Schwitters’ assemblages and the approach of amassing waste to become parts of a whole. However, today the techniques tend to be more systematic, and material assemblages are limited to single object types rather than a collage of diverse materials. This often yields field conditions that are constructed from the propagation of a single material unit or object. The effect is a transformation induced by object grouping.
DIKT, GARBAGE, WATER, AND STEEL: ARCHITECTURAL ENTREPRENEURSHIP IN SOUTH AFRICA
Nathan L. Richardson, Oklahoma State University

The profession of architecture (and its academic counterpart) has an exquisitely designed building for most problems—including those insufferably prefigured by climatologists. Few would consider such a fault—for the production of the built environment appears to occupy a center of gravity within our human ecosystem that gives it a coincidental relationship to nearly everything. It is pertinent to most challenges like few other forms of production. This alone affords architects (along with architectural educators) heightened relevance within the cohort of agencies addressing climate change. As such, architects are dutifully educating themselves on the matters of ecology, sustainability, and climate change. However, the professional paradigm remains awkwardly burdened by its necessity to offer an architectural solution, no matter the problem. Architecture is no small part of climate change. But architects interested in addressing the broader complexity of environmental, social, and economic sustainability may find greater effectiveness by assimilating the entrepreneurial paradigm.

“Entrepreneurship is a process by which individuals...pursue opportunities without regard to the resources they currently control.”1 This alone explains architecture’s sub-entrepreneurial approach to sustainability. Architects “control” the resources employed in building, and as such, leverage building resources when addressing sustainability. Another commonly cited definition of entrepreneurship frames it as the process of creating value by bringing together a unique combination of resources to exploit an opportunity.2 Architects are plenty adept at uniquely combining resources in creating value through opportunity—so long as the resources are bricks and mortar, the value architectural, and the opportunity a well-funded client. Certainly the opportunities offered by conventional design, practice, and pedagogy are relevant, if not critically important. But their associated limitations are no less so.

This paper, and the coursework that informs it, imposes the entrepreneurial mindset on an otherwise conventional architectural paradigm. Entrepreneurship and Architecture is structured as an interdisciplinary course in which students collaborate on projects of a post-architectural nature in a distinctly challenging context. Most recently, students of architecture, agriculture, construction management, journalism, and entrepreneurship proposed design interventions in the dynamic social, political, and environmental climate of subtropical South Africa. The student investigations of soil conditions, waste streams, water quality, climate change, and other contextual forces at work in the black townships of Mthatha allude to a productive re-orientation of practice that befits the problematic future foreshadowed by recent trends. Rather than preparing students to find a problem for their architectural solution, future practitioners are confronted with a dynamic and complex environmental context to which they must respond with a fitting intervention of some form—architectural or otherwise. Dirt, garbage, or steel—their proposals for soil management, waste stream harvesting and industrial up-cycling allude to a promising future for an engaged and entrepreneurial profession.


MINING LANDSCAPES OF WASTE: FINDING IMAGINATIVE POTENTIAL IN DISCARDED OR SALVAGED MATERIALS*
Daniel Butko, University of Oklahoma
Stephanie Pilat, University of Oklahoma

Our planet requires designs and construction methods that are energy efficient, environmentally stable, and socially responsible. Collaborative design teams of architects, engineers, consultants, and clients recognize typical construction activities consume enormous amounts of resources and produce vast quantities of waste. As the EPA reports, “building construction, renovation, use, and demolition together constitute about two-thirds of all non-industrial solid waste generation in the U.S.” This presents opportunities to think and design outside the typical recycled and/or newly manufactured environmentally friendly material palettes often considered the go-to wheelhouse for sustainability.

What if scrap materials, re-appropriation of salvaged materials, and typical soil spoils from excavation become inspiration? The volume of waste and how waste can be appropriated represents both stewardship of material economy and the resultant eclectic composition of found and/or reconditioned objects providing a unique combination of aesthetics and functionality. Research, experimentation, and physical design projects can demonstrate novel ways of using salvaged materials or bi-products. Declining and decaying landscapes can be reimagined through the functionalism and aesthetic nature of salvage-based design. Pedagogical approaches can introduce students and frame an understanding of the inspirational potential for salvaged materials, reducing waste, and addressing compound climate changes.

Designers in the twenty-first century are becoming increasingly aware of the long-term costs of consumption and waste in the building industry. They are not alone. There is an emerging consciousness of the global societal costs of our dirty little habit of mindlessly throwing things away. Faculty and students at The University of Oklahoma have exercised theory into practice by designing and constructing various projects from mining landscapes of waste into inhabitable spaces. Reclaimed wood, salvaged acrylic, and earthen construction practices were catalysts allowing multidisciplinary collaborative teams opportunities to explore design concepts and materiality at full-scale, benefiting both students and the local community. The approach of sustainability as infectious to all phases of design and construction has led to three collaborative projects: [1] 2012 CASA Playhouse, [2] current construction of a Compressed Earth Block residence with Habitat for Humanity, [3] and the development of an interactive database for regional salvaged materials. This paper explores recent advancements in design and construction pedagogy of the aforementioned projects, demonstrating imaginative potential for reusing existing materials.

* Poster Presentation
ENGAGING A CRITICAL METRIC: NEW STRATEGIES IN ENERGY LITERACY

Thomas Bradley Deal, Louisiana Tech University

“If you want to teach people a new way of thinking, don’t bother trying to teach them. Instead, give them a tool, the use of which will lead to new ways of thinking.”
- Buckminster Fuller

Sustainable design has for many years been high on the list of critical issues that schools of architecture across the globe have sought to emphasize and integrate into their curricula. Once treated as a specialized topic within the field, it is now ubiquitous. Unfortunately many undergraduate students equate sustainable design with checklist or another because those are the tools they encounter first when reading about projects lauded for their environmental achievements. Checklists offer an array of strategies, but often the logic behind them is buried deeper than students are willing to look. For most designers espousing sustainability, global warming and its threats to future generations are a universally shared motivation. The concerns of climate change however are typically not expressed in the vague moral sensibility of students with a fleeting interest, they are assumed as common knowledge among like-minded individuals, considered beyond the scope of a given situation, or similarly marginalized for various reasons. These conditions highlight a need among students for an earlier introduction to both the larger issues that give weight to sustainable design practices as well as more versatile and informative metrics to inform design decisions.

Responding to this observation, an elective seminar course offered to third year architecture students in the winter of 2012/2013 at Louisiana Tech University introduced building energy modeling as both a gateway to understanding the larger issues of climate change and simultaneously as a tangible resource for evaluating the energy implications of design decisions. Reflecting on the pedagogy, methods and student work of this seminar, it is the intent of this paper to identify the challenges and opportunities presented by the early introduction of these specialized topics often reserved for graduate level courses.

LEED GREEN AND MEAN

Randy Atlas, Florida Atlantic University

While the focus of many architecture courses and practice is on the sustainability of architecture and the built environment, emerging trends in the practice of LEED is resulting in litigation against the architect because the architect did not properly understand the security concerns of their client. This presentation explores the conflicting and competing goals of sustainability and security, and resolves those conflicts with CPTED (crime prevention through environmental design). LEED and Green building design has very specific design needs and requirements, and security is part of them. Issues presented in the presentation will address interior and exterior lighting issues that need to be conserving energy and reduce sky glow yet be sufficient for safety and security requirements for parking lot and pedestrian travel needs. Green roof will be addressed, as well as building siting and placement ad how that affects security vulnerabilities. A top ten list will be presented on the newest LEED requirements and what are the security implications and methods to resolve user and building use conflicts between sustainability and security.

ON TIGHTNESS AND LOoseness

Bradley Walters, University of Florida

Unique amongst sustainable building programs, the Passive House Building Energy standard is both a building energy performance standard and a set of design and construction principles used to achieve that standard. Buildings that meet this standard use 80 percent less energy than conventional equivalent buildings and often provide superior air quality and comfort. Passive House involves design and construction of a super-insulated and air-tight building envelope, reducing the need for mechanical systems to maintain occupant comfort. It is the fastest growing energy performance standard in the world with 30,000 buildings realized to date, most of which were completed since 2000.

Intended not only for residential buildings but also for institutional, commercial, and industrial structures, the Passive House or “Passivhaus” standard focuses on: 1) strategic design and planning, 2) specific climate, siting and sizing, 3) super-insulated envelope, 4) thermal bridge-free detailing, 5) air-tight envelope (but diffusion open), 6) advanced windows and doors, 7) energy recovery ventilation, 8) heating, 9) efficient systems, and 10) alternative energy.

While Passive House standards are relatively new, highly insulated building envelopes have been a tradition in cold climates for many years. In tropical and subtropical climates, however, vernacular building traditions often involve porous building envelopes and ambiguous boundaries between interior and exterior spaces. In north-central Florida, for instance, an important reference is the 19th-century vernacular housing known as Florida Cracker. The Cracker house is recognized for its simple approach to addressing basic issues, namely shelter from the intense Florida climate while accommodating the basic needs of living, eating and sleeping. These homes were generally small in size, clad with breathable and/or porous materials, and included breezeways and porches that provided natural ventilation and sheltered exterior living areas.

These vernacular traditions have been reinterpreted throughout the years, most notably through the modern mid-century structures of the Sarasota School. These projects include work by such luminaries as Paul Rudolph, Bert Brosmith, Ralph Twitchell, Victor Lundy, Tim Seibert, Jack West, Philip Hiss, Gene Leedy, and Mark Hampton, amongst others. Built between 1941 and 1966, these projects are broadly identified by their attention to climate and site, large sunshades, innovative ventilation systems, oversized sliding glass doors, open stairs, and operable windows.

While these strategies continue to have currency today, there is also the need and the opportunity to explore alternative strategies, some of which may at first seem counter-intuitive. This paper will document the design and construction processes for the first project in Florida to deploy the Passive House Building Energy standard. The research aims to specifically test and evaluate the standard for use in hot and humid climates, reconciling the requirements of a high-performance super-insulated building envelope with more porous building models. It points the way towards new building models that offer long-term resiliency, reduced energy use, and superior comfort in subtropical and tropical climates.
THE USABILITY OF GREEN BUILDING RATING SYSTEMS IN HOT ARID CLIMATES: A CASE STUDY IN SIWA, EGYPT
Shady Galal Attia, Swiss Federal Institute of Technology
Marwa Dabaieh, Lund University, Sweden

In the last three years there has been a proliferation of regional building rating systems across the Middle East. Most those emerging rating systems and labels imitate the British and American rating systems BREEAM and LEED that emerge from an impact reduction paradigm. Thus they are neglecting the local historic, climatic, economic, technological, cultural and social context. This paper presents two case studies of a recently constructed ecolodges in Siwa, Egypt, that performs beyond the existing rating systems requirements. The paper illustrates the environmental and sustainability design strategies adapted to El-Babinshal and Adrère Amellal buildings’ context. In this study, various design strategies are surveyed and their response to climate, occupants and society is evaluated. The paper presents a set of sustainability principles addressing (1) the site, (2) water, (3) energy, (4) resources, (5) comfort, (6) heritage and (7) social responsibility. In addition, the building is examined across the environmental criteria of LEED, Estidama and the Egyptian Green Pyramid Rating System. Results showed that the building failed to comply with the three rating systems despite winning the Egyptian Hassan Fathy Award for environmental design. The paper elaborates on this conflict and presents recommendations to improve the questioned rating systems and support architects with the principles and strategies for sustainable design.
Global trends in high-density coastal development in urban zones have eliminated the topographical and ecological transition of the intertidal zone, consequently increasing vulnerability to massive disturbance and disruption related to climate change. The increasing intensity and volatility of climatological and hydrological patterns challenges coastal cities to develop a land-sea interface that absorbs and addresses these unpredictable forces. Despite the vulnerability of urban coastlines, it is unlikely that development in these areas will wane in the near future. Additionally, the widespread failure of large-scale energy infrastructure during large storm events exposes a vital need for site-scale energy production at the coastline. Development in the intertidal zone provides the opportunity for a synthetic architectural-infrastructural system that redirects the hydrologic forces at the shoreline to increase flood protection, restore biological robustness, and produce energy.

Current proposals for aquatic energy production are largely focused on flow-based systems. New York State projects that 7 percent of the state’s total renewable energy will be produced by wave energy (0.5 percent), tidal energy (1 percent), and hydroelectric energy (5.5 percent) by 2030 (Jacobson 2013). These proposed technologies are limited by a narrow range of flow characteristics (velocity, frequency and regime) that are largely dependent on the morphology of the surfaces over which they flow. Achieving maximum efficiencies in flow-based technologies requires morphological interventions that enhance high velocity, laminar flow. Although these systems work well in certain landscapes, designing for the acceleration of flow at the coastline is in direct contradiction to the goals of decreased wave energy, biological robustness and flood protection. If sites at the land-sea interface were able to utilize the inherent electrochemical potential where freshwater meets salt water, then surface morphology could enhance conditions for biological and flood protection systems rather than flow-based energy collection.

In urban conditions, highly directed water flows off of urban surfaces and through plumbing systems to meet the saline ocean waters at the land-sea interface. The ionic differential between the saline and freshwater can be used to create site-scale energy production using Reverse Electrodialysis (RED) technology. This research explores the feasibility of small scale RED systems utilizing the influx of greywater and stormwater and seawater flows at the coastline. Architecturally integrated RED systems can potentially be deployed in myriad urban coastal morphologies globally to generate electrical energy while reducing wave energy, counteracting negative hydrological forces, and sustaining a reliable energy source during high-energy storm events.

The present research reviews the theoretical energy production potentials of large-scale Reverse Electrodialysis, and characterizes the various membrane technologies, water flow and volume requirements, power densities, and cell sizes of current technological iterations. This characterization is then compared with site-scale input and output specifications to validate the feasibility of an architecturally-integrated RED system for localized energy production in coastal areas. Assessing the potential for translation of RED technology across scales allows for an understanding of the energy-production potential and encourages further inquiries into the integration of these systems with inter-scalar architectural surface morphology and coastal hydrological patterns.
THERMO-REGULATING FUTURE CITY ENVELOPES WITH MULTIVALENT SURFACES
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Jason Vollen, Rensselaer Polytechnic Institute
Kelly Winn, Rensselaer Polytechnic Institute

Cities are urbanizing and modernizing at alarming rates as populations leave rural areas for new opportunities in urban centers. Today global urban populations have surpassed their rural counterparts and are expected to continue to collect the bulk of global populations (UNFPA 2007). These future cities will be denser and hotter as the sheer volume of impervious surfaces required to meet the needs of urban populations replaces the natural ecological systems that previously regulated the local climate. As a result, temperatures within the urban core can exceed surrounding temperatures by as much as 10°C in what was previously considered to be temperate climates (NASA, 2005). Design for hyper-density means design for material density; hotter habitats require thermal sinking and the metabolism of solar energy that would normally be provided by flora. The majority of the urban growth is further projected to be in developing nations and will require low-maintenance durable envelope systems that mitigate variable solar resource in similar ways that used to be accomplished by natural systems as sustained ecologies.

While the concern of modern cities focuses on envelope transparency as the social interface between users and their greater social and environmental context, the challenge of material intensive future cities will rest in the execution of opaque façade systems and activated surfaces that reintroduce thermo-regulative systems to an unyielding built environment. A new logic of receptive surfaces, intelligent articulation, and modified topology, while restoring as many of the functions of the original natural systems as possible, represents a new ecology reconnecting urban populations with the dynamic and fluid systems of the local environmental context. By engaging principles from bioanalytics, energy flows through the building enclosure are harnessed to metabolize excess thermal and environmental loads. These ‘energy exchange’ envelope systems harness bioclimatic energy flows through diffuse surfaces and opaque wall systems in order to reach a more effective thermal balance. The building façade is thus tuned towards ever changing localized environmental conditions through the use of multi-scalar color, texture, and morphology extended and augmented with next-generation technologies as they become available for widespread introduction. Through this versatile manipulation of material systems the envelope can then become a source of reclaimed space in the expanse of future cities for the introduction of these emergent built ecologies. In this paper, precedents will be explored and potential system manifestations will be discussed as the totality of the problem is characterized and quantified relative to changing local climate context and design adaptability.


EMBEDDED HYDROLOGIES - COMBATTING WATER SCARCITY THROUGH LOCAL WATER CAPTURE*
Miriam Ho, University of Waterloo

In a situation of rapid environmental change and resource insecurity, socio-disadvantaged groups are often increasingly marginalized by unequal access to state infrastructure. In the Aral Sea crisis, an iconic example of unsustainable water management, subsistence farmers and fishermen whose livelihoods are threatened by desertification also lack the political and economic power to improve their own water access in the existing distribution systems. However, not only does the existing transboundary water network enable uneven distribution; a survey of the farmers’ own perspectives reveal that cultural values associated with water and its use are influenced by the local visibility of water. Recognizing mechanisms in the everyday environment that prevent or promote water sharing can lead to more ecologically-sensitive urban design. A design method that draws upon local knowledge and materials to harvest water can empower disadvantaged communities and improve human relationships to the vital resource of water.

The “death” of the Aral Sea in Central Asia - which shrank from 68,000km³ to 5,000km³ in forty years - is primarily caused by water diversion for agriculture. The extensive irrigation infrastructure, built to enable prosperous industrial farming under Soviet rule, now facilitates water trade amongst former Soviet states with dams, reservoirs and canals regulating the movement of water to each country according to agreed quotas. Downstream communities rely on a distant water source and its uncertain flows through contested geopolitical spaces for their water supply. Individuals with political or financial power may improve their own water access priority using private pumps, and a cultural memory of water abundance associated with modern technology motivates this practice.

An alternative to the control and allocation of water resources is a model for local water harvesting, embedded in the materiality of the built environment. Creating a water-sensitive urban fabric that can empower local communities begins with a close scrutiny of water in the everyday environment and its impact on how scarcity is locally experienced. For rural groups in the Aral basin, linear systems of water delivery through modern infrastructure conflict with traditional beliefs of water as a God-given gift and a shared responsibility; far from limiting water use, consumption patterns are exacerbated by religious values that free-flowing water in the canals should not be wasted or left to evaporate. Sociological studies indicate that a mentality of water-saving is challenging to endorse in the absence of water storage spaces within the community.

Vernacular examples from this region of ancient oases show that water can be captured, filtered and distributed through urban material interfaces to create cities with self-sustainable water cycles. Traditional building technologies and nature-inspired material systems interact directly with climatic forces and are capable of harvesting atmospheric moisture and retaining water, holding tremendous potential to restore local water sources.

By increasing the visibility of water in the urban landscape and fostering more intimate connections to the dynamic water processes, this can not only augment local water access, but can promote better water stewardship.

* Poster Presentation
DESIGNING FROM DISASTER

VISIONS OF A SUBTROPICAL CITY FOUR SIMULTANEOUS URBAN PARADIGMS FOR NEW ORLEANS
Scott Bernhard, Tulane University

New Orleans is a notoriously hot, humid, subtropical city. It is also a costal city located very near the Gulf of Mexico, between and below the Mississippi River and the large brackish Lake Pontchartrain. Surrounded by water and wetlands, the city is effectively an island reached only by boat or causeway. New Orleans has experienced rapid changes in density over its 300-year history reaching a peak of 625,000 people in 1965 – and then shrinking to 425,000 in 2004, and 200,000 in late 2005 before growing again to 315,000 in 2012. We may also add to this series of variables the fact that much of New Orleans continues to sink below sea-level and that the surrounding River, Lake and Gulf levels continue to rise due to global climate change.

The urban “idea” of New Orleans is also in flux. In fact, it may be more accurate to say that New Orleans is currently pursuing several entirely distinct and often mutually contradictory urban concepts. It is following multiple forks in its morphological path – each leading to a different paradigm of dwelling in a hot, humid climate, in the midst of ambiguous coastal waters, and in the presence of vast infrastructural investments and perceived geographic inevitabilities. Some of the “visions for a new New Orleans” are based on desirable but improbable notions of social justice and a “one-to-one” replacement of the city before the flooding accompanying Hurricane Katrina. Some visions emerge from an anachronistic optimism about the possibility of civil engineering projects featuring ever-higher levees and ever-larger pumps. Other visions imagine a full retreat to higher-ground with substantial increases in density on those high-ground locations and a correspondingly reduced and softer infrastructure. Still other visions imagine a city without collective infrastructure at all – where each home is a freestanding entity with its own grid-less power, on-site water management, and self-contained infrastructure.

Each of these “visions” or paradigms of a reconstructed city produce a specific or implied “mode of dwelling” in the new infrastructure (or its lack). In this research project, these housing/dwelling/urban forms have been analyzed, categorized and presented with original graphics created to show different plans and proposals in an easily comparable format. Four distinct strategies of urban re-construction are featured and four modes of “new housing” accompany each of these visions. Each of these strategies is presented in relation to the historic development and occupation of New Orleans to compare the city’s established trajectory to the various proposals. Several built examples (buildings as well as infrastructure) of each paradigm or vision will help illustrate the concepts presented. Substantial original photography and carefully documented historical buildings types and urban patterns accompany the analysis.

Visions of a transformed “post-Katrina” New Orleans created by the Urban Land Institute, the Bring New Orleans Back coalition, the Congress for a New Urbanism, the Make it Right Foundation, Morphosis, Habitat for Humanity, and a wide range of other contributors will be presented.

LESSONS FROM LEOGANE - 3 CASE STUDIES FROM HAITI’S RECONSTRUCTION
Mark Stephen Taylor, University of Illinois, Urbana-Champaign

Drawing on three research investigations in Léogâne, the town at the epicenter of the 2010 Haitian Earthquake, this paper will evaluate built work and methods of construction. The paper will outline the structural and physical attributes of buildings that respond to some what opposing hazards: Light ductility to respond to seismic hazards, and heavy monolithic construction to resist annual hurricane forces. In addition, and more importantly, the paper will address logistical, economic, and societal constraints to build safe and affordable civic and residential structures following a natural disaster.

The first building is a rural school serving more than 300 children. The building maximizes classroom size to enable diverse teaching methods, and uses affordable strategies to maximize natural day lighting and passive cooling. With funding from the Spanish Red Cross the building was completed in December 2012.

The second building is a prototype rural clinic, built on the outskirts of Léogâne to accommodate a midwifery-training project. The building responded to vernacular building practices, and was built in part to understand why so many concrete masonry buildings failed. Designed on a floor plan that could be adopted for residential use the 1,000 sq/ft building demonstrates simple, yet secure connection details. The design principles employed harness natural ventilation and allow for the building to expand from its core to affordably double the square footage of the house.

The third investigation addressed an issue that arose during the construction of the two buildings highlighted above. A year and a half after the Haitian Earthquake it was not possible to purchase Concrete Masonry Units (CMUs) of a dimension and compressive strength that would resist the forces of natural hazards present in the town where the epicenter of the earthquake struck. Collaborations with local producers, users and engineers were established to address the need to improve access to durable building materials.

Six months after the Haitian Earthquake there was support and a willingness to consider adjustments to building practices, practices that had led to the loss of so many lives. However, delays in publishing and disseminating information into the hands of those rebuilding, led to little change in the building culture in Haiti. As Non Government Organizations withdrew to address the next humanitarian need in the region, temporary shelters became the default permanent solution. It is the author’s belief that the response to the Haitian Earthquake needs to be examined. Many valuable lessons can be learnt from Haiti’s recovery effort, lessons that are applicable to numerous tropical cities exposed to similar natural hazards around the world.
STRONG WINDS AND RISING CURRENTS: A DESIGN PROPOSAL FOR THE GRAND BAHAMA INTERNATIONAL AIRPORT
Michelangelo Sabatino, University of Houston
Serge Ambrose, University of Houston

Over the last decade, the islands of the Bahamas have been battered by a series of powerful hurricanes of increasing strength and frequency. The high winds and flooding that arrive with each storm result in significant damage to buildings and infrastructure. The Grand Bahama International Airport, located in the city of Freeport, has been a casualty of several recent hurricanes. In 2006, the documentary film and book, An Inconvenient Truth, generated greater awareness about the threats of global warming among architects and society at large. Although there has been substantial research into building components that can withstand windstorm and flooding, there has been less attention paid to comprehensive building design for climate change and “rising currents”. In the mid-2000’s the Grand Bahama Port Authority began exploring options to accommodate future growth of the airport complex. In 2012, our design team developed a concept for a new passenger terminal. The original Freeport airport terminal was completed in 1958, designed by Floridia’s premier “tropical organic” architect, Alfred Browning Parker (1916-2011). Architects of Parker’s generation were not faced with the threats of global warming including the challenges of rising sea levels that are currently impacting sub-tropical regions. Our concept of an airport terminal is one that reflects the natural and cultural environments of the islands of the Bahamas while addressing the concerns of climate change. This design project draws upon primary and secondary research that included the analysis of a wide variety of airports built over the last eighty years from a functional, environmental and architectural perspective. Paralleling contextual design strategies such as those found in the Kuala Lumpur International Airport by Kisho Kurokawa (2000), our airport seeks to create a symbiosis between the climate and culture of the Bahamas. The plan and section of the new terminal fulfills the functional program while abstracting the land and sea formations of the Bahamas. Culture and identity of the Bahamian people are revealed through the use of color, material and art. The proposed terminal building utilizes a basic structural system of column and plate raising the building off the ground safely above hurricane storm surges, facilitating air circulation and providing shelter for airport equipment and service vehicles. Performance based design strategies were used to assist in the development of the architectural design. Considerations regarding energy usage, carbon footprint, thermal load, day lighting, water usage, water catchment, informed the design process. The environmental effectiveness of the design is currently being analyzed and tested through the use of new building performance analysis software and the original digital building model. The design for the Grand Bahama International Airport passenger terminal seeks to minimize the effects of catastrophic weather events while utilizing and promoting sustainable design approaches. Local culture and sense of place are abstracted through architectural strategies based on a contextual language. By engaging with and acknowledging significant environmental and cultural characteristics, using contemporary materials and technologies, and employing performance based design analysis, this airport aims to foster an experience that is local, global and environmentally responsible.

SURGE CITY
Charlton Lewis, University of Texas at Austin
Simon Atkinson, University of Texas at Austin

Cities will contain approximately 70% of the American population by 2040. At the same time many of the projected growth centers are situated on southern seaboards, subject to tropical storms and hurricanes.

Aside from the reality of human danger, and physical and economic tragedy, many, if not most, of these cities are attractive and memorable places to live, some of world importance. Texas, both in its leading cities and the Lower Rio Grande Valley region has witnessed disproportionately high urban growth, combined in many cases with the relocation of the new industries, and thus a strengthening economy. This resurgence, much like the ones that have historically preceded it, is inextricably linked to the vulnerability associated with a coastal inhabitation.

The proposition is made that future urban growth, purposefully designed, should continue to focus on these vulnerable urban areas, which could well be the next revolution in regional economic strategy.

Hence, we are addressing a host of southern, and southeastern seaboard cities and firstly looking at the asset side of the balance sheet: mild climate; abundant fresh water, cheap land, often good land, rail, and air communications, solar, sea and wind power, existing physical, social and educational infrastructures. If we bring to these areas an increase of industry, population, and focused federal support, then, in turn, more tax dollars are generated, while deep, preventative design interventions can ensure a response and safety net at times of storm and sea surge.

Corpus Christi – Surge City

The work presents a design framework for a set of interrelated measures to reposition, infill, extend, and protect the City of Corpus Christi, Texas. The city is a tourist destination, has a small international airport, strong rail and road connections, good agricultural land in the vicinity, and significant areas for commercial, hotel, and residential expansion. It is also worth noting that it is a significant oil terminal requiring increased protection.

A master plan demonstrates increased surge protection, and identifies safer areas for expansion combined with local transit and increased amenity.

One of the barrier defenses is designed to double as a tourist attraction.

Water Town is an area designed to accommodate flooding with an appropriate architectural framework.

Hurricane resistant structures are designed as the basis to all new development.

New transit nodes interconnect with community centers that are “safe houses” offering protection to the infirm, the mobility impaired, and those inhabiting locales with only partially adequate safety measures.

The design strategy is implemented through a partnership, including a federal stimulus package for infrastructure and commercial and home hurricane protection, and an extension of tax increment financing where potential property tax provides robust, sustainable infrastructure.
EMILIO SANCHEZ IN CUBA: MID-CENTURY MODERNISM AND THE SEARCH FOR CULTURAL IDENTITY

Victor Deupi, New York Institute of Technology

Emilio Sanchez (1921-1999) was a Cuban artist who was born in the rural countryside of Camagüey, and left his native country in the late 1930s to study in America. After stints at Yale University (1939-40) and the University of Virginia (1941-43), he settled at the Art Students League in New York (1944) to study painting, a lifelong desire. Inspired by the mid-century New York realists such as Edward Hopper and Thomas Hart Benton, Sanchez took to drawing and painting architecture and quickly returned to his homeland in search of his cultural identity. Throughout the 1940s and 1950s, Sanchez travelled and lived in New York, Havana, and the Caribbean islands, establishing himself as the premier representative of daily life in the West Indies. His drawings and paintings of Cuban architecture, in particular, were exhibited in Havana and New York, but the Revolution brought an end to his direct relationship with the island. Though he never claimed any nostalgia for Cuba, his sexuality would have certainly made it impossible for him to continue visiting the island after 1960. He became a United States citizen and shifted his focus to New York City and other islands in the Caribbean.

In 1965, A. Hyatt Mayor, the Curator of Prints and Drawings at the Metropolitan Museum of Art acquired some 50 prints and approximately 200 drawings by Sanchez, nearly all of Cuba in the 1940s and 1950s. This collection has remained in the Museum without having been catalogued, exhibited, or seriously considered. While Sanchez has received substantial interest in the last decade, very few of his works from Cuba in the 1940s and 1950s have ever been discussed in any significant way. Nevertheless, these architectural drawings, watercolors, and lithographs of Cuba shed enormous light on the cultural identity of the island in the last decades of the Pre-Revolutionary era, ranging from the vernacular farm structures of the interior to the fashionable architecture of Havana (Colonial, Neoclassical, and Modern). His reflections on the daily life of rural Cuba reveal a profound fascination with light, shadow and color, industrial buildings, farmer’s shacks, local businesses, dark interiors, landscapes, dancing and laundry. Similarly, his work in Havana continues these themes in both the residential interiors of the social elite, and in the bustling streets of the day-to-day working residents of the capital city.

While proponents of this period refer to it as the “Golden Age” of Cuba and its critics as the “Mistress of Pleasure”, Emilio Sanchez was able to cut through the conspicuous consumption and tourism of the island and present an accurate face to what was a truly sad and beautiful place. In this sense, Emilio Sanchez in Cuba presents a unique insight into the complex character of a mid-century Modern artist who specialized in architectural representation as a way of searching for cultural identity in a land to which he would unwittingly never return.
SUBTROPICAL FUTURES: VICTORIA PARK RE-IMAGINED
Peter Richards, Deicke Richards

Brisbane, the capital of Queensland, in South-East Queensland is situated on the Brisbane River, one of the largest rivers (and floodplains) on the east coast of Australia. The river defines the city and gives it its name. The river has been a natural place to accommodate some population growth for the city with high-density development that capitalises on the natural amenity, cycleways and a string of parks and the flatter land. The major floods of 2011 and the scare of 2013, has seen a more malevolent quality of the river and shift of thinking on its role within the city. The floods have made council, for the first time, acquire prime development sites near the river, with proposals for high density development and made them parks, at great cost. The pressure for population growth in Brisbane remains. 140,000 new dwellings are required by 2031. Brownfield sites are less plentiful and there is interest to rethink of some of the other strategic locations in the city away from the river on higher ground and steeper slopes. Some of these places are currently open spaces.

Victoria Park Golf Course sits on a high ridge line and a very strategic part of the city just north of the city centre is one of the few remaining golf courses close to the centre of an Australian capital city. While it is a public course and a valuable community asset, it has been compromised by the recently completed northern busway with two bus stations constructed on its edges. It is bounded on the west and north-east by two major community facilities, the Queensland University of Technology (QUT) to the west and RBW Hospital at its northern end. In a city in need of urban consolidation, perhaps it is time to review the future of the golf course.

This question has been investigated as a conjecture in the Master of Architecture program at the QUT. The project has been to re-imagine Victoria Park as a new city parkland and a place that makes an urban connection from the QUT to the hospital. This new urban precinct is to be a medium to high-density transit oriented development that capitalises on the bus way stations and the proximity of the university and hospital. The precinct will frame/define/interact with the new major urban park for the city.

A key question being addressed is how the design can embody and define principles of a subtropical urbanism. Students are identifying the appropriate street and block structure, density and built form to be accommodated on blocks that define and activate a rich sequence of streets and public spaces.

The paper will present a critical overview of the project work that provides a lens to how future professionals may respond to these issue that will be the focus of their professional lives.

RE: COVERING SHELTER
Rob Whitehead, Iowa State University

“Shelter is Warm, Dry, and Noble.” – Samuel Mockbee
“A great architect...is made by way of a cultivated, enriched heart”- Frank Lloyd Wright

Traditionally, structural design pedagogy for architecture students is taught using an engineering-based system of abstract analysis and representation in which “design” refers to the analysis and sizing of elements—the courses reward the accuracy of elemental calculation over spatial conceptualization and typically avoid experimentation or engagement in any critical social issues, even when those issues might dramatically affect potential structural solutions. However, by engaging architecture students in a project with very specific constraints, such as those found in the creation of disaster relief shelters, a very particular set of design criteria emerge that are well-suited to be explored in a structural design course IF the classroom setting and pedagogical approach are also evolved accordingly.

This paper will describe the results of a week long, intensive, project-based learning exercise completed by architecture students in the newly implemented, award-winning, undergraduate structural design course. Students were tasked with creating, “a structurally responsive shelter designed for rapid deployment (and re-use) which favors material optimization, sturdy performance (not just a tent) and an architectural intention for inhabitation.”

This paper will discuss the important synergistic relationship between the specific pedagogical approach to used to teach the structures course, Think + Make + Break + Evaluate, and the fascinating, albeit complex, set of social and technical constraints created by this scope of exploration. Several examples of student work will be shown that resulted from the exercise including-experiments in pneumatics (for shelter and for thin-shell formwork), thin shell structures made from parametrically-modeled segments, configurable triangulated panels that create folded plate structures, and even more traditional unfolding flat-pack panels.

There are profoundly unique social and technical benefits of integrating this scope of work into the structural design education of young architects. They learn to care and that architecture/structures can make a difference, but they learn that the relative efficacy of their design interventions are inextricably linked with their realistic engagement with a broad range of technical encumbrances such as the fabrication, deployment, and overall structural performance of the shelter—it is a meaningful design project with incredibly difficult design objectives. As a result, this portion of the module elicits both great enthusiasm and consternation from the students—but most importantly, it elicits a holistic engagement of broader design principles than is typically found in a structural design course.
GEOMETRIC FLOOD CONTROL SYSTEM (GFCS)*
Wendy W. Fok, university of Houston
Megan Hartensteiner, University of Houston

DESIGN PREMISE:
According to the National Oceanic and Atmospheric Association, the U.S. records $7.82 billion in damages every year as a result of fresh water flooding not including the damages resulting from coastal storm surges. In trying to prevent the effects of flooding on an area, various systems are employed, most notably the stacking of sandbags along rising waters. The sandbag system has been effective in offsetting flood waters since the 18th Century yet emerging technologies in materials and computational design have provided the opportunity to redesign this age old method to increase efficiency and sustainability.

The research centers on the idea of creating a new module to replace the sandbag in order to increase the quality, efficiency, and sustainability found in a flood control system. The research process will focus on three categories of research: geometry, material, and performance. By using this approach, the research evolves through a non-linear process in order to continually edit and test the design to produce the maximum performance possible in both geometry and materiality. The three-part process is further below:

GEOMETRY
The study of geometry will allow for the creation of a system that is successful due to the influence of the geometry of the module offsetting the lateral hydro forces which are most commonly offset by mass in existing modular systems. The geometry of the module will result in research conducted on the strength of geometric shapes and the performance of structural forms used in larger scale applications such as dams. The goal of refraining from a mass derived system is to create a module that is more democratic in use in order for it to be easily handled by everyone from a strong laborer to an elderly homeowner.

MATERIAL
Materials research was conducted in tandem to the study of geometry in order to find a material suitable for both the geometry used and the application of the material in retaining flood waters. In order to meet the secondary goal of sustainability, the material’s embodied energy as well as its recyclability will be taken into account when choosing a material.

PERFORMANCE
Throughout the research of geometry and material, the designs produced will be continuously evaluated for their performance in retaining flood waters through physical and virtual testing. The testing of module design and material will allow for continuous design improvement throughout the course of research and design development. The ultimate goal is to be able to test the final design iterations in real world applications to determine the full scale feasibility of the solution.

We hoped to create a system that can be deployed quickly and efficiently to areas expecting and/or experiencing flooding for use by both civil institutions in large-scale applications and individual home and business owners in small-scale applications. This system will also allow for a more sustainable solution to flood control in an age where sustainability is a forerunner in design consideration and weather trends are resulting in more areas experiencing flooding.

* Poster Presentation
WEATHER & ATMOSPHERE

THE NEW SUB-TROPICAL CITIES
Hollee Hitchcock Becker, Catholic University of America

Climate Change 2007: The Physical Science Basis (Meehl 2007, p.768) is a report developed by the Intergovernmental Panel on Climate Change Working Group 1 that analyses indicators of climate change. The report summary, based on multiple models, states that typhoons and hurricanes will become more intense with higher peak wind speeds and heavier precipitation. Further, the report predicts cyclone patterns will move farther from the equator making cities as far north as 40 degrees latitude subject to hurricane force winds in excess of 150mph. This means that cities such as Washington, DC, and New York could become sub-tropical cities within the next century.

The potential for damage to structures these cities not typically prone to severe weather is of concern from several viewpoints. First, there is a large stock of existing buildings designed for lower wind loads that may become damaged. Second, there is currently no change in minimum required building design loads to accommodate predicted increases in wind speeds. Third, few design studio programs focus on lateral-force-resistant strategies, or consider flutter or uplift resulting from wind loads.

This paper posits that wind speeds in East Coast Cities from Virginia to Long Island Sound will see a near doubling of wind speeds within the next fifty years along with higher temperature variations, higher humidity and higher flooding potential. The paper compares the similarities and differences between existing and future climate conditions and vernacular architecture in U.S. East coast cities. Design strategies are formed using a holistic mix of structural and environmental logic. Finally, examples of future-design-thinking implementation through an integration of studio and technical courses in the architecture school are discussed.


FACADE DESIGN FOR SUPER HIGH-RISE BUILDING IN SUBTROPIC REGION IN CHINA
Ming Hu, Catholic University of America

As a major energy consumer, the high-rise building does not ordinarily conjure images of sustainable design. But a new generation of tall buildings could incorporate new developments in technology and design to produce responsive, energy-efficient buildings.

A high-rise building, can be understood in terms of systems and subsystems in which Environmental systems of Indoor Air Quality, Comfort, and Serviceability can be related to subsystems of Structure, Transportation, Mechanical, and building envelope. In sustainable tall buildings the independency of these systems and subsystems becomes immediately apparent where the design and construction of one subsystem impacts other subsystems.

However, in current practice, building envelope is being designed as a separation between exterior and interior environments, to provide an enclosure for comfortable indoor environment. In China, beyond aesthetics, façade systems are addressing the unique needs of Chinese climate and geography. The majority of southeast China falls into the humid subtropical climate category, experiencing hot humid summer and mild winter.

This paper is to identify the appropriate sustainable façade type for high-rise building in southeast China, and four case studies will be used to demonstrate the variety façade type.

NEXT-GENERATION SUSTAINABLE CONSTRUCTION:
BUILDINGS AS ACTIVE AIR POLLUTION REMEDIATORS
John T. Fox, Lehigh University
Nik Nikolov, Lehigh University

Research into photo-catalytic architectural materials has been progressing for over ten years and this emerging technology offers building professionals a renewed opportunity to contribute toward sustainable goals by enabling the design of radiation-active architectural facades that can lead to potential advances in passive air pollution remediation.
FARMING FREEWAY CORRIDORS
Carey Clouse, University of Massachusetts, Amherst

As designers visualize a world beyond oil, their ideas have the power to catalyze the regeneration of the built environment by creating an open invitation to plant along public road networks. A plan for green infrastructure with local food or fuel production—a photosynthetic infrastructure—would strengthen communities, sequester carbon, and support biodiversity. The land around roads could supplement traditional farms and urban gardens, providing a new agricultural typology built upon the woefully underused ribbons of public land throughout our American landscape.

As the end of the era of cheap oil threatens global food security and forces a reexamination of food production techniques, the U.S. freeway system stands poised to enter a new age. As increasing energy prices force more and more cars and trucks off of the nation’s highways, this dendritic infrastructure will see dramatic shifts in use and capacity. In cities and towns across America, new land use patterns will evolve, finally referencing the system of roads that have heretofore enjoyed their own formal autonomy.

This changing relationship to highway infrastructure calls for innovative design tactics; suburbs, exurbs, drosscapes and peripheral rings offer exceptional opportunities for constructive design interventions. The vast and connected land abutting interstate freeways could become a linear garden, seized, planted and harvested by adjacent growers.

New proposals for freeway corridors must acknowledge that this road system has already dramatically altered the landscape, and “despite the very real regional consequences of such accidental ecologies, and their negative perceptions, we need to come to terms with their benefits, so that they may be better understood, protected, and enhanced.” (Fletcher, 2008) Urbanist David Fletcher recognizes that “many of these infrastructural freakologies serve as green infrastructures, cleansing and processing excess nutrients, controlling erosion, and providing habitat which survives independent of human agency.” (Fletcher, 2008) The freeway system will need to be evaluated in terms of productive capacity, rejecting outdated binary notions of nature and wilderness.

THE URBARN PROJECT; WE ARE WHAT WE GROW*
Timothy Gray, Ball State University

We have all heard the saying “We are what we eat”. Another idea that is just as true is, “We are what we grow”. With this in mind, the Farm Project brings together business, school and community around the concept of reclaiming impacted urban space and turning it into a working farm and urban green space. The one-acre organic farm will consist of a half-acre of growing plots and raised beds, a chicken coop, beehives and meeting and workspace. The Farm Project will provide space for gathering and enjoying the outdoors, teaching space for a local K-12 school and community groups, and it will have a farm store that will sell organic produce at affordable prices. The farm will not only provide students and community residents with nutritious meals, but will also get them connected to their food and introduce the various user groups to models of sustainable agriculture and healthy and sustainable lifestyles.

The first completed component of the Urban Farm is the “urbaRn” project; a classroom / meeting / lab facility which has been designed and constructed almost completely from waste stream materials and is intended to extend the lessons of the Urban Farm to that of the built environment. The urbaRn was designed and fabricated by a group of fourth year architecture students, and employs two repurposed shipping containers, which have been extensively modified for use at the Urban Farm.

The students were challenged to design the facilities using low / no impact materials, and after some research came to recognize the containers as a potential waste stream resource. In addition to being at the end of their useful life, the containers selected for the project were contributing to a surplus of shipping containers in the region due to a regional trade imbalance. The choice of containers also facilitated the staging of the project, which was fabricated largely off-site and then delivered to the Farm, and allows for the potential of relocation in the future. Modifications included creating large openings with sliding panels and fitting out the interiors with shelving, rolling farm tables and windows created from salvaged materials diverted from the local landfill.

The students also used digital technologies to minimize waste in the production of 18 chairs for the facility. The chairs were designed to “scissor” together and could be milled and fabricated without the use of any adhesives. In addition to being light and functional, the chairs demonstrate an approach to sustainable design by being extremely efficient in their use of materials. Nesting programs allowed all components for the chairs to be milled out of sheet goods; a yield of four chairs coming from one 4’ x 8’ sheet.

Educational materials directed to various user groups ranging from community members to grade school students frame these principals and extend the lessons of the farm to the built environment.

* Poster Presentation
PLACE TALKING: A NEW POSSIBILITY FOR PRESERVING SITES OF CULTURAL SIGNIFICANCE
Alice C. Guess, Louisiana State University

On a scenic oak lined road that follows the curves of the river between downtown Charleston, SC and the island resort community of Kiawah Island lies a vine covered ruin of concrete block walls. In front of the building is a sign that reads Historic Site PROGRESSIVE CLUB. A Community Service Center Est. 1948. Nothing about the sign or the broken walls gives any indication of its cultural or historical significance. Nothing about what remains suggests this site was the center of a community education and engagement movement that became a model for communities across the nation during the civil rights struggle. Important figures such as Martin Luther King and Andrew M. Young came to this place to learn about strategies for voter education and community organization that were developed by The Progressive Club. In 1989 Hurricane Hugo caused significant damage to the roof structure of the building. In a community with limited means, struggling to recover losses to person property the uninsured building was left relatively unprotected. While there have been efforts to stabilize the structure since that time, it has deteriorated to the point where it might not be possible to rehabilitate the remaining fabric. In its current state the site cannot be seen, it is invisible to those without knowledge of its story. The oral tradition of this coastal community is still strong and as a result the history of this place is largely anecdotal and individualized. It is also relatively recent. While these aspects place this site outside of the realm of traditional preservation might they also provide an alternative mode of persistence? This paper will explore the potential for the oral record of the place to suggest a model for the rehabilitation of the physical site. While the structure may not be reconstructed in the traditional sense, might it still have the power to speak.

LOCAL URBAN ECOLOGIES: CONSERVING INDIGENOUS KNOWLEDGE AND URBAN CONTINUITIES IN PERSIAN GULF PORT CITIES
Samia Rab, American University of Sharjah

The fast rate at which port cities along both sides of the Persian Gulf are urbanizing is eliminating, threatening or preventing conservation of urban heritage. Loss of built heritage limits our ability to learn the indigenous knowledge of the urban environment's complex and dynamic patterns of exchange that generated "seascape urbanism" along the Persian Gulf. This paper focuses on the existing urban ecologies of three port cities at varying levels of urban transformation in the United Arab Emirates (Dubai, Ras al Khaima and Sharjah). It acknowledges the necessity of introducing new architecture in older parts of living port cities, but argues that new interventions should be based on strategies to create restorative relationships between cities and their surrounding environments.

Historic buildings in the UAE are made with sea stone (coral) and since 1995 are being enthusiastically restored, reconstructed and de-restored utilizing approximately harvested coral imported from the island of Saccotra in Yemen. These historic preservation efforts remain focused on building an urban image of the city as it was in the 1950s. Modern buildings introduced in the 1970s made of concrete are earmarked for demolition to support this urban image. While tall concrete structures may appear as if they do not fit the historic context, they are now home to significant number of people.

Replacing concrete structures with reconstructed historic houses will reduce the urban density, gentrify the central business district, and displace a heterogeneous community. This paper will discuss the environmental and economic benefits of maintaining these concrete structures as an important layer in the city's urban development. It proposes regenerative design concepts that contribute to, rather than extract from, local urban ecologies to strengthen urban public spaces that maintain life within the historic district.
LANDSCAPE ARCHITECTURE WITHOUT LANDSCAPE ARCHITECTS: EXPLORING CHANS MODELS IN THE SHADOW CONSERVATION NETWORK OF SACRED SITES
Julia N. Watson, Rensselaer Polytechnic Institute

The vernacular of the world’s traditional and indigenous peoples has historically inspired innovation in the field of architecture. However, so far there has been minimal impact on the fields of landscape architecture and urbanism. Meanwhile ecologists and conservation biologists have begun to respond to a powerful critique from anthropologists, who point out that “indigenous peoples live in most of the ecosystems that conservationists are so anxious to protect.” Some studies go further, suggesting that indigenous peoples have not simply been preserving, but catalytically increasing ecosystem biodiversity, through subtle modifications and ecological mimicry, for millennia. The following essay introduces this bio-cultural model of conservation into the field of landscape architecture via several indigenous landscape infrastructures that appear intrinsic to these coupled human-nature systems.

Continuous human interaction with natural systems creates unique and inseparable organizational, spatial and temporal couplings that can be found in the global shadow conservation network of sacred sites. Indigenous knowledge and its associated infrastructures are recognized in a sub-field of human ecology called Traditional Ecological Knowledge (TEK) as coupled human-nature systems (CHANS). Untangling their complexities can reveal novel discoveries for ecological designers still learning to integrate reciprocal effects and emergent properties into the design and management of landscapes.

Several indigenous landscape infrastructures can be found in the environs of ecosystem dwellers of the sub-tropics, including the constructed islands of the Uros in Northern Peru, the artificial reefs of the Tofinu people of Lake Nokoue in West Africa and the Lardil of the North Wellesley Islands and Kaiadilt of the South Wellesley Islands in Northern Australia. These innovations are opportunistically migrated via two case studies to the Boreal Tundra and the Equatorial Tropics. For the Tundra, the innovation results in a hybrid indigenous aquaculture system for an impoverished indigenous fishing community, threatened by climate change and the inevitability of relocation. In the tropics, a recently inscribed UNESCO World Heritage Site in Bali, composed of 19,500 hectares of sacred rice terrace, is appended an ecological and educational program. The result is a hybrid mitigation terrain of integrated vertical rice-terrace wetlands and interpretive Eco-museum landscapes.

Landscape architecture is presently querying how design can successfully manifest complex human and non-human species interactions. As for the vernacular, the neglected practices of indigenous peoples have the potential to cast new light upon ecological design practices. Influencing Architecture’s fascination with the non-pedigreed architecture, Bernard Rudofksy (1964) accounted that the vernacular remains unnoticed, being overshadowed by our western fixation on the higher arts, coupled by a lack of documentation of these vernacular practices. This alternative theory of the Indigenous Landscape System affords a new direction of inquiry for landscape architecture, prompting the exploration of the cultural landscape to inspire ecological innovation and an engagement with the ancient that we are only beginning to understand.


THE SUBVERSIVE ERUV AND THE SACRED PROCESSION: ETHNO-MANIFESTATIONS OF RELIGIOUS SPATIAL PROPINQUITY IN MIAMI-DADE COUNTY
Armando Montilla, Clemson University

In the ‘Production of Space’, Henri Lefebvre announced what he categorized as “social space”, a set of complex spatial conditions whose significance is socially produced. Focusing on this notion, Lefebvre argues that space is not an inert, neutral, and a pre-existing given, but rather, an on-going production of spatial relations. Miami-Dade County is one of the most ethnically-diverse metropolitan areas in the country, where a panoply of ethnicity and cultural production inform urban patterns, socio-spatial practices, territorial empathy and urban idiosyncrasy. Added to this, the year-round sub-tropical climate allows for ample opportunity for outdoors leisure, which gives this urban setting the privileged condition of simultaneously being a densely populated agglomeration and a fertile urban playground. In the midst of such urbanity, popular street festivals such as the ‘Calle 8’ Street Fest (in March of each year), or the Caribbean Carnival Parade (in February), further denote an important presence of ethnicity in the city and activate the urban space as social space, leading to the notion of an event-driven urbanity. Furthermore, the influx of urban transnational migration from Latin America and many other geographical origins fuels the urbanity of Miami-Dade with a resulting extrapolation of religious traditions that are essentially, spatial. Such religious spatial operations promote a street life occupation of the city space, and a link between different communities to inform each other in an urban setting. The paper will center on two instances of event-driven urbanity, geographically situated on two opposite poles of the ethnic spectrum of Miami-Dade County: One being the procession of ‘Nuestro Señor de los Milagros’ (‘Our Lord of the Miracles’) on 137th Ave. in the city of Kendall FL (South Miami-Dade County) - considered the urban strip with the largest concentration of Peruvian immigrants in the country. The other being the Rabbi-sanctioned Eruv - a millenarian concept from Judaism that is also essentially, spatial - in the city of Aventura FL (North Miami-Dade County) Through the spatial analysis of these two urban event and religious driven spatial conditions, dwelling between ephemerality and permanence, the paper intends to set a precedent for a re-interpretation of Lefebvre notion of social space, in ways that are culturally produced, through the urban phenomenon of urban transnational migration and ethnicity in the subtropical city.
THE GARDEN ELEVATED*
Elizabeth Grant, Virginia Tech
Tess Thompson, Virginia Tech

The creation and sustenance of greened roofs has required a concerted effort ever since the Hanging Gardens of Babylon improbably thrived in the deserts of Mesopotamia. Even with the advancements of today's engineered systems, a collaborative design process is necessary to satisfy the architectural and the biological, the functional and the aesthetic requirements of these displaced gardens.

A team of students in biological systems engineering, landscape architecture, and architecture collaborated on the design of a green roof for Cheatham Hall at Virginia Tech, which houses the university's College of Natural Resources and Environment. The project is a microcosm of the subtropical urban condition: an existing, uninspiring roof visible from adjacent spaces, at a nexus of local activity. Beyond merely being a design problem to be solved, this roof begs to be occupied, to be transformed into a viable, living space. The design project was mentored by faculty in biological systems engineering and architecture with additional guidance from both the end users of the space and from green roof system experts. Designed to elevate and illustrate the potential of vegetation in buildings, the project was intended to develop both an accessible roof garden and a living and evolving demonstration project for the college. The design process gave students the opportunity to investigate the transformative potential of these systems to create a beautiful space for faculty and students to converse, learn, and relax; to establish a location of increased biodiversity; and to provide a seasonally changing view through expansive windows of a lush, flowering carpet of creeping sedums and flowing grasses. The students took a creative approach to incorporation of architectural and landscape elements to create shade, texture, path, niche, and rhythm, while simultaneously considering real issues of access, life safety, structure, drainage, heat flow, fire protection, cost, and maintenance.

By observing this first attempt at interdisciplinary design cooperation, and learning the students’ reactions to it, the faculty mentors have generated ideas intended to assist the students in overcoming these obstacles in similar exercises in the future. These approaches would bring more structure to a process that may have suffered from a lack of adequate framing. Despite the difficulties, the exposure to students in other fields seemed to be a valuable educational experience for this group. Perhaps more valuable still was the authenticity of the project with its real site, real products, and a real client. At the end of the process, the team presented their design proposal to the Dean of the College of Natural Resources and Environment, who will be sharing it with his leadership team. Faculty and students are hopeful that funding can be secured to bring this project to fruition.

* Poster Presentation