

# IN FLUX

## COMMUNITY DESIGN FOR CHANGE, CHANCE AND OPPORTUNITY

The National Resilience Initiative | 2015 Annual Report



**Architects  
Foundation**

The Foundation for the  
American Institute of Architects

Cover image: Interstate 90 bridge  
across Biloxi Bay, October 2005

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Presented by the ARCHITECTS FOUNDATION,  
Foundation for the American Institute of Architects

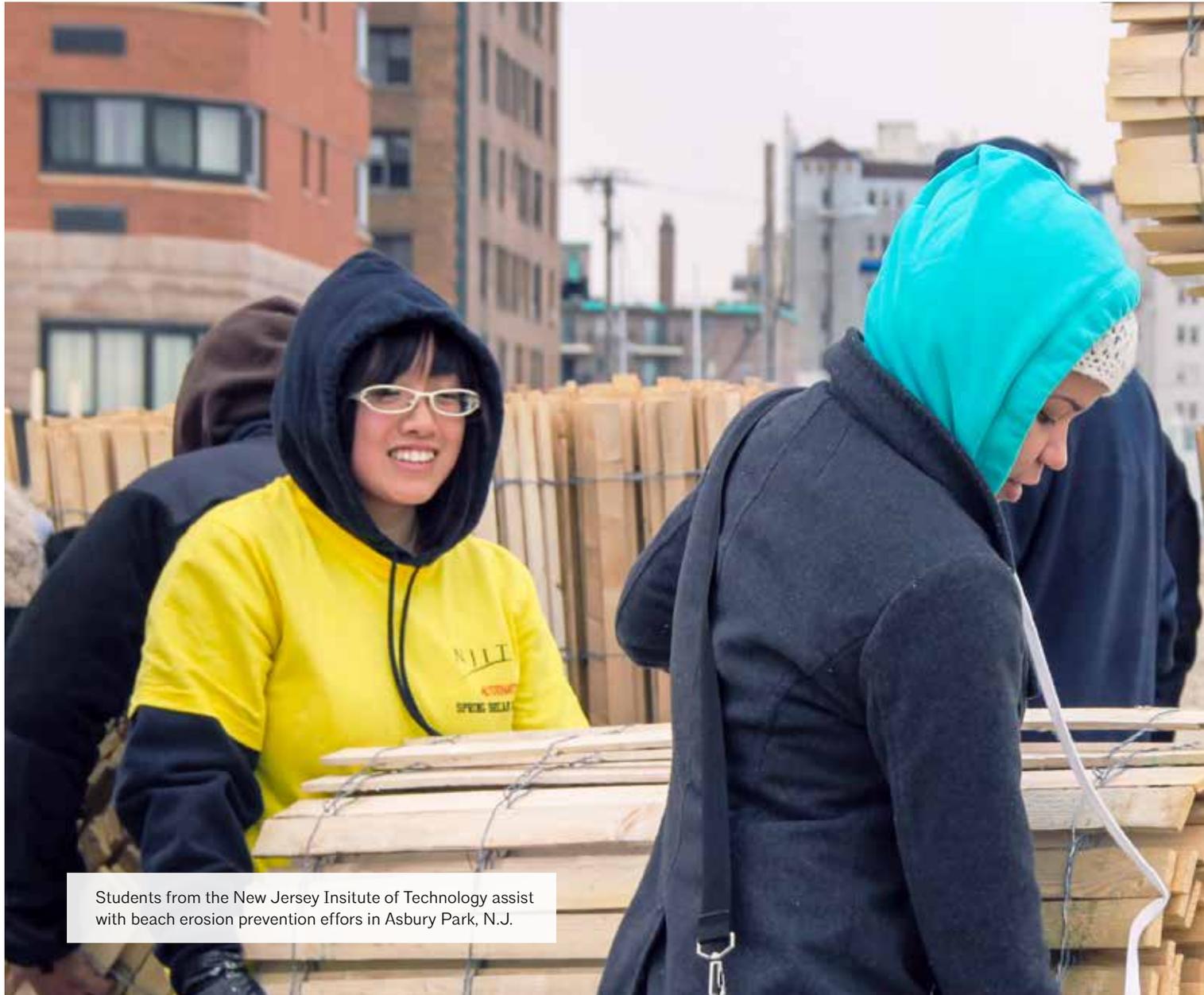
**Architects  
Foundation**



**The American  
Institute  
of Architects**



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Students from the New Jersey Institute of Technology assist with beach erosion prevention efforts in Asbury Park, N.J.

A person wearing a white hoodie and a bright yellow-green high-visibility vest is seen from the side, working in a warehouse. They are surrounded by large stacks of lumber, some of which are secured with blue straps. The background shows more stacks of wood and the structure of the warehouse.

# FOREWARD

## A message from the CEO of the American Institute of Architects

At a time of unprecedented environmental degradation and disasters – be they drought, earthquakes, climate change or even social inequity and mobility – opportunities for architects to provide solutions multiply. Confronted with change, we are responding with new ways for architects to demonstrate their value and offer positive responses to human needs. Today’s buzzword, resilience, rises out of these challenges and offers hope.

The term resilience grew from honest, tri-partite beginnings: it evolved from architecture’s commitment to enhancing health, safety and welfare. Yet resilience promises so much more. It implies an ability not only to spring back, but also to stand like a pillar against these challenges and, regardless of external pressures, enhance the world.

Resilience places architects once again at the center of the human equation, offering a stable, beneficent addition to a world in flux. The National Resilience Initiative confronts the world’s realities and emphatically states that we can make a difference.

Robert Ivy, FAIA  
Executive Vice President / Chief Executive Officer  
The American Institute of Architects

# DESIGNED TO PROTECT

The National Resilience Network and a vision for a better, safer and stronger tomorrow





## INTRODUCTION

Sherry-Lea Bloodworth Botoy  
Executive Director, Architects Foundation

In August 2005, Hurricane Katrina ravaged the Gulf Coast. One of the costliest natural disasters in U.S. history – estimated at \$108 billion – it was also one of the deadliest, killing more than 1,800 people and displacing hundreds of thousands more. This should not have happened. Neither the destruction of property nor the human toll was inevitable. What led to the catastrophe was not only poor planning and investment, but also a lack of vision and a failure to design resiliency into communities vulnerable to extremes of wind and tide.

My hometown of New Orleans became a symbol of our nation's failure to prepare for natural disasters. In the years since, there has been progress; much of it led by the architecture community. Since Katrina, the Architects Foundation (formerly the American Institute of Architects Foundation) has worked alongside the American Institute of Architects to take a lead role in resilience efforts around the country.

What is still needed, however, is more coordinated expertise, counsel and planning before disaster strikes . . . But how? Responding to the challenge, the Architects Foundation launched the National Resilience Initiative (NRI), at the

center of which sits a network of university-based design studios that share information and educate local stakeholders about resilient building and planning practices. Collectively known as the National Resilience Design Network, individual studios offers direct architectural and building services to their respective communities. Effective preparedness and mitigation activities are delivered through training sessions and technical consultations that equip local leaders and architects to strengthen their communities before disaster strikes.

In addition to these primary functions, the NRI works at a grassroots level to identify policy impediments to enacting resilient design, while finding existing codes and standards that do not support the approach. The program also will contribute to the creation of a robust resilience curriculum, providing students and practicing architects access to information on how to make communities safer, stronger and more equitable. These lessons will be shared among our

LEFT: Post-Katrina model home by MC<sup>2</sup> Architects for the Gulf Coast Community Design Center



allied professionals in planning, engineering and landscape architecture to build an environment of cross-collaboration.

Leveraging the work of existing architecture schools and institutions specializing in resilience, the first three core studios were established in 2014 and 2015: the Northeast Studio at the New Jersey Institute of Technology's Center for Resilient Design; the Lower Midwest Studio at Arkansas University's Community Design Center at the Fay Jones School of Architecture; and the South and Gulf Coast Studio at Mississippi State University's Gulf Coast Community Design Studio.

These three regional studios played a key role in the initiative's beginning, addressing diverse community challenges with a series of successful projects, many of which are highlighted in this report. Three additional core studios will be selected in 2016. Together, these six main design hubs will network and engage with other architecture studios and centers across the nation.

Collaboration is essential to the NRI mission, which looks to engage government, the private sector, academia and

nonprofit organizations across the U.S. and beyond. This focus on forging local solutions that can be translated to address national and international challenges proved a central reason the NRI was selected in 2013 as a Clinton Global Initiative Commitment to Action, an effort launched simultaneously with the Rockefeller Foundation's 100 Resilient Cities (100RC) program. These far-reaching partnerships will foster an unprecedented exchange of resilience knowledge, shared globally through 100RC officials in major cities throughout the world.

The NRI is part of a growing system of resilience efforts taking aim at the many challenges communities face at this important juncture in human history. The initiative's design-thinking, problem-solving and networking between studios and local, regional, federal and international stakeholders offers as a fresh and collaborative model for mitigating social and disaster-related risks across the globe.

ABOVE: Work tools at a community cleanup event for the New Jersey Institute of Technology's Center for Resilient Design

## MISSION & GOALS

Targeting vulnerabilities with community outreach and lasting solutions

The National Resilience Initiative is a joint program of the AIA and the Architects Foundation, with partners including the Rockefeller Foundation's 100 Resilient Cities, the Clinton Global Initiative, the Association for Collegiate Schools of Architecture and Public Architecture. The initiative aims to create a nationwide professional and academic network of studios that develops design and policy solutions to increase resilience in the built environment. This studio collective together forms the National Resilient Design Network (NRDN).

Resilience has emerged as a national issue for a number of reasons, but primarily because disturbances, disasters and changes we face are coming to be understood as no longer a one-off, once in a lifetime event, but rather

a compounding issue that affects us all. Modernization of health, safety and security practices means we are losing fewer lives to threats like fires, hurricanes and floods. Unfortunately, the frequency and intensity of these events are sharply on the rise, threatening whole communities and economies. And while building codes protect life safety, they do not protect against property loss. At issue is the creation of a "new normal" that's able to accommodate these changes without it harming people, the planet or the economy.

But it is not just natural disasters like hurricanes, earthquakes and floods we are mitigating. There are many more weaknesses and threats that impact the viability of communities. Recognizing that the architecture community has a leadership role to play in drawing together the

**Short  
history.  
Long-term  
impact.**

**SEPTEMBER 2013**  
Clinton Global Initiative  
commitment made to  
the National Resilience  
Initiative

**MAY 2015**  
First core regional design  
studios announced at AIA  
National Convention

**AUGUST 2015**  
Second and third  
regional studios  
revealed

**OCTOBER 2015**  
Requests for Proposals  
due for final three core  
studios

**MARCH 2016**  
Remaining three  
core studios  
announced

interdisciplinary approaches necessary for success, the AIA along with industry partners like the Urban Land Institute and the U.S. Green Building Council jointly adopted a definition of resilience that promotes projects that help communities prepare, recover and adaptation to adverse events.

“Resilient design places architects at the center of the solution, with particular emphasis on the private, non-governmental sectors,” says American Institute of Architects CEO Robert Ivy, FAIA. “I would like to congratulate my fellow leaders in the design and construction sector for joining together to make sure resiliency is not viewed as just a fad but remains front and center in our efforts moving forward.”

The NRI and its partners believe that resilience is achieved when systems remain adaptable and functioning when faced with disturbances and changing conditions. Using skills drawn from architectural education and practice, the initiative believes that creative system-thinking and design innovation results in thriving and sustainable communities



that allow people and the planet to prosper for years to come. With assistance from the AIA’s extensive membership network, the NRI will inform policy – as well as codes and standards – at national, state and local levels.

The NRI and its affiliates believe that deeper co-benefits for professionals and academia may be realized when collaborations and direct exchanges exist between practice and emerging knowledge. Architects will design using the latest research, and students will become better professionals with exposure to practice-based issues. As such, the NRI’s National Resilient Design Network will unite existing and emerging university-based design centers that are engaged in planning, facilitation and project implementation in their communities.

ABOVE: East River flooding in New York City

LEFT: An NJIT student helps rebuild a damaged Jersey Shore building.

RIGHT: Architect Maurice Cox explains a new project at community design event.



# A MATRIX OF RISK

Approaching a range of interrelated issues

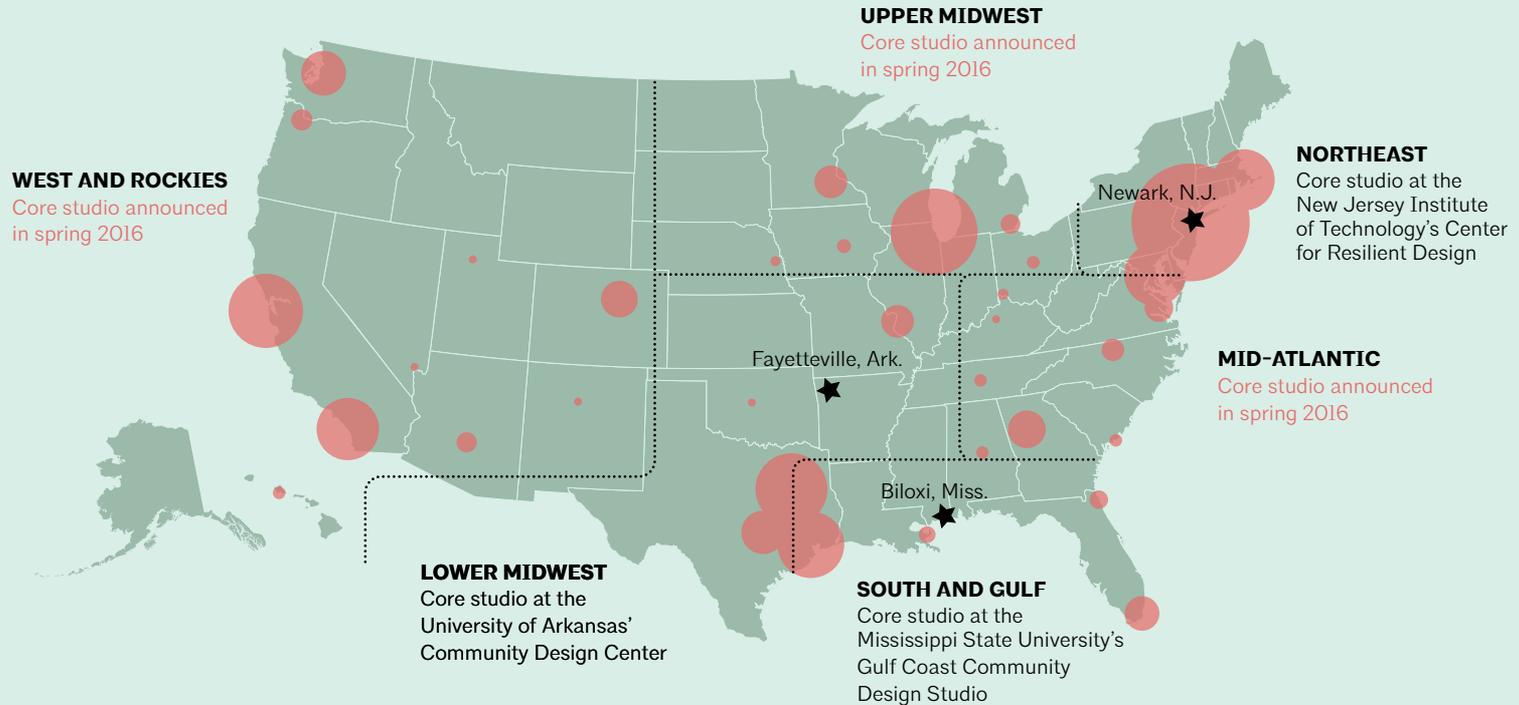


The NRI leverages the expertise of architects, engineers, planners and landscape architects to mitigate chronic, social and disaster-related risks in the following interlinked areas.



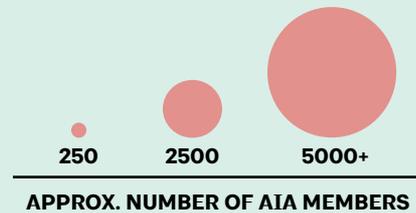
# NETWORKED KNOWLEDGE BASE

Core studios in the NRI's National Resilience Design Network



**STANDARD FEDERAL REGIONS**

★ **NRI CORE DESIGN STUDIO**  
Final three regional core studios will be selected in late 2015 and early 2016



# MISSISSIPPI STATE UNIVERSITY

COLLEGE OF ARCHITECTURE, ART & DESIGN

GULF COAST COMMUNITY DESIGN STUDIO

**NRI CORE STUDIO | SOUTH & GULF COAST REGION**



Biloxi, Miss.





## INTRODUCTION

David Perkes, AIA

Director, Gulf Coast Community Design Studio

2015 marks the ten-year anniversary of Hurricane Katrina and the five-year anniversary of the Deepwater Horizon oil spill. The Gulf Coast Community Design Studio, an outreach program of Mississippi State University College of Architecture, Art and Design, was created to respond to Hurricane Katrina and in the past ten years has evolved from disaster response to long-term efforts of resilience. It has been a remarkable opportunity for me, the director of the Design Studio, to be part of this development. However, I realize that the Design Studio's evolution is not an isolated story. It parallels a national move toward resilience. The National Resilience Initiative is part of this evolution, recognizing that the work of resilience is central to the practice of architecture and taking a leadership role to institutionalize resilience into the practice, the education and the research of architecture.

From the vantage point of ten years of work on the Gulf Coast, I think it is worthwhile to step back and ask the question, "what is changing in the world so that the word 'resilience' is becoming so well-used?" Risk is steadily increasing because natural hazards are increasing and because our increasingly urbanized, industrialized, global economy is dependent upon systems that are vulnerable to failure. However, even though risk is increasing at a steady

rate, the awareness of risk changes abruptly with events such as Hurricane Katrina, the Gulf of Mexico oil spill, Superstorm Sandy, etc. Such disruptive events change the public's attention to risk and stimulate cooperative work.

As disruptive events happen more frequently and effect more people, the public awareness of risk remains heightened and becomes a concern that doesn't go away. Such is the condition of the 21st century, a condition in which there is a nagging awareness of increasing risk. This awareness has an emotional dimension as well, especially when we consider that natural hazards are uncertain and images of disaster in some other part of the world remind us that the particular place we call home could be hit next. What is more, we are becoming increasingly aware that slow-change variables such as ocean temperatures, land cover, ground water levels, etc., can almost imperceptibly approach threshold conditions that result in positive feedback loops that lead to irreversible changes in ecosystems. In the context of risk from both abrupt and slow changes, the word "resilience" is used to

LEFT: Le and Nghia Tran with a home designed and built through the Gulf Coast Community Design Center's Katrina Houses project

# MISSISSIPPI STATE UNIVERSITY

## GULF COAST COMMUNITY DESIGN STUDIO

### Introduction (continued)

counteract uncertainty. It stands against uncertainty, and though we do not always know precisely what we are going to do, to become resilient we agree that we should be doing something.

In the ten years since Hurricane Katrina, the work of MSU's Gulf Coast Community Design Studio has paralleled a national move toward resilience. Our work has been part of a series of national programs and sources of funding that mark a path from disaster recovery to resilience. The design studio's work and the parallel national path toward resilience include:

- 2006-2009 - Housing and Urban Development (HUD) Rebuilding America Partnership Grant
- 2008-2012 - HUD Community Development Block Grant Disaster Recovery funding to produce Long Term Work Force Housing to replace houses lost in Katrina
- 2009-2012 - Department of Homeland Security South East Region Research Initiative (SERRI) funding to research Flood-proof Construction and Temporary Disaster Housing
- 2010-2015 - National Fish and Wildlife Foundation funding for inner city tidal marsh restoration following the BP Gulf of Mexico Oil Spill
- 2010-2013 - HUD Sustainable Communities Initiative
- 2013-2014 - HUD Rebuild By Design

- 2014-2015 - HUD National Disaster Resilience Competition
- 2015 - AIA National Resilience Initiative

As we worked with local communities on the Gulf Coast, I saw a turn toward resilience at the federal level. This turn was clearly evident in the overlap of HUD's Sustainable Communities Initiative and the Rebuild by Design competition when HUD's Office of Sustainable Communities changed to become the Office of Economic Resilience. This was not simply a name change. I saw a new confidence from many people as they rallied around resilience and saw the number and diversity of people working together dramatically increase. I am encouraged from what I am seeing that resilience is a much broader and less exclusive effort than sustainability. I believe that we all have an extraordinary opportunity to shape this broad, inclusive term to encourage learning and experimentation, to broaden public participation and to demonstrate how design is well suited to take on the complexity and uncertainty of social-ecological systems.

I am pleased the Gulf Coast Community Design Studio is part of the National Resilience Initiative and look forward to working with other universities, design practitioners and many other partners in this important effort.

RIGHT: Some of the hundreds of participants in GCCDS's post-Katrina home design program



# MISSISSIPPI STATE UNIVERSITY

## GULF COAST COMMUNITY DESIGN STUDIO

### CASE STUDY: Katrina Houses



BUILT ENVIRONMENT

COMMUNICATIONS

COMMUNITIES

KNOWLEDGE SHARING

Hurricane Katrina resulted in unprecedented housing needs across the Mississippi coast, revealing an unforeseen number of organizational and institutional complications. The Gulf Coast Community Design Studio emerged as a vehicle to use architectural services to create safe and resilient communities in the wake of one of the region's worst natural disasters on record.

To get devastated low-income families into new long-term housing, GCCDS staff found themselves serving as both designers and case managers, working



with clients throughout the design process and helping them secure public relief funding. Studio architects also assisted in guiding local builders and volunteers in proper hurricane zone construction.



For eight years, with various funding sources and partner organizations, GCCDS provided architectural services for 230 new houses and more than 100 rehabilitated homes. Each house was designed specifically for the family and the individual site.

ABOVE: Post-Katrina GCCDS clients

RIGHT: Iesha Brimage and family with their new East Biloxi house

LEFT: Client Patricia Broussard's flood-proof design



# MISSISSIPPI STATE UNIVERSITY

## GULF COAST COMMUNITY DESIGN STUDIO

### CASE STUDY: Bayou Restoration



ECOSYSTEMS



WATER MANAGEMENT



COMMUNITIES



COMMERCE

Bayou Auguste in East Biloxi has been abused by urban development, municipal neglect and poor management, reducing this inner city waterway to little more than a drainage ditch. For the past five years, the Gulf Coast Community Design Studio has worked with many local and national partners to transform Bayou Auguste into a resilient and living landscape, creating a public asset for a historically-underserved community devastated by Hurricane Katrina.

To bring back the bayou's social and ecological potential, GCCDS enlisted a team of volunteers to reshape the stream banks and restore a tidal marsh habitat for fish and shrimp, staples of the local food industry. For stream bank stability, flood control and stormwater filtration, a wall was constructed from reused concrete and local oyster shells. More than 10,000 native plants were placed throughout the site.



Bayou Auguste has an important social role allowing the community to enjoy wildlife, encouraging environmental stewardship and appreciating the unique coastal environment that makes Biloxi home.

The project received a 2012 Mississippi AIA Honor Citation and an EPA Gulf Guardian Award in 2015.

LEFT: A young volunteer takes water samples in the tidal marsh habitat.

ABOVE: A wall of recycled concrete and oyster shells secures a stream bank and controls overflow.

# MISSISSIPPI STATE UNIVERSITY

## GULF COAST COMMUNITY DESIGN STUDIO

### CASE STUDY: Plan for Opportunity, Housing

-  BUILT ENVIRONMENT
-  COMMERCE
-  COMMUNITIES
-  TRANSPORTATION

The Gulf Coast Community Design Studio has joined a team of local and national partners to spearhead the first regional planning effort on the Mississippi Gulf Coast.

Dubbed the Plan for Opportunity, this multi-year collaborative project aims to make the Mississippi Gulf Coast a more sustainable and prosperous region by simply enhancing regional coordination. With its deep roots in post-Katrina rebuilding efforts and community-based design philosophy, GCCDS proved an ideal partner to lead the Plan's housing component and guide a thorough public engagement process.



Starting with a housing assessment report, GCCDS examined the complex story of housing on the Mississippi Gulf Coast, exploring key issues such as affordability, vacancy, finance, insurance, energy and the overall housing market and trends. The studio then reached out to community members to identify challenges and opportunities for fair housing throughout the region. After two-and-a-half years of extensive research, the studio developed a series of recommendations to guide housing interests across the coast.

LEFT: Resilience targets for the Plan for Opportunity

ABOVE: Planning meeting at GCCDS headquarters

**RESILIENCY**  **PLAN FOR OPPORTUNITY**

**WATER**  Water quality and quantity to support regional growth and economy through best management practices.

**FOOD**  The ability to produce and deliver healthy and safe food choices.

**HOUSING**  Housing that is safe, energy efficient and fair. A housing system able to withstand sudden changes or events.

**ECONOMY**  Economy prepared for change through a diverse, educated and trained workforce able to earn livable wage.

**TRANSPORTATION**  Multiple modes of transportation connected regionally to serve diverse mobility needs.

# MISSISSIPPI STATE UNIVERSITY

## GULF COAST COMMUNITY DESIGN STUDIO

### CASE STUDY: Flood-proof Construction

-  KNOWLEDGE SHARING
-  BUILT ENVIRONMENT
-  COMMUNITIES
-  COMMERCE

As with many large flooding events, Mississippi coastal flood zones greatly expanded after Hurricane Katrina, taking in many existing commercial districts. Though houses are required to be above the base flood elevation, commercial construction is allowed to be build at grade for high visibility and handicap access.

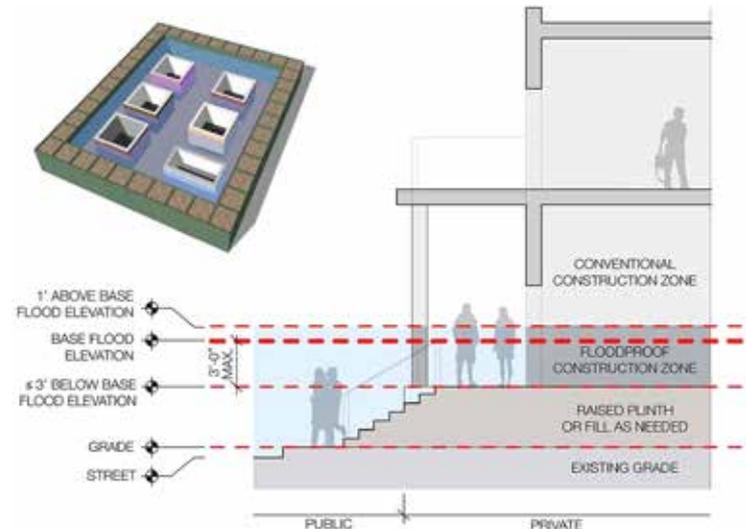
Flood-proof construction still remains a relatively underexplored field for architects, engineers, builders, building inspectors and real estate developers. As such, the Community Design Studio researched planning, building and cost aspects of flood-proof construction in neighborhood-scale commercial buildings.

The studio recreated six common commercial wall assemblies, each monitored with moisture sensors and improved for flood-proof performance during the course of several weeks.

Findings were used by the Biloxi Housing Authority and later submitted to FEMA, which incorporated the lessons into its revised publication on flood-proofing non-residential buildings.

ABOVE RIGHT: Digital construction model and diagram highlighting key floodlines

BELOW RIGHT: Researchers examine the six wall assemblies.



# MISSISSIPPI STATE UNIVERSITY

## GULF COAST COMMUNITY DESIGN STUDIO

### CASE STUDY: Women in Construction Center



BUILT ENVIRONMENT

COMMUNITIES

COMMERCE

PUBLIC SERVICES

The Women in Construction Training Center offers teaching space and working areas for a nonprofit organization whose mission is training and placing women in non-traditional construction occupations.

An interior renovation and new addition not only serves the nonprofit's functional needs, it communicates the "can-do" philosophy of the organization. Design-build elements in the renovation work show innovation and resourcefulness, while the roof of the outdoor workspace manifests how an ordinary, repetitive building element — a roof truss — can accomplish something truly unique.



Construction centered around a week with 40 volunteers from a sponsor organization who traveled to the project site.

In the end, the building process brought together a wide array of participants for a quintessential "barn-raising" style community experience.

RIGHT: Inside the Women in Construction training center

BOTTOM LEFT: Volunteers lift the center's unique roof trusses.

BELOW: The completed open-air workshop center



# MISSISSIPPI STATE UNIVERSITY

## GULF COAST COMMUNITY DESIGN STUDIO

### CASE STUDY: Watershed Planning



ECOSYSTEMS



WATER MANAGEMENT



COMMUNITIES



COMMERCE

With input from local leaders and residents, the Gulf Coast Community Design Studio developed a plan for Rotten Bayou, labeled an impaired waterbody by the Environmental Protection Agency for organic enrichment, low dissolved oxygen, turbidity and nutrient levels. The main contributors to these environmental stressors do not come from a single source and require a holistic approach to devising solutions, along with significant education and public outreach.

Since 2013, GCCDS has sought non-traditional partners for the project, using churches, libraries, golf courses and even an educational puppet show to spotlight the bayou's importance in the region.

One of the most successful projects centers on a popular area pond that flows directly into Rotten Bayou. Well-loved but seriously impacted by waterfowl, the pond has been equipped with a stone filter system, floating islands, and extensive native planting to create abundant root plants to take some of the excessive organic nutrients out of the water before it enters into the bayou.

RIGHT: Education outreach program explores the bayou.

BELOW: Volunteers help contain soil and bayou waterflow.

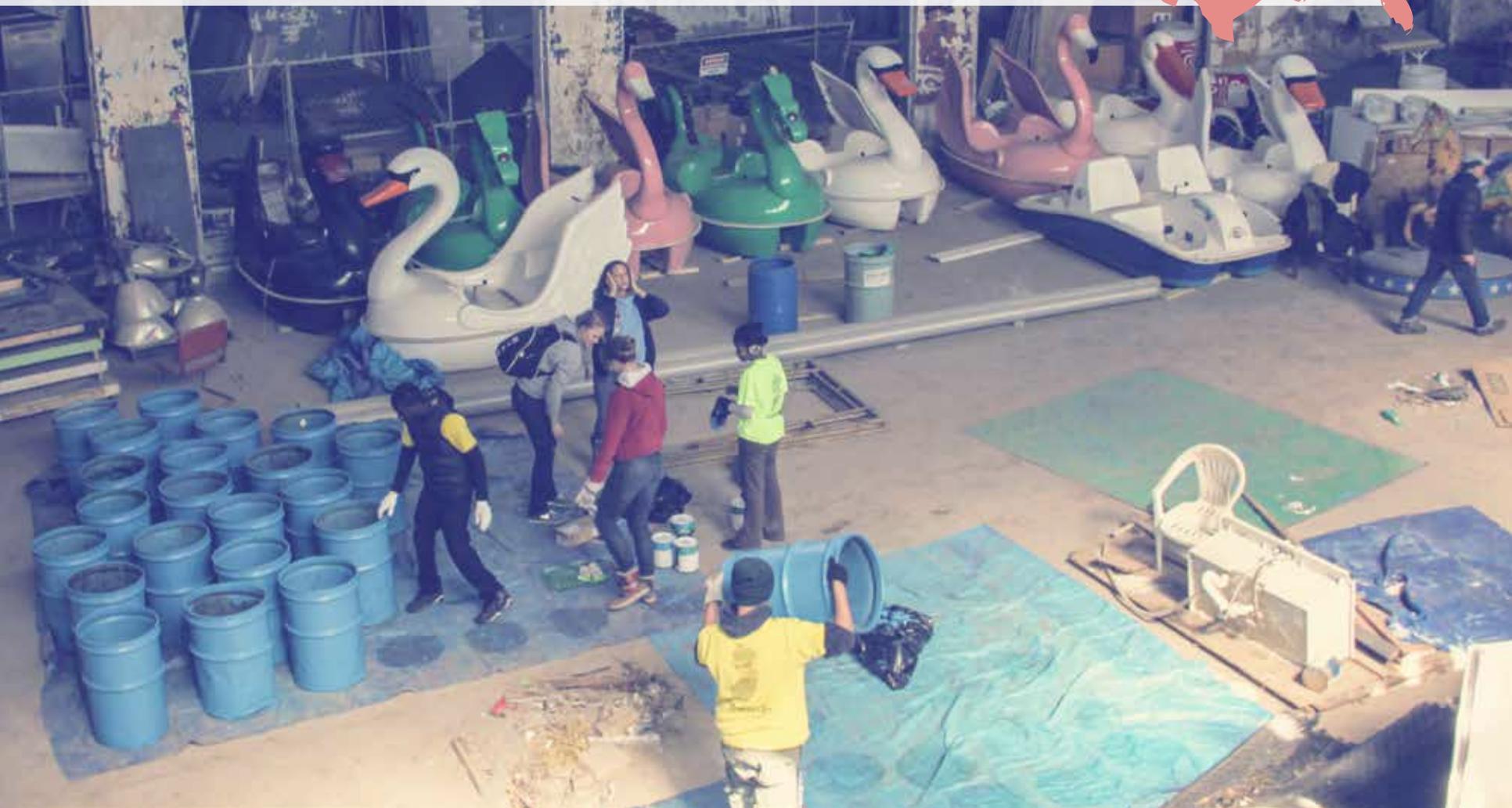


# NEW JERSEY INST. OF TECHNOLOGY

COLLEGE OF ARCHITECTURE & DESIGN

CENTER FOR RESILIENT DESIGN

NRI CORE STUDIO | NORTHEAST REGION



# INTRODUCTION

Deane Evans, FAIA

Executive Director, NJIT Center for Resilient Design

On October 29, 2012 Superstorm Sandy made landfall in the State of New Jersey. More than two million households in the state lost power in the storm, 346,000 homes were damaged or destroyed and 37 people were killed. Storm surge and flooding affected a large swath of the state, and the total cost of damage within the state exceeded \$37 billion.

In the immediate aftermath of this devastating event, the New Jersey Institute of Technology established the Center for Resilient Design as a resource to help New Jersey communities recover from the effects of Sandy. The center has successfully served in this capacity for the last two-and-a-half years – conducting research, providing technical assistance, convening with key stakeholders and utilizing the architecture design studio as a vibrant platform for exploring, conceptualizing and presenting new ideas for improving community resilience through design.

While the center’s focus to date has been on the citizens and communities of New Jersey, its goal is to build on lessons learned in the state and generate research findings, program designs, resiliency “toolkits” and other

outputs that can inform and support disaster-resilience initiatives in other jurisdictions across the United States.

Being part of the National Resilience Design Network is critical to this objective. By providing a conduit for sharing our findings with other regions – and across the country as a whole – the network vastly enhances the reach and impact of our design solutions and our research results.

Likewise, by facilitating access to successful solutions that are being implemented in other parts of the country, the network significantly enhances the center’s capacity to provide “best practice” resilience solutions to jurisdictions within New Jersey and throughout the northeast region.

For all these reasons, the NJIT Center for Resilient Design is both pleased and honored to be included as a participant in the National Resilience Initiative and as a founding member in the National Resilience Design Network.

LEFT: Volunteers with the Center for Resilient Design’s Alternative Spring Break organize a beach restoration project in Asbury Park, N.J.

# NEW JERSEY INSTITUTE OF TECHNOLOGY CENTER FOR RESILIENT DESIGN CASE STUDY: Alternative Spring Break



- COMMUNITIES
- BUILT ENVIRONMENT
- PUBLIC HEALTH
- KNOWLEDGE SHARING

In early 2013, the Center for Resilient Design launched New Jersey Institute of Technology's first annual "Alternative Spring Break" — a large-scale volunteer effort aimed at bolstering communities after Superstorm Sandy's destructive landfall in October 2012.

More than 300 students, faculty, staff, alumni and friends undertook work from Newark to the Jersey Shore, cleaning up devastated areas and helping towns and waterfront neighborhoods rebuild resiliently.

Students worked on cleaning debris from beaches and parks, removing flooring and wallboard, replacing floors and walls, painting and carpentry. Volunteers also continued to stock and distribute food and clothing, as well as gathered information on areas affected by the storm's damaging winds and flooding.

The program has continued to expand following a successful and high-profile inaugural run.



ABOVE RIGHT: Program coordinators at the SurfFlight Theater in Beach Haven, N.J.

RIGHT: Clearing a lost Jersey Shore boat

# NEW JERSEY INSTITUTE OF TECHNOLOGY

## CENTER FOR RESILIENT DESIGN

### CASE STUDY: Resilience Research and Design

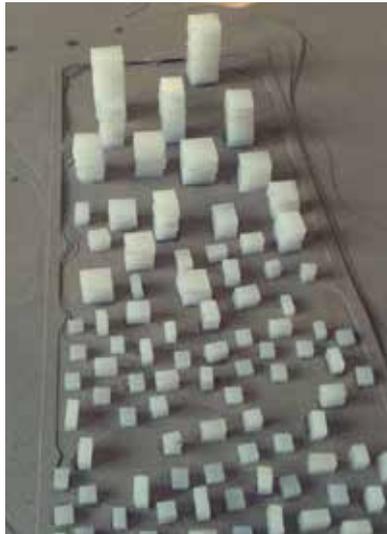


BUILT ENVIRONMENT  
KNOWLEDGE SHARING  
COMMUNITIES  
ECOSYSTEMS

In response to Superstorm Sandy, the NJIT College of Architecture and Design – in collaboration with the Center for Resilient Design – conducted a series of undergraduate studio classes that focused on various aspects of resilient design throughout the northeast United States.

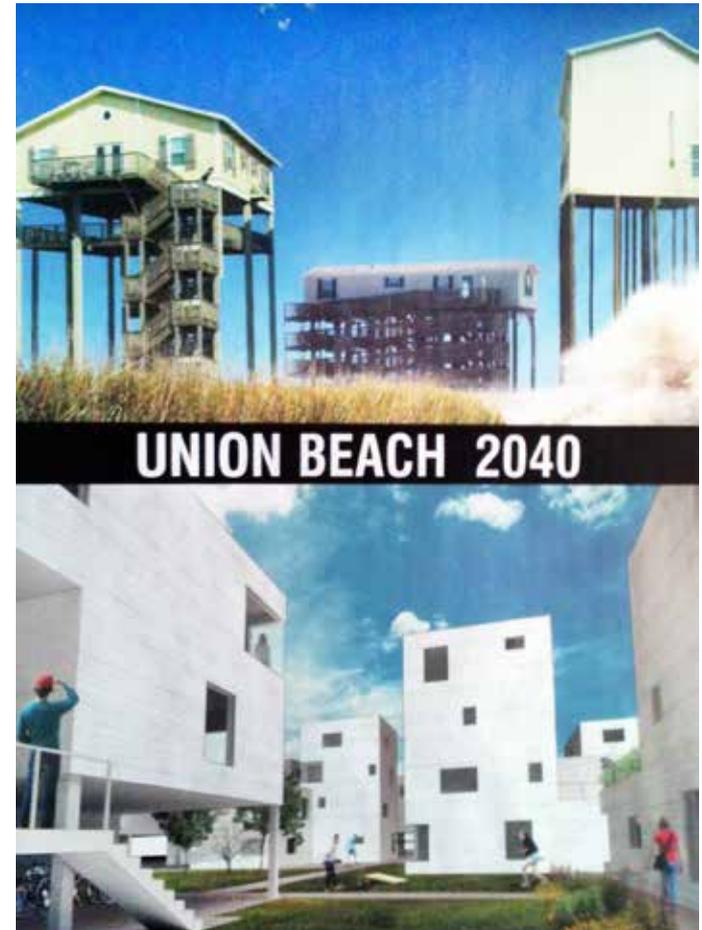
Close to 1,000 NJIT faculty, staff and students created provocative designs and models that helped to both visualize the (re)building post-Sandy and anticipate potential future natural disasters. A centralized clearinghouse is being created

to organize this information as a means to provide public officials, design professionals and others with access to the research that went into the projects and the resulting design solutions.



LEFT: Site design mockup highlighting varied building types

RIGHT: Poster display examining Union Beach, N.J., a popular summer destination just south of Staten Island



# NEW JERSEY INSTITUTE OF TECHNOLOGY

## CENTER FOR RESILIENT DESIGN

### CASE STUDY: Hoboken Terminal Project



- TRANSPORTATION
- BUILT ENVIRONMENT
- COMMUNITIES
- KNOWLEDGE SHARING

Through a generous grant from New Jersey Transit, the NJIT College of Architecture and Design – in collaboration with the Center for Resilient Design – conducted a research seminar and a comprehensive design workshop focused on expanding and improving the resiliency of the Hoboken Terminal.

The terminal, located on the northern edge of the city of Hoboken, is one of NJ Transit’s most trafficked and serves as a multi-nodal center with New York City access via train, PATH and ferry; Hudson County access via PATH and Hudson-Bergen Light Rail; and broader state access via New Jersey Transit trains. The existing terminal was damaged during Superstorm Sandy, requiring the resilient adaption of the building while expanding it with an annex.

Students worked in teams over the course of the semester, with regular input and review by New Jersey Transit architectural and

engineering personnel. At the conclusion of the semester, four projects were selected for further elaboration by a four-person team of students working as summer interns at New Jersey Transit’s headquarters in Newark.

A final presentation of the updated projects – highlighting design ideas of particular interest to NJ Transit personnel – is scheduled to take place inside the Terminal building in late 2015.

RIGHT: Hoboken Terminal in October 2012, following Superstorm Sandy



# NEW JERSEY INSTITUTE OF TECHNOLOGY

## CENTER FOR RESILIENT DESIGN

### CASE STUDY: Microgrids and Resilience



POWER



ECOSYSTEMS



COMMUNITIES



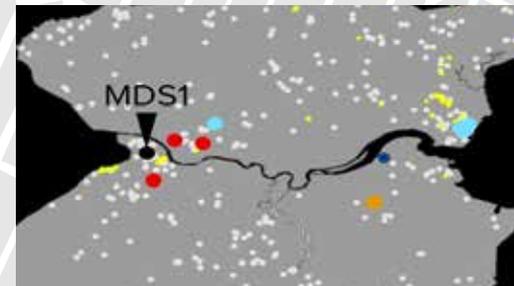
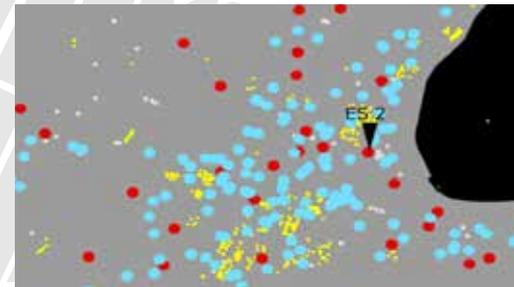
KNOWLEDGE SHARING

The Center for Resilient Design initiated a study to assess the potential for using distributed power generation and “microgrids” to both increase energy efficiency and reduce hazard vulnerability at the community level.

Through an innovative partnership with the Regional Plan Association and the New Jersey Energy Resilience Bank, the center conducted an analysis of potential locations for distributed energy resources in the Sandy-affected regions of New Jersey. The project identified a series of 24 “town centers” – clusters of public facilities and geographically adjacent non-public buildings – that could be suitable for community-level microgrids.

A report summarizing results was provided to the Energy Resilience Bank, which has indicated a desire to expand the analysis to all the remaining counties in New Jersey.

RIGHT: Regional New Jersey maps marking potential sites for 24 new microgrids



# NEW JERSEY INSTITUTE OF TECHNOLOGY CENTER FOR RESILIENT DESIGN CASE STUDY: Ocean City Sustainable Housing



BUILT ENVIRONMENT  
KNOWLEDGE SHARING  
ECOSYSTEMS  
COMMUNITIES

The Center for Resilient Design began work on a research project analyzing the relationship between sustainability and resilience at the scale of the single family house.

The project focused specifically on a home in Ocean City, N.J. that had been damaged in Superstorm Sandy and recently rebuilt. The study analyzed whether the repairs implemented would qualify the home for both Energy Star certification (a measure of its sustainability) and for Fortified Home designation (a measure of its resilience).

The study was a first step in what the Center hopes will be a broader set of analyses to assess the degree to which employing energy conservation measures can result in improved resilience and vice versa.

A comprehensive report covering the results of the Ocean City study will be compiled and released to the public.

CLOCKWISE  
TOP: Boardwalk  
debris three  
blocks from the  
beach; sand and  
water blocking  
traffic; waters  
reaching City  
Hall



# NEW JERSEY INSTITUTE OF TECHNOLOGY CENTER FOR RESILIENT DESIGN CASE STUDY: Mayors' Academy on Resilience



ECOSYSTEMS

WATER MANAGEMENT

COMMUNITY

COMMERCE

The Center for Resilient Design will convene the first New Jersey Urban Mayors' Academy on Resilience. The Academy is a joint effort of NJIT, the John S. Watson Institute for Public Policy of Thomas Edison State College and the Regional Plan Association.

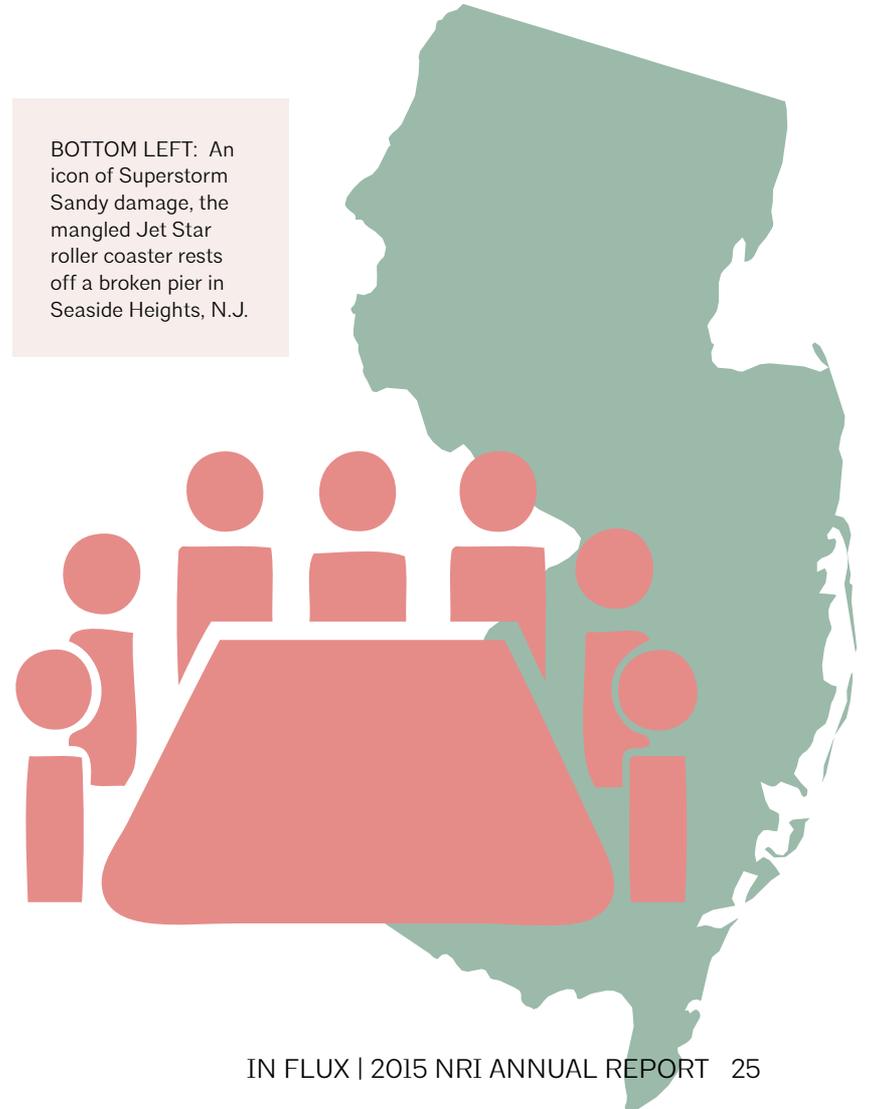
Modeled on similar — and highly successful — regional and urban design institutes, the Academy will provide a two-day retreat for invited mayors and a resource team of technical, design and planning professionals to develop local resiliency strategies that synthesize the best available approaches with specific local conditions, costs and benefits.



The resulting strategies will be summarized for each participating mayor and released publicly to serve as models for other urban municipalities throughout the state and beyond. Participating New Jersey municipalities will include Bridgeton, Orange, Perth Amboy, Trenton and Vineland.

The first Academy takes place in late 2015, with a report of findings to be delivered soon thereafter.

BOTTOM LEFT: An icon of Superstorm Sandy damage, the mangled Jet Star roller coaster rests off a broken pier in Seaside Heights, N.J.

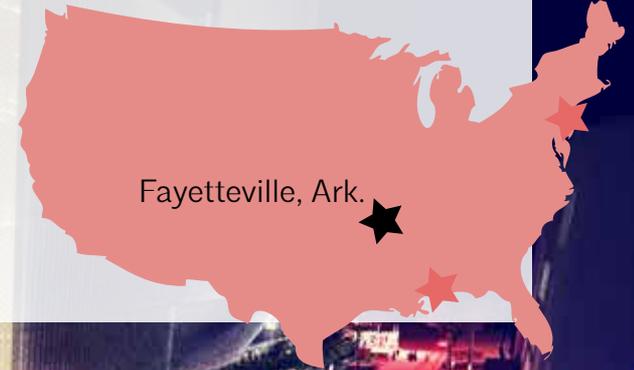


# UNIVERSITY OF ARKANSAS

## FAY JONES SCHOOL OF ARCHITECTURE & DESIGN

### COMMUNITY DESIGN CENTER

**NRI CORE STUDIO | LOWER MIDWEST REGION**



Fayetteville, Ark.



## INTRODUCTION

Stephen Luoni, AIA

Director, UA Community Design Center

The University of Arkansas Community Design Center advances creative development in Arkansas through design, research and education solutions that enhance the physical environment. UACDC is one of only a handful of university-based teaching offices in architecture and urban design nationwide. Founded in 1995 as an outreach center of the Fay Jones School of Architecture + Design (FJSoA+D) the center is housed in its own facilities in downtown Fayetteville with 12-month design and planning staff who deliver professional services to communities and organizations statewide. Several staff hold faculty appointments in the FJSoA+D, including a distinguished university professor in architecture. The design center regularly collaborates with allied professionals and faculty in multiple disciplines. UACDC's signature design approach works within multidisciplinary frameworks that address the "triple bottom line," simultaneously solving for social, economic and environmental benchmarks.

While university-based community design centers were common decades ago their focus was mostly directed at discrete projects for distressed communities. Taking a different approach to the public interest, UACDC addresses the development of public goods through

context-oriented challenges — "wicked problems" — that frame larger purposes. UACDC has developed eight place-making models to address core challenges in the built environment. Among these platforms UACDC has triangulated codes, policies and best practices toward new design vocabularies in transit-oriented development, low impact development (ecologically-based stormwater management), context-sensitive street design, agricultural urbanism, watershed urbanism and smart growth urbanism, among others. UACDC has helped to reshape development and planning policy at state, regional and municipal levels.

The center works incrementally on the greatest ongoing challenge to design and planning: design within ecosystems that are now human-dominated. In watershed urbanism we ask how the ecological integrity of riparian corridors flowing through cities might be maintained to deliver the 17 ecological services that all healthy ecosystems deliver? On the other hand, in low impact development, we ask how urban infrastructure might integrate ecological engineering so that

LEFT: Little Rock Creative Corridor, conceived by students from the UA Community Design Center

# UNIVERSITY OF ARKANSAS

## COMMUNITY DESIGN CENTER

### Introduction (continued)

hard infrastructure delivers ecosystem services? UACDC's book, "Low Impact Development: A Design Manual for Urban Areas," pioneers the role of ecological-based urban stormwater management in urban design and is used in university classrooms and government agencies worldwide. Such reconciliation landscapes are indispensable to the formulation of resilience.

In agricultural urbanism, we propose scenarios that optimize a city's metabolism through the rendering of agricultural processes and food production as a utility throughout an urban region. Our scenario planning also has envisioned alternative futures to regional sprawl through transit-oriented development featuring interurban rail as a generator of sustainable development patterns. In context sensitive street design we investigate the street's reclamation of non-traffic functions to regenerate neglected downtowns and civilize



auto-oriented commercial corridors ripe for retrofitting. Such multi-year initiatives in developing public goods are sustained by the university's investment in the center's infrastructure, which includes facilities and a professional staff.

Based on UACDC's work in urban ecology, it is fitting that the next stage of the center's development involves partnering as a regional design center with the Architects Foundation's National Resilience Initiative. The NRI is premised on understanding that the health of a profession is related to its capacity to produce public goods. Public goods like clean water, waste management, education, public health, law and order, parks, roads and transit infrastructure, etc., are social structures necessary in building healthy communities though they are not comprehensively provided by markets. Indeed, classical economists see public goods as "market failures" because easy money cannot be made by providing public goods. The very status of public goods is indicative of a community's resilience; its ability to endure and even grow stronger in the face of acute shock or chronic stress. Hence, professions are unique cultures of work distinguished by their incorporation of the public interest in the delivery of goods and services.

The NRI is an important public-interest effort to embed design thinking into the operation and management of communities. We are proud to be part of the NRI and its inaugural cohort of regional centers and look forward to the new horizons ahead.



ABOVE AND RIGHT: Little Rock Creative Corridor, creating bustling streetscapes both day and night

LEFT (OPPOSITE): Site model of the UA design center's Transit City project



# UNIVERSITY OF ARKANSAS COMMUNITY DESIGN CENTER CASE STUDY: Fayetteville 2030, Food City



FOOD SUPPLY



ECOSYSTEMS



BUILT ENVIRONMENT



KNOWLEDGE SHARING

The City of Fayetteville is located in northwest Arkansas – the most prosperous region of the state. Yet, area has one of the highest rates of child hunger statewide, while Arkansas itself has the highest rate of child hunger nationally with more than 25 percent of children food insecure.

What if new development enabled the city to sustain its food budget through a local urban agriculture network?

As the Fayetteville looks to double its population by 2030, Food City proposes an urban food production system beyond the scale of the individual garden. The

scenario envisions the foodshed as an ecological municipal utility, featuring green infrastructure, public growscapes, and urban spaces related to food processing, distribution and consumption.

The project reclaims a missing middleground of agricultural land use, one that rests untapped between the personal backyard garden and the large-scale industrial farm.

Created in close collaboration with the city and nonprofit groups tasked with overcoming hunger and poverty, Food City presents a resilient community where a significant portion of the population experiences compounding distress brought by swings in the economy.



ABOVE: Community cafe offering food items produced from the Food City initiatives

LEFT: Sanctioned right-of-ways for gardeners transform front yards into food-producing “edible estates.”



# UNIVERSITY OF ARKANSAS COMMUNITY DESIGN CENTER CASE STUDY: Fayetteville 2030, Transit City

-  TRANSPORTATION
-  BUILT ENVIRONMENT
-  ECOSYSTEMS
-  COMMERCE

Like the Food City project, Transit City explores a Fayetteville that will double in size by 2030, adding approximately 160 million square feet in less than two decades. To tackle this new urban space, the Community Design Center envisions a unique but plausible future based on emerging energy and transit trends.

What if 80 percent of future growth occurred around a new streetcar system along Fayetteville's main commercial arterial, presently dominated by sprawl and the automobile?

By retrofitting Fayetteville's traffic-heavy College Avenue — at present, a state highway — Transit City envisions a

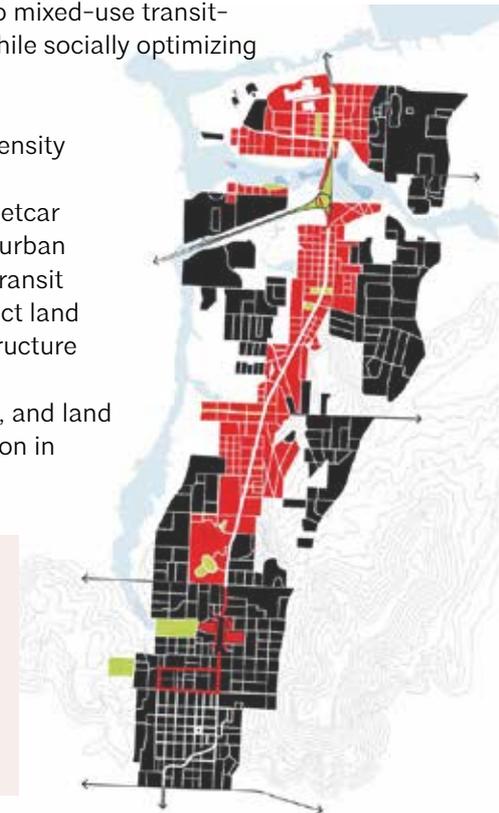
five-mile signature multi-modal boulevard that features outdoor public art malls, transforming single land-use zoning into mixed-use transit-oriented neighborhoods while socially optimizing its transportation future.

While dominated by low-density neighborhoods with single-family housing, streetcar neighborhoods producing urban concentrations along the transit corridor. The plan's compact land uses and neighborhood structure remediate inefficiencies in transportation, energy use, and land consumption — a maturation in urban metabolism.



RIGHT: Fayetteville's existing development in black, with Transit City project in red

LEFT: The remote Walton Arts Center gets integrated into a new pedestrian-friendly shared street.



# UNIVERSITY OF ARKANSAS COMMUNITY DESIGN CENTER CASE STUDY: Habitat Trails Neighborhood



BUILT ENVIRONMENT



ECOSYSTEMS



PUBLIC SAFETY



KNOWLEDGE SHARING

Consisting of 17 Habitat for Humanity homes, Habitat Trails is a green affordable neighborhood that employs a range of conservation planning strategies to preserve more than one third of the site as open space.

Both environmentally and economically sound, the project is designed as a sponge to work in accord with existing hydrological drainage, catchment and recharge patterns. Stormwater runoff is retained and treated through a contiguous network of bioswales, infiltration trenches, stormwater gardens, sediment filter strips and a constructed wet meadow.

The integration of a treatment landscape with open space substitutes an ecologically-based stormwater management system for the expensive curb-gutter-pipe solution in civil infrastructure. Narrow width streets installed with pervious



materials like grasscrete leave ample room for green space, minimizing costly impervious pavement and dampening unsafe motorist speeds.

Vegetated stormwater landscapes project a unique neighborhood character and visually link the house porches to the streetscape. Since all homes feature a generous open porch area, all residential setbacks are minimized to facilitate and increase opportunities for neighborly interaction.

ABOVE: One third of neighborhood is preserved as open space.

LEFT: Porches, though private, remain connected to public areas.

# UNIVERSITY OF ARKANSAS COMMUNITY DESIGN CENTER CASE STUDY: Little Rock Creative Corridor



BUILT ENVIRONMENT



COMMERCE



COMMUNITIES



ECOSYSTEMS

The Creative Corridor retrofits a four-block segment of an endangered historic downtown Main Street through development catalyzed by the cultural arts rather than Main Street's traditional retail base.

The goal is to structure an identity for the Creative Corridor based on a mixed-use working and living environment anchored by the arts. The challenge involves restructuring a public realm conceived for workday commercial activities to now serve 24/7 urban lifestyles with a high level of livability.



The design approach restructures the corridor into a node utilizing the urbanism of streetscapes – landscape architecture, ecological engineering, public space configurations, frontage systems and other townscaping elements.

Catalyzed by the aggregation of cultural organizations currently scattered throughout the greater Little Rock area, this reclamation of a neglected historic Main Street proposes a land-use mix presently unavailable in the city, one that combines residential development with work opportunities and urban cultural life.



ABOVE: An “outdoor classroom” for public education and knowledge sharing outreach

LEFT: Once a veritable ghost town after the workday, Little Rock's Main Street becomes a hub of evening activity.

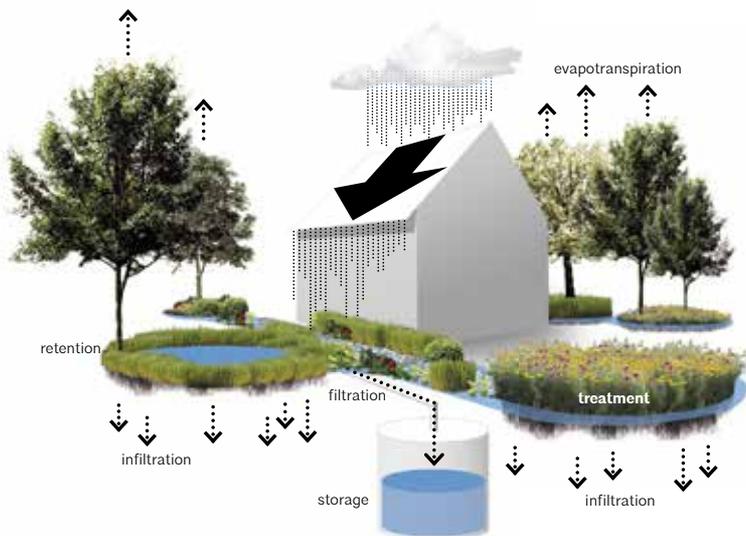


# UNIVERSITY OF ARKANSAS COMMUNITY DESIGN CENTER CASE STUDY: Low Impact Development

-  ECOSYSTEMS
-  WATER MANAGEMENT
-  COMMUNITIES
-  KNOWLEDGE SHARING

To assist developers, homeowners and municipalities enact more sustainable stormwater management, the Community Design Center published a 230-page manual covering the essentials of Low Impact Development (LID).

With detailed illustrations and instructions, this guide presents a graphic argument that uses urban design templates to highlight the role of LID technology in regional planning, infrastructural design and community development.



The goal is to promote water-management techniques that infiltrate, filter, store, and evaporate stormwater runoff close to its source, rather than the conventional “pipe-and-pond” methods that simply transfers polluted water to an other location through pipes, catchment basins, curbs and gutters.

Commissioned by the US Environmental Protection Agency and the Arkansas Natural Resources Commission, the manual serves as part of a larger planning effort to promote implementation of LID in urban areas. Designers collaborated with state agencies, the City of Fayetteville, environmental advisory citizen groups and nonprofits to provide planning templates, codes and best practices that enable use of LID.

In April 2010, Fayetteville became the first Arkansas city, and among a handful nationwide, to adopt a LID code, making it a by-right system.

LEFT: A residential format for LID design which captures, filters and stores stormwater onsite rather than diverting water to another location.



# UNIVERSITY OF ARKANSAS COMMUNITY DESIGN CENTER CASE STUDY: Vilonia Plan and Safe Rooms



BUILT ENVIRONMENT



PUBLIC SAFETY



COMMUNITIES



ECOSYSTEMS

In April 2014, the Little Rock suburb of Vilonia was devastated by an EF4 tornado. With much of the town destroyed, local leaders began a planning the effort to rebuild.

The Vilonia Reinvention Plan addresses the small town's exponential population growth and desire for local commerce and community safe rooms. New safe room typologies from shipping container arrangements are proposed, and the introduction of a town loop organizes public space and new walkable neighborhoods.

Based on the Reinvention Plan, FEMA awarded a \$1 million grant to Vilonia in July 2015 to build a demonstration underground safe room using shipping containers. Vilonia's City Council unanimously adopted the Reinvention Plan and its requisite form-based codes

LEFT: Damage from Vilonia's EF4 tornado touchdown

ABOVE AND RIGHT: A town square helps unify a once sprawling plan.



(eliminating single-use zoning) on April 27, 2015, the one-year anniversary of the 2014 Tornado. The city is currently working with property owners to aggregate parcels for the development of a Phase I mixed-use town square.





Stabilizing dune grass begins to spout as part of NJIT's beach protection project in Asbury Park, N.J.



# IN CLOSING

## Designing for a stronger, brighter future

We are seeing the intersection of two powerful forces already affecting us and certainly our children. The frequency and intensity of storms is increasing as the world's growing population is moving into densely crowded cities. The result is clear: When disaster strikes, more of us are in harm's way.

Earthquakes, fire, flood and acts of terrorism are unfortunately facts of life. However, we are not powerless to prevent or lessen the pain and suffering they cause. Under the leadership of the Architects Foundation, architects are working with their neighbors to design resiliency into their communities. In 2016, the Foundation will continue to grow its network of National Resilience Design Studios, and as a result of that effort, the National Resilience Initiative will continue to offer communities large and small a stronger, brighter future.

Whatever shape they take, destructive forces will inevitably come pounding at our door. Architects and community leaders are making sure that door is strong and resilient.

George H. Miller, FAIA  
2010 AIA President  
Director, Architects Foundation Board of Directors



## ACKNOWLEDGEMENTS

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100 Resilient Cities, Pioneered by the Rockefeller Foundation

The Rockefeller Foundation

**... And most importantly, the architects who work every day for our collective health, safety and welfare.**

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