

## NEWSLETTER

Year 36, Issue 1 | Spring 2012

### Contents

President's Message .....	1
<i>ARCC Report</i>	
Conferences & Calls	
<a href="#">2012 EAAE/ARCC Conference</a> ...	2
<a href="#">2013 ARCC Conference</a> .....	3
Awards Program	
<a href="#">2010-11 King Medal</a> .....	4
<a href="#">General Award Deadline</a> .....	5
<a href="#">New Publications</a> .....	6
Research Reports	
<a href="#">Fenestration Guidelines (IIT)</a> .....	7
<a href="#">Public Interest Design (LTU)</a> .....	11
<a href="#">U.S. EDA Grant (Maryland)</a> .....	11
<a href="#">Smart Growth (Maryland)</a> .....	12
<a href="#">Transitory Constructs</a>	
<a href="#">(Montana State)</a> .....	13
<a href="#">Social Interaction</a>	
<a href="#">(U of Kansas)</a> .....	15
<a href="#">CONNECT Vision (UNCC)</a> .....	16
<a href="#">Solar Decathlon (UNCC)</a> .....	16
<a href="#">Re-Shaping Lilong (UNCC)</a> .....	17
<a href="#">Textile Block System (USC)</a> .....	19
<a href="#">Daylight, Glare &amp; Facades</a>	
<a href="#">(USC)</a> .....	20
<a href="#">Sustainable Choices (UTSA)</a> .....	21
<a href="#">ARCC Information</a> .....	21

## President's Message

Keith Diaz Moore, PhD, AIA  
January 26, 2012

Dear ARCC colleagues,

It is a great honor to have been elected as President of ARCC and I look forward to your ideas on how ARCC may better forward its commitment to the expansion of the research culture and a supporting infrastructure in architecture and related design disciplines. **Michael Kroelinger** (Arizona State) leaves difficult shoes to fill as ARCC as seen tremendous growth and advancement as an organization during his time at the helm. I am glad he continues to serve as our Past-President.

One of the advantages I have as incoming President is that the ARCC executive committee has such wonderfully insightful and hardworking members. **Michelle Rinehart** (Catholic University of America) has been an active board member of ARCC and is now serving ably as Vice-President. Michelle and I have known each other for longer than either of us would care to divulge, and I look forward to her wise council. **Barbara Klinkhammer** (University of Tennessee) was elected Treasurer, taking over the position from **Steve Weeks** (University of Minnesota) who served as ARCC Treasurer with distinction for many years. Barbara has an effervescent personality that I am sure will energize the board. Luckily, **Leonard Bachman** (University of Houston) continues to serve as the organization's secretary, providing us a steady hand during transition. The Board also welcomes **Christopher Jarrett** (UNC-Charlotte) as an at-large Board Member, joining **Aron Temkin** (Norwich University), **Hazem RashedAli** (University of Texas-San Antonio) and **Philip Plowright** (Lawrence Technological University), while thanking **Michel Mounyar** (Ball State University) as he cycles off the board after giving so much spirit and direction to the organization over the past decade. Collectively, we thank Michel and Steve for their yeoman efforts and while we are saddened to see them go, we move forward and embrace the urgency of our era to forward ARCC's mission, so critical to the further development of our discipline and our profession.

One of our core efforts at expanding the research culture is this newsletter. The purpose of this newsletter is to share information about how many of our member schools and programs are focusing their research efforts. Our intent is to galvanize innovation and collaboration through such networking. We encourage each member organization to share the outstanding work that is occurring within each member organization.

The newsletter is also intended to highlight opportunities such as conferences and workshops to share and become inspired. Two future research conferences to note include the fast-approaching 2012 ARCC/EAAE Conference which will be held in Milan, Italy during June of 2012, and the 2013 ARCC Research Conference which will be hosted by the University of North Carolina at Charlotte both of which have additional information in this newsletter.

Again, I am humbled to serve as your President but I know with such a great and able team and with your continued efforts, ARCC will continue to increase its effectiveness in nurturing the research culture within architecture and its related disciplines.

Keith Diaz Moore, PhD, AIA (University of Kansas)  
ARCC President

## ARCC Report

The ARCC Report covers activities that the ARCC is directly engaged in supporting. These include the ARCC Awards Program, which is an annual collection of grants and recognition to support architectural research, as well as the ARCC conference series and the ARCC Journal, an Academic Free Access Journal for Architecture.

### 2012 EAAE/ARCC Conference

## Conferences and Calls



## 2012 EAAE/ARCC INTERNATIONAL CONFERENCE ON ARCHITECTURAL RESEARCH

### Cities in Transformation Research & Design Ideas, Methods, Techniques, Tools, Case Studies

#### Milano (Milan, Italy) 7-10 June 2012

The 2012 international conference of the European Association for Architectural Education (EAAE) and the Architectural Research Centers Consortium (ARCC) will be held in the period from June 7<sup>th</sup> to 10<sup>th</sup> in the Italian city of Milan. This year's offering of this prestigious biannual joint conference is hosted and organized by the Politecnico De Milano, one of the major Italian universities, and is titled "*Cities in Transformation, Research and Design*". The conference themes revolve around the well-known sentence by Leon Battista Alberti: *The house is like a small city and the city is like a big house*, and therefore aim to underline the tight connections existing between architecture and the city, and the strong and recognized Italian tradition of urban studies in the context of the underlying climate change and energy issues. Conference papers will explore ideas, methods, techniques, tools and case studies of urban transformations following seven general themes:

- Knowledge of the City for Urban Transformation;
- History, Theory and Criticism of Architecture and Urban Design;
- Criticism, Conservation and Restoration;
- Housing and the Shape of the City;
- Architecture and Technical Innovation;
- Infrastructure Networks and Landscape; and
- Education in Architecture.

This year's conference received approximately 450 abstract submissions from academics, researchers, and scholars the US, Europe, and around the world. Selection of papers for the conference will be based on a rigorous two-stage peer-review process by leading researchers from Europe and the US. In addition to full papers, the conference will also include a poster session which will include contributions that are interesting and suitable for synthetic exposition represented by an appropriate choice of iconography. In

In addition to paper and poster sessions, the conference will include three keynote lectures by leading researchers as well as relevant tours in Milano and Como. More information about registering for the conference can be found at:

<http://emma.polimi.it/emma/showEvent.do?page=1530&idEvent=49>

## **CONFERENCE COMMITTEE**

Adalberto Del Bo (Head of Committee), *Politecnico di Milano*  
Ebbe Harder, *Royal Danish Academy of Fine Arts*

### **Scientific Committee**

#### **Politecnico di Milano**

Federico Bucci, Adalberto Del Bo, Giancarlo Floridi, Martina Landsberger, Maurizio Meriggi, Ilaria Valente

### **ARCC**

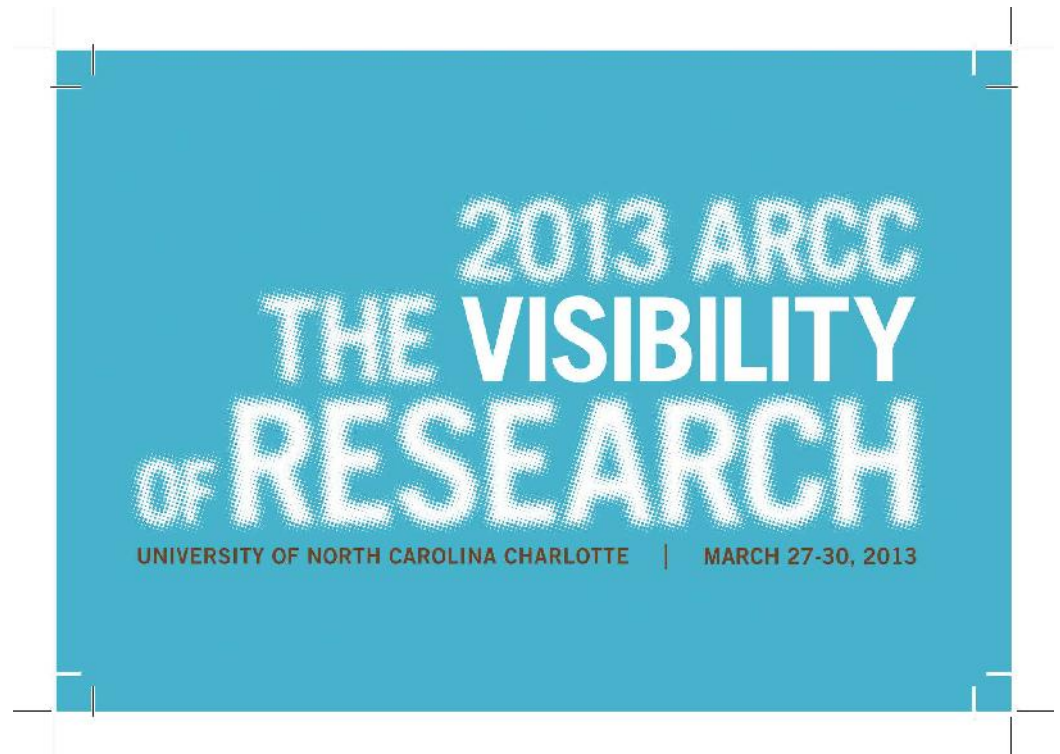
Leonard Bachman, *University of Houston*  
J. Brooke Harrington, *Temple University*  
Philip Plowright, *Lawrence Technological University*  
Hazem Rashed-Ali, *University of Texas at S. Antonio*  
Katherine Wingert-Playdon, *Temple University*  
Christopher Jarrett, *University of North Carolina-Charlotte*

### **EAAE**

Per Olaf Fjeld, *Oslo School of Architecture and Design*  
Maire Henry, *Waterford Institute of Technology*  
Johannes Käferstein, *Lucerne University Applied Sciences*  
Stefano Musso, *Università di Genova*  
Herman Neuckermans, *Katholieke Universiteit Leuven*  
Aart Oxenaar, *Amsterdam Academy of Architecture*  
David Vanderburgh, *Katholieke Universiteit Leuven*

SECRETARIAT Cristina Giannetto, Marco Grassi - email: [eaae-arcc.milano@polimi.it](mailto:eaae-arcc.milano@polimi.it)

2013 ARCC Research Conference



**2013 ARCC Spring Architectural Research Conference**

March 27-30, 2013 at the University of North Carolina Charlotte  
Chris Jarrett, Chair | Kyounghee Kim and Nick Senske, Co-Chairs

[www.soa.uncc.edu](http://www.soa.uncc.edu)

## 2010 Awards Program

The ARCC supports architectural research through a program of awards and research grants. The full list of awards can be found at <http://www.arccweb.org/news.html> The deadline for all award and grant applications is in January of each year, excluding the King Medal program which has an April deadline.

### 2010-11 King Medal

## 2011-12 ARCC | King Student Medal for Excellence in Architectural + Environmental Design Research

The Architectural Research Centers Consortium is pleased to announce the thirteenth annual King Student Medal award program.

Named in honor of the late Jonathan King, co-founder and first president of the Architectural Research Centers Consortium (ARCC), this award will be given to one student per ARCC member school. Selection of school recipients is at the discretion of the individual institutions, but will be based upon criteria that acknowledge innovation, integrity, and scholarship in architectural and/or environmental design research. The award may be made at either the graduate or the undergraduate level.

For more information on the ARCC | King Medal please contact Dr. Brian R. Sinclair FRAIC, Faculty of Environmental Design, University of Calgary, 2500 University Drive NW, Calgary, Alberta, Canada T2N 1N4 email: [brian.sinclair@ucalgary.ca](mailto:brian.sinclair@ucalgary.ca)

**Deadline for submissions is Monday 9th April 2012**

Details on the Web: [http://arccweb.org/about\\_awards3.html](http://arccweb.org/about_awards3.html)

### General Award Deadline

## 2012 Award Program Deadline

The Architectural Research Centers Consortium (ARCC) has **extended its deadline until Friday, February 10** for the following three awards:

### ARCC James Haecker Distinguished Leadership Award

*This award recognizes an individual who has made outstanding contributions to the growth of the research culture of architecture*

<http://www.arccweb.org/ARCCHaecker11.pdf>

### ARCC Incentive Fund Award

*This funding is intended to supplement and support ongoing efforts to disseminate findings of architectural research*

<http://www.arccweb.org/ARCCIncentive11.pdf>

### ARCC New Researcher Award

*This award acknowledges emerging figures (whom must be tenure-track) in architectural and environmental design research.*

<http://www.arccweb.org/ARCCNewR11.pdf>

## ***New Publications by ARCC Members***

### **Material Strategies in Digital Fabrication**

Chris Beorkrem, Assistant Professor  
Digital Arts Center (D-Arts)  
University of North Carolina-Charlotte

Professor Chris Beorkrem's forthcoming book *Material Strategies in Digital Fabrication* (Routledge Press) argues for melding the expressively digital with a strict material-conscious design process. Each chapter looks at both case studies and methods for using parametric software and fabrication equipment to link form to material and construction limits. The book will serve as a guide for post-great recession digital design processes focused on the use of tools to create iconic, conscientious built form. The book will include alternative curriculum for digital fabrication courses in architectural schools. It will also provide practitioners with hands-on instruction for emulating proven design strategies.

Wide spread availability of advanced software and computer-controlled manufacturing tools have led to some of the greatest advances in architectural discourse over the past fifteen years. These tools have brought about a windfall of change, for the process of design and construction and the expectations for singular architectural works. While infatuated with new automated sculptural capabilities, we have often lost sight of our larger responsibilities to human inhabitation and the phenomenological experience of materiality.

Architects and designers must respond to the post-great recession standard society is expecting of them. While the arc of digital advancement is seemingly unstoppable, there must be a more grounded outlook going forward. The material choices designers make bare the burden of their performative impact. If there are particular parameters to define exceptional work, materiality and construction ought to be at the forefront. All too often construction techniques are post-rationalized layers of the design process. Forms are brought to engineers and consultants to have systems applied to them. This often results in convoluted and piece-meal structural integration and excessively high construction costs. Alternatively, inventive material uses could be the defining logic behind innovative architectural form.

*Material Strategies in Digital Fabrication* is divided into five parts by material – wood, metal, concrete, hybrids, and recycled. The book outlines, in graphic detail, the processes used to delimit architectural form through material constraints and performance. In step-by-step diagrams, Beorkrem shows how material performance drives the digital fabrication process. Some of the most progressive works of architecture of the last decade are recreated and dissected, with perspectives from the designers who describe the successes and failures of each project. Using consistent language and simple construction techniques, Beorkrem identifies the important characteristics of each material, including connection types, relative costs, deformation, color, texture, finish, dimensional properties, durability, and weathering and waterproofing, linking design process to form.

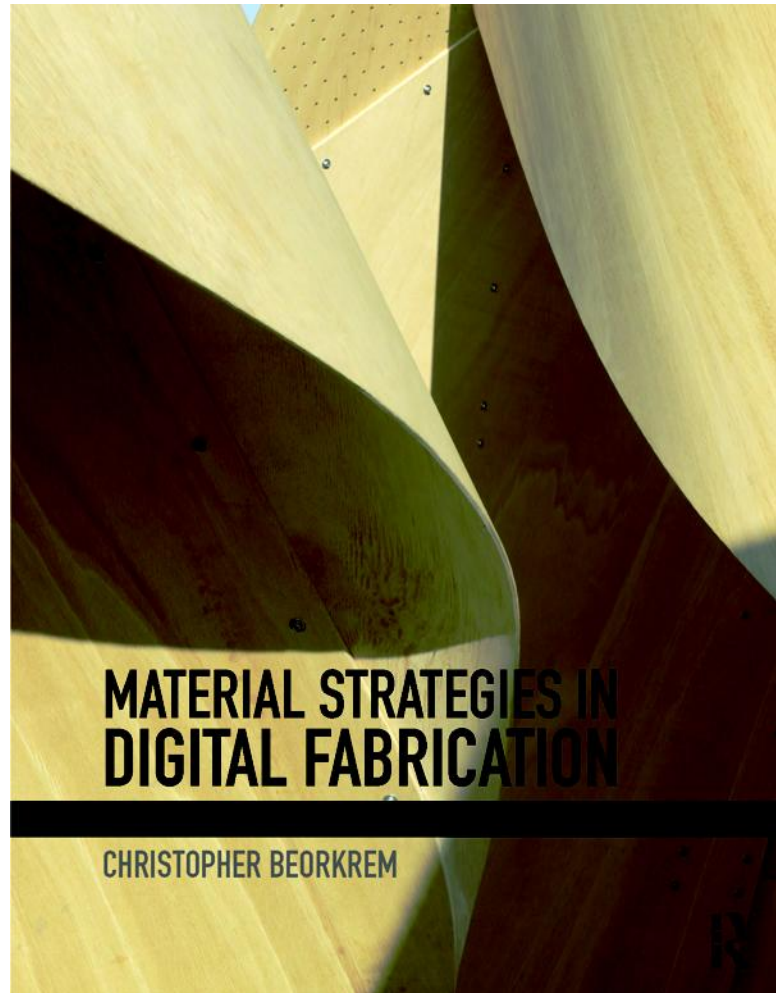


Figure 1. Cover Photo, Material Strategies in Digital Fabrication (Routledge Press, 2012)

## **Research Reports**

### **Fenestration Guidelines (IIT)**

### **FENESTRATION GUIDELINES FOR ENERGY-EFFICIENT FACADES IN COMMERCIAL BUILDINGS (Illinois Institute of Technology)**

This research has been funded by Wanger Institute for Sustainable Energy Research (WISER). Professor [Mahjoub Elnimeiri, Director of the Ph.D. Program, College of Architecture](#), is the Principle Investigator (PI) of this research.

#### **Background and Significance**

Up to 40% of overall building energy consumed by a regular commercial building is spent on HVAC systems (EIA, 2010). A significant amount of this energy goes to building cooling and heating systems to compensate heat loss or gain through its facade. In addition to fenestration's high heat transfer, it admits heat from solar radiation which increases a building's cooling load significantly. Consequently, one of the

main ways to achieve better building energy performance and to increase energy savings is to improve the performance of a building's fenestration. In addition, 20-30% of the energy consumed by a commercial building in the US is used for its lighting (EIA, 2010). Reduction in energy consumption can be achieved by decreasing artificial light use and by bringing daylight to the interior through the fenestration. Therefore, in order to maximize daylight, it is essential to control fenestration material properties and fenestration geometry.

In existing design practice, building designers are under constant pressure to deliver a project on time and within budget. As a result, energy performance of future buildings is rarely addressed due to the extreme complexity of energy analysis procedures and difficulty evaluating building energy performance at the design stage. The proposed fenestration guidelines' goal is enabling building professionals to predict energy performance of a new building or of an existing building being retrofitted early during the design stage. Thus, the guidelines will be used as an important sustainable design tool as they should help define building geometry and orientation.

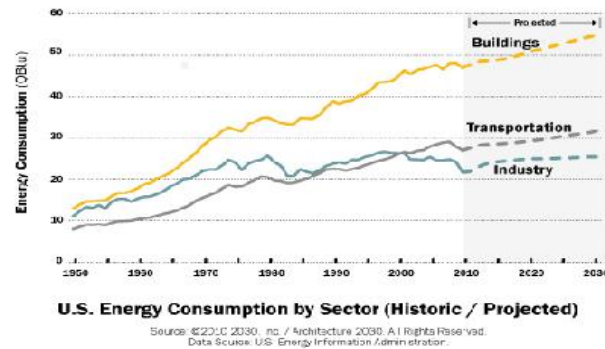


Figure 1. US energy consumption by sector (Source: Architecture 2030).

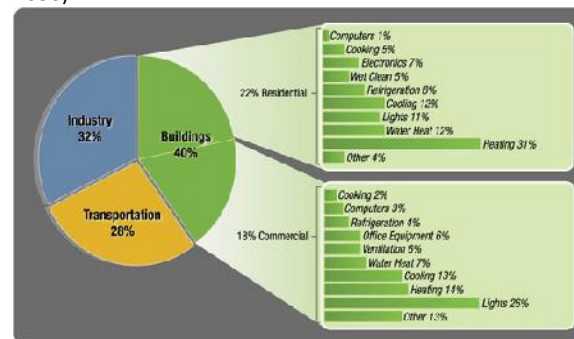


Figure 2. Building energy consumption by sector (Source: Cleantech Insights)

**Objectives**

The main objective of this proposal is to create easy-to-use guidelines for building professionals to evaluate building fenestration performance and to assess its contribution to overall building energy savings. Additionally, the use of the proposed guidelines will help architects shape building design by enabling selection of appropriate fenestration area, orientation, and glazing material properties. The guidelines can also be used by design professionals to achieve Leadership in Energy and Environmental Design (LEED) points in the categories of Energy and Atmosphere and Indoor Environmental Quality.

### **Methodology:**

The methodology of the current research consists of determining design data, developing module, defining input parameters, running computer simulations, collecting and interpreting data, validating results, and finalizing guidelines.

A group of fenestration parameters that has the highest impact on building thermal and daylighting performance has been selected for this study. These parameters include climate zone, orientation, room geometry (width-to-depth ratio), fenestration geometry (window-to-wall ratio), and glazing thermal parameters (U-Value, VT, and SHGC).

According to the ASHRAE standards, six of the most common climate zones (Zone 2 Hot, Zone 3 Warm, Zone 4 Mixed, Zone 5 Cool, Zone 6 Cold and Zone 7 Very Cold) have been selected. The current research will also consider eight typical orientations: north, north-east, east, south-east, south, south-west, west, and north-west. Four room modules are developed for the study from room width-depth ratio 1:1, 1:1.5, 1:2 and 1:2.5. Five window-to-wall ratios (WWR), 20%, 30%, 40%, 50%, 60%, 70% and 80% are the variations studied.

The conceptual module that represents an interior unit of a typical office building is modeled in Design Builder. The module is assigned with set values of the abovementioned parameters. To assess the impact of each parameter on energy results, each simulation is performed changing only one parameter at a time while keeping other parameters unchanged. First, simulation is running to understand the correlation amount the room depth, window-to-wall ratio (WWR), window position for all eight abovementioned orientation and different climate zones. In this case the glazing parameters are kept as constant value according to the ASHRAE standards. After that simulation is running to understand the effect of glazing parameters of the energy consumption.

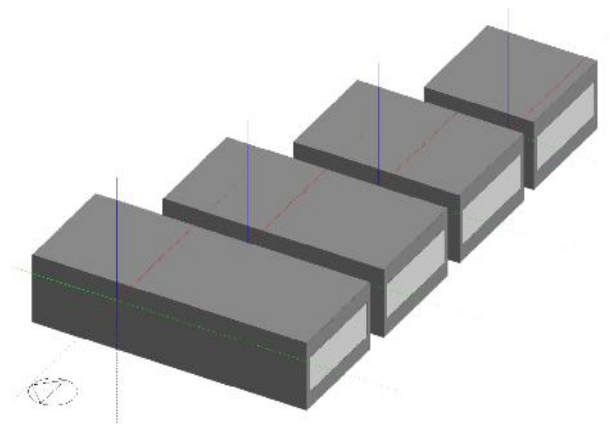


Figure 3. Four conceptual modules with the room depth of 50 ft., 40 ft., 30 ft., and 20 ft. ft.

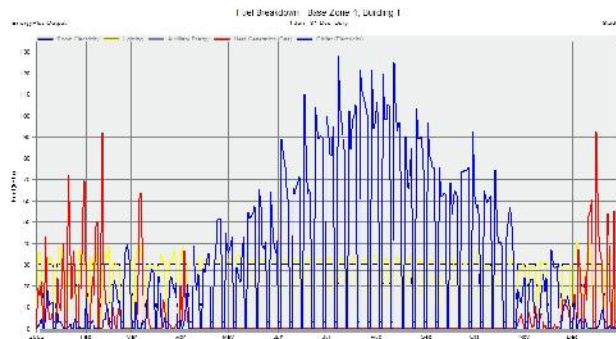


Figure 4. Annual energy consumption in an office building in climate zone 4 (Seattle, WA).

**Result analysis and data interpretation**

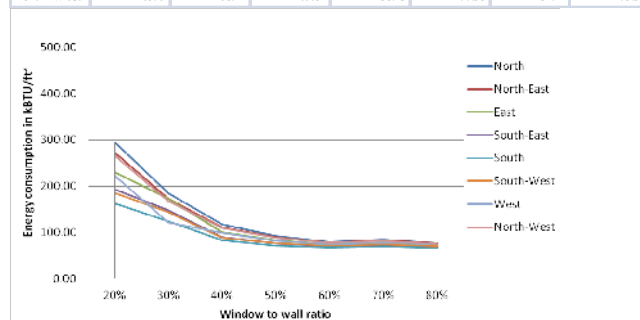
The results from the simulations are put into a set of result tables, showing the total annual energy consumption as well as the energy breakdown into 3 main consumption categories lighting, cooling and heating. After determining the impact of each parameter on the total energy consumption of the module, the analyzed data as well as the trends of the change based on these parameters are put into another set of tables called guideline tables, in which the best performing values for each parameter is thrived and commented on.

**Formulation of guidelines**

After the results of energy simulations are compared with the energy performance of the baseline model to calculate the percentage of reduction in building energy consumption for different fenestration cases. The finalized results will be compiled into fenestration guidelines to show the effect of various parameters on the final energy consumption and to develop an easy-to-use set of guidelines to define the design strategies for better performing commercial buildings.

Table 1. Total annual energy consumption in an office building in climate zone 4 (Seattle, WA) for four different room depths

Zone 4, W/D ratio 1:1, room depth 20 ft.							
Total energy consumption per year per unit area (kBtu/ft²) and energy savings (%)							
Orientation	Window to wall ratio (WWR)						
	20%	30%	40%	50%	60%	70%	80%
North	294.77	84.62	117.03	92.33	79.72	84.75	76.95
North-East	272.36	172.62	111.10	90.05	78.25	82.73	76.18
East	229.26	172.62	100.47	82.81	74.57	78.42	73.29
South-East	82.15	148.14	89.93	76.08	69.59	73.07	69.13
South	162.80	124.71	82.80	71.93	66.97	69.57	66.59
South-West	85.00	143.72	88.79	76.13	70.80	73.88	70.21
West	221.25	121.41	99.49	82.15	74.64	78.36	73.72
North-West	265.89	168.24	109.82	88.43	77.55	82.42	75.58



**Public Interest Design (LTU)****PUBLIC INTEREST DESIGN PRACTICES – NCARB GRANT AWARD  
(Lawrence Technological University)**

Associate Professor Joongsub Kim, PhD, AIA, AICP is conducting research on various models of public interest design practices such as design as activism, open source design, advocacy design, social construction models, collective capability models, participatory action research and practices, pro bono design services, grassroots design practice models to name just a few. This research is funded by the 2011 NCARB (National Council of Architectural Registration Boards) Grant Award for the Integration of Practice and Education in the Academy. This grant also supports Prof. Kim's proposal entitled "Public Interest Design Practices and Research Workshop." This workshop aims to expand the discipline of architecture by challenging the traditional definition and boundaries of the profession of architecture, and by exploring alternative design practices.

**U.S. EDA Grant (U of Maryland)****UNIVERSITY OF MARYLAND URBAN STUDIES AND PLANNING PROGRAM  
RECEIVES \$500,000 GRANT FROM U.S. EDA**

*University Center will leverage University assets to foster innovation, economic development*

As part of an initiative to promote job and economic growth, the U.S. Economic Development Center (EDA) has awarded the University of Maryland a five-year, \$500,000 grant through its University Center Program. Awarded to the School of Architecture Planning and Preservation's ([MAPP](#)) Urban Studies and Planning program, the grant will establish a University Center in collaboration with the [School of Architecture and Planning at Morgan State University](#). The University Center will provide regional economic development tools for practitioners that expand opportunity and create jobs. Maryland was one of only 21 universities nationwide selected.

*"Innovation and entrepreneurship fuel America's economy. Our success in creating the conditions that spur new ideas will determine the opportunities for future generations," Acting U.S. Commerce Secretary Rebecca Blank said. "The University Center Program represents an important partnership that advances innovation, supports stronger economic growth, and helps create the high-skill, high-wage jobs of the future."*

EDA University Centers provide targeted assistance with research commercialization, workforce development and entrepreneurship, as well as business counseling services. The Centers also help local organizations conduct preliminary feasibility studies, analyze data, and convene customized seminars and workshops on topics such as regional strategic planning and capital budgeting.

The University of Maryland / Morgan State University Center, spearheaded by Dr. Marie Howland and Senior Doctorial candidate Scott Dempwolf will initially focus on three projects:

- Mapping and modeling innovation and entrepreneurial networks using advanced analytical methods like Social Network Analysis, to provide economic development practitioners and policy makers with new tools to visualize the spatial, social and technological organization of innovation and entrepreneurship throughout the state.
- Creating economic, community and physical development plans for the revitalization of the Morgan Mile, a substantial redevelopment area surrounding Morgan State University. This initiative will have the University and

surrounding neighborhoods working together to create a vision and implementation plan.

- Expanding Professional Development and Economic Training course offerings through MAPP, in partnership with the [Maryland Economic Development Association \(MEDA\)](#), for local economic development and planning practitioners.

Assisting Dr. Howland and Dempwolf on the project are Ph.D. candidates Naka Matsumoto and Qiao Yu, as well as graduate student Allison Bishop. The team will also be collaborating with faculty and students from Morgan State University, as well as Maryland's College of Information Sciences.

Substantial portions of the University Center grant application were developed last spring by community planning and public policy master's students, as the semester project for a graduate course on Technology-Led Economic Development (TLED), taught by Dempwolf.

*"As an EDA University Center, we will expand our initiatives to integrate the creativity and talents of our students and faculty with the economic growth and development needs of our State and local communities," Said co-PI and planning faculty member, Marie Howland.*

The investment announcement comes on the heels of an initiative among 135 university leaders across the country -including Maryland President Wallace Loh- to collaborate with industry, investors and agencies to foster both entrepreneurship and economic development. The initiative, part of the *America Invents Act*, was signed into law last week by President Obama.

"The faculty and students who will develop this new University Center have the resources to drive the much needed innovation and economic growth our state needs today," said David Cronrath, Dean of The University of Maryland School of Architecture, Planning and Preservation. "It is part of our continued commitment as a land-grant institution to use our resources, research and energy for a more sustainable economic future."

## **Smart Growth (U of Maryland)**

### **NATIONAL CENTER FOR SMART GROWTH (University of Maryland)**

The National Center for Smart Growth (NCSG), a research center housed at the University of Maryland, College Park, is advancing several new research projects, due in part to an influx of grant money this past fall from foundations, federal and state government agencies. Among them is the launch of a Sustainable and Equitable Economic Development -or SEED- initiative, which will evaluate and pinpoint both obstacles and sustainable alternatives in low income and underserved communities throughout Maryland. Funded in part by a grant from the Sundra foundation, the initiative will cover an array of sustainable solutions including better public transportation options, increased housing options and targeted workforce development. The state continues to look to the NCSG's diverse talent pool for assistance in a variety of economic development projects throughout the state of Maryland. In November, the center announced a partnership with several public and private groups to create and implement a sustainable growth plan for the Baltimore metropolitan area. They also recently received a grant from the Appalachian Regional Commission to help develop an economic development plan for Western Maryland.

The center continues their ongoing and extensive research of transportation within the Northeast corridor for Federal and Maryland State Highway Administrations, and recently presented some of their findings, including studies on emissions reduction and transit ridership at the 91<sup>st</sup> Annual Transportation Research Board Meeting. The center also continues to be tapped by Maryland Department of Planning and Maryland Department of Transportation to analyze potential development scenarios throughout the state.

#### Transitory Constructs (Montana State)

### **TRANSITORY CONSTRUCTS OF RURAL BUILDING IN THE GALLATIN VALLEY, MONTANA (Montana State University)**

Maire O'Neill, Associate Professor  
School of Architecture, Montana State University

The history of the Gallatin Valley, Montana as an agricultural producer for the 1860s gold rush in the Montana Territory, and later as a major attraction for homestead settlement, highlight its significance in helping Montana reach statehood in 1893. Early agricultural production in the Gallatin Valley, as in the larger region, included varieties of hay, grain, beef cattle, draft horses, military remounts, and sheep. Ironically, the very buildings that helped to establish the solid agricultural economy of places like the Gallatin Valley are now threatened by a new boom time in the Rockies. The rich farmland of the valley, as in other parts of the region, have been subject to rapid subdivision, and many historic structures are being lost or threatened.

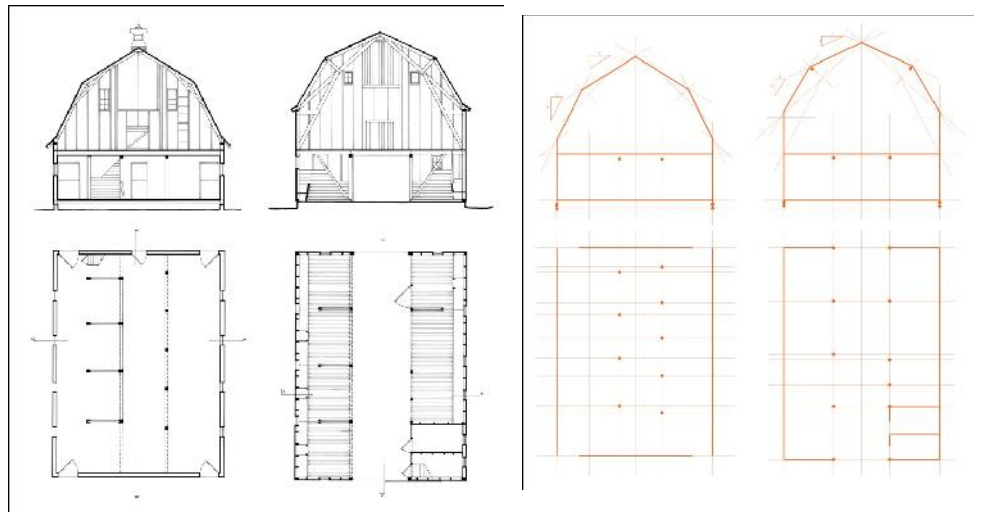
During twelve years of field research with architecture students Associate Professor Maire O'Neill has developed an archive of 90 of these buildings recorded in measured drawings at ¼ inch scale (7-8 drawings of each building). The research has been a teaching/learning opportunity at Montana State University, offered as individual directed research and as a graduate elective in field documentation. With this critical mass of building types and variants in the collection we are now developing a chronology and morphology.

The chronology of early agricultural building construction in the region investigates the historical context of livestock producers and farmers settling the inter-mountain west, and the relationships between evolving agricultural practices, promotional literature, and design and construction decisions. To date the author has outlined the types of rural structures that were built during each of four periods of settlement: Speculation (1862-1870s); Aspirations of permanence (1880s); Diversification (1890-1900s); Consumer culture (1910-1930s). These buildings satisfied emerging needs under the changing conditions that each era presented. This little-known vernacular building history is explored outside of the framework of mainstream architectural history. Methods and constructs from material culture studies are brought to bear in the analysis of extant structures. The narrative explores a wide variety of motives for the adoption and adaptation of forms and construction techniques, and examines where and why they depart from those used in the eastern and mid western United States.

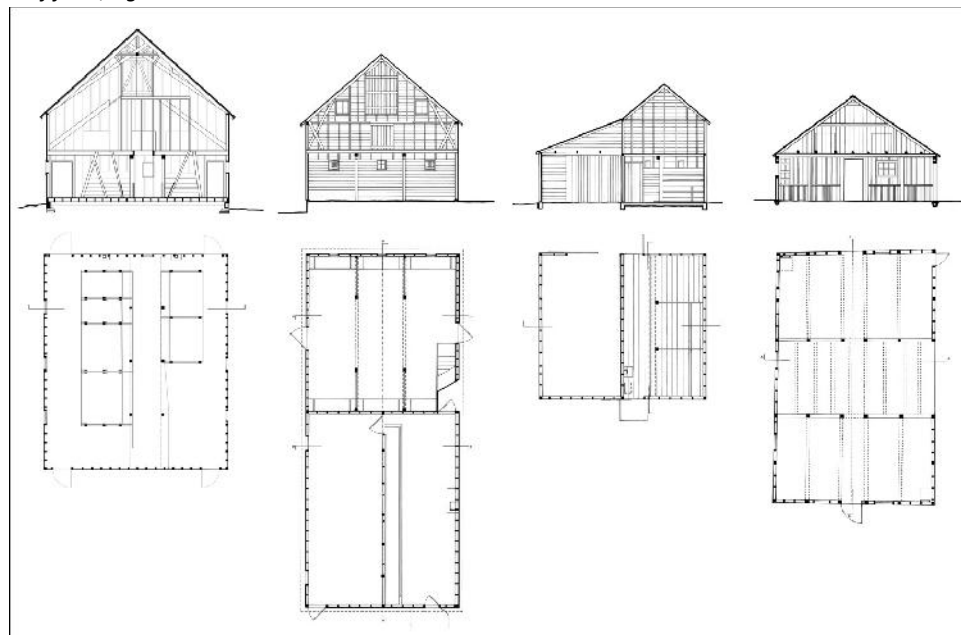
There have been few disciplined studies of the light construction of agricultural buildings in the Rocky Mountain region, but these forms and construction types contribute a unique perspective to the narrative of settlement and economic development in the northern Rocky Mountain region – a perspective that clearly reflects its speculative and transitory character. The inexpensive, light construction of these structures enabled several generations of farmers and ranchers to modify or diversify their operation based upon changing market conditions, evolving agricultural and climatic knowledge, the advent of electrification, the participation of women in the farm and ranch operations,

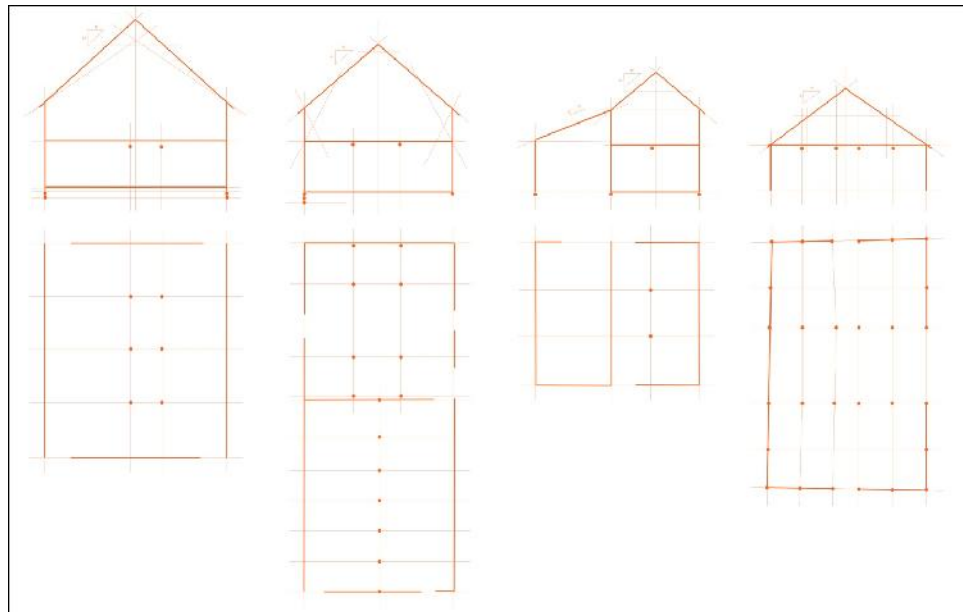
the development of transportation infrastructure, and the availability of new farm technology. This research explores how the character of these buildings offers a clear reflection of economic fluidity and facilitated the survival of western farmsteads.

A variety of influences precipitated architectural developments, and clues linking the building forms with their place in history can be found through morphological analysis, close examination of the materials and techniques used to build them, the evolving need for sheltering different types of livestock or produce, combined with a holistic view of the settlement history of the region and market demand for produce. The study involves graphic analysis of roof form, scale, construction type, floor plan, roof structure, lumber milling, openings, hardware, and fittings. The continued development of this morphology will explore correlations between agricultural building form and shifting social, economic, and infrastructure conditions in the region.



*Light wood frame gambrel section and floor plan samples, left. Graphic analysis of structure and roof form, right.*





*Light wood frame gable section and floor plan samples above. Graphic analysis of structure and roof form, below.*

## Social Interaction (U of Kansas)

### **The Impact of Spatial Configuration on Social Interaction in Long-term Care Facilities (University of Kansas)**

PI: Keith Diaz Moore, PhD, Mahbub Rashid, PhD, and Kristi Williams, RN, PhD

#### **Research Abstract**

Social interaction is considered an essential therapeutic intervention for people experiencing dementia of the Alzheimer's type (DAT). A growing body of literature in the areas of environmental design and space syntax theory within architectural research suggests that several key, objective dimensions of the physical environment have a high degree of influence upon social behavior. Based on this previous research, this study conceptualize that improved accessibility and environmental visibility in two types of social spaces—dining rooms and living rooms—found within Long-term Care Facilities serving people with dementia (LTCF-DATs) may help generate and sustain more social interaction among residents and caregivers, resulting in improved behavioral outcomes for patients with DAT.

To investigate the relationship between social interaction and environmental accessibility and visibility to and from dining rooms and living rooms in LTCF-DATs, this study utilizes behavior mapping and the tools and techniques of space syntax (Figure 1). Using space syntax tools and techniques, researchers around the world study the configurational effects of spatial layout on behaviors at various scales of the physical environment. From this research, it is clear that spatial configurations characterized by having greater connectivity, integration and proximity promote greater levels of social interaction and we seek to extend this research into the LTCF setting. This research will use the findings to inform a set of design guidelines based on the effectiveness of design interventions in generating and sustaining social interaction among residents and staff in dining rooms and living areas of LTCF-DATs. This research is essential to better understand the role of the physical environment in the person-centered care approach underlying current best practice in dementia care.

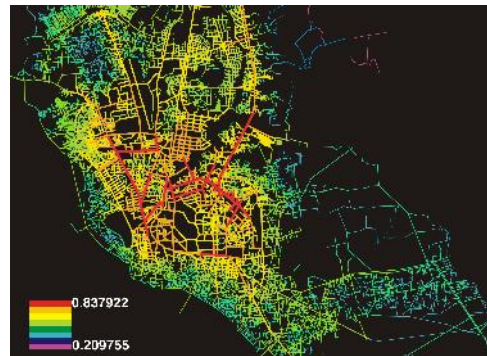


Figure 1: Global integration map (Rn) showing the distribution of integration (low=purple, high=red) with different band of color

### CONNECT Vision (UNCC)

### CONNECT Vision (University of North Carolina-Charlotte)

Jose Gamez, Associate Professor  
David Walters, Professor  
Design + Society Research Center

The U.S. Department of Housing and Urban Development (HUD) announced in November 2011 that *CONNECT Vision* - a sustainable communities grant proposal led by Centralina Council of Governments, Catawba Regional Council of Governments, and the Charlotte Regional Partnership was one of three 2011 Sustainable Communities Grant Program applications awarded in the State of North Carolina (funded at \$4.9 million). Professors Jose Gamez and David Walters are contributing a "blueprinting" and sustainable urban design guideline study to *CONNECT Vision*. A portion of the grant funding is dedicated to sponsored urban design studios and graduate research assistantships for the School of Architecture's Master of Urban Design program and its public outreach arm, the Design + Society Research Center (D+SRC).

### Solar Decathlon (UNCC)

### UNCC TO COMPETE IN ENERGY DEPARTMENT'S SOLAR DECATHLON 2013 (University of North Carolina-Charlotte)

PI, Mona Azarbayjani, Assistant Professor, School of Architecture  
Co-PI's: Ben Futrell, Phd Candidate; Valentine Cecchi (ECE), Abasifreke Ebong (ECE), and Linda Swayne (Marketing)  
Center for Integrated Building Design Research (CIBDR)  
Infrastructure, Design, Environment and Sustainability (IDEAS)  
Energy Production and Infrastructure Center (EPIC)

U.S. Department of Energy (DOE) Secretary Steven Chu announced that the University of North Carolina at Charlotte has been selected to compete in the U.S. Department of Energy Solar Decathlon 2013. The school will represent the North Carolina team in this worldwide competition to build solar-powered, highly energy-efficient homes that combine affordability, consumer appeal and design excellence.

The 20 selected teams from colleges and universities across the United States and from around the world will now begin a two-year process to design, construct and test their homes before reassembling them at the Solar Decathlon 2013 competition site in Irvine, California. Like the Olympic Decathlon, Solar Decathlon teams compete in 10 different categories, ranging from architecture and engineering contests, to energy production, affordability and market appeal.

"Our project brings together a diverse team of faculty, scientific staff, and students from the School of Architecture and the Colleges of Engineering and Business to both lead and organize the project," says Professor Mona Azarbayjani, Project Manger of UNC Charlotte's team. "Our interdisciplinary team represents expertise from the Infrastructure, Design, Environment and Sustainability Center (IDEAS), the Center for Integrated Building Design Research (CIBDR), and UNC Charlotte's new Energy Production and Infrastructure Center (EPIC) - a multimillion dollar energy research center led by Dr. Johan Enslin, former chief technology officer at Petra Solar. "Together, the university and the city are poised to be a model of progressive energy leadership," says Azarbayjani.

UNC Charlotte will leverage their strong partnerships with the energy industry in the Piedmont region to design, build and operate the solar house of the future for the 2013 competition.

## Re-Shaping Lilong (UNCC)

### **RE-SHAPING *LILONG* HOUSING IN URBAN SHANGHAI (University of North Carolina-Charlotte)**

Peter Wong, Associate Professor

The *lilong* dwelling type in Shanghai, China has contributed greatly to the shape of the city as well as its urban life for more than 140 years. Also known as "lane housing" or "stone-gate-door" (*shi-ku-men*) dwellings, the origins of the type are attributed to a confluence between mid-19<sup>th</sup> century European row housing superimposed on courtyard housing of the rural vernacular found in the water towns of the Anhui Province. The *lilong* type marks the rise of Shanghai from the 1870s to the 1940s as a modern industrial city, where migrants from outlying regions as well as foreign interests from abroad met to inhabit neighborhoods and blocks during the first order of the city's expansion.

As part of the economic reforms in China today, much of this fabric is under threat by a new order of modern development. *Lilong* housing and its neighborhoods at one time composed more than 50% of the urban fabric in Shanghai. Though the type is resistant and strong, many examples were altered after the revolution of 1949 to accommodate as many as five or six families per dwelling. This crowding often forced entire families to live in one room. Many of the modifications made to meet these demands significantly altered the interiors of these houses as well as the social and living patterns in the lanes themselves. Therefore, developers today would rather demolish *lilong* neighborhoods in favor of taller, more profitable structures.

The *lilong* and *shikumen* type neighborhoods have become a natural part of the history and identity of urban Shanghai. Researchers and scholars are contributing to the archeological, historic preservation, and/or cultural significance of this housing type (e.g., Hua Sheng, Chenghao Lou, and others). Some architects and developers have recognized the importance of reusing *lilong* morphology by either borrowing and/or recreating its urban character – the upscale retail developments of Xintandi or Tangzifang in Shanghai are examples. However, beyond the commercial success of these projects as shopping districts, they do not contribute to the deeper and more profound objectives of providing affordable living options, creating authentic and diverse urban experiences, and/or realizing environments that help strengthen a sense of Shanghai as a place.

The morphology of the *space* and *form* of the *lilong* and *shikumen* type and their inherent architectural properties and language are currently being examined. A series of

written and graphic analyses will demonstrate the spatial and environmental influences of both early-*shikumen* (1910s) and late-*shikumen* (after 1920) housing examples. These analyses will account for the effects of solar orientation, structural systems, spatial morphology, and density. Analysis will be followed with a series of preliminary designs for the modification of the *shikumen* type.



Figure 1. Photocollage, Huai Hai Village, Shanghai, 1924 (Source: photo by author October 2011)

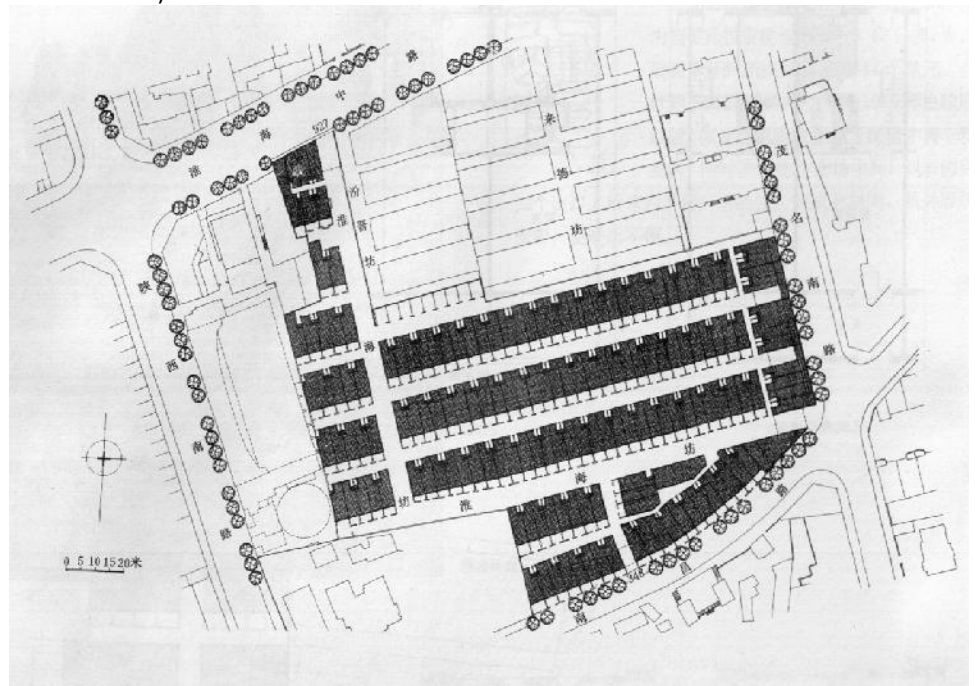


Figure 2. Plan View, Huai Hai Village, Shanghai, 1924 (Source: Sheng Hua, *Shanghai Lilong Housing*, 1987)

## FRANK LLOYD WRIGHT'S TEXTILE BLOCK SYSTEM: THE INSPIRATION FOR A SUSTAINABLE FUTURE (University of Southern California)

Ed Losch, Ph.D. candidate,

Frank Lloyd Wright had a vision for an inexpensive, aesthetically pleasing precast concrete modular block system, locally-produced and assembled without the use of a mason. His vision never took hold, in large part due to the technological limitations of the period. It is possible that, 88 years later, these limitations can be overcome by using architectural precast techniques, realizing Wright's original idea of replacing masonry with something better.

When Wright devised his "textile block" system, he envisioned it as a mono-material – one material that would have integrity, serve as both the inner and outer finished surfaces of a wall, support floor or roof loads, and provide insulation and protection from the weather. To be successful, it would have to be inexpensive yet aesthetically pleasing, locally-produced from local materials, and assembled without special skills or equipment. As he wrote in his autobiography, concrete block was "the cheapest (and ugliest) thing in the building world... Why not see what could be done with that gutter-rat?"

Starting in the early 1920's, Wright designed a series of homes that incorporated this block system. It consisted of a dry-cast double precast concrete block wall with an air gap between the outer and inner wythes. The outer wythe was optionally stamped with a decorative pattern. The 16 in. square site-cast blocks were stacked and reinforced horizontally and vertically with a "fabric" or mesh of grouted reinforcing bars, 16 in. on center. Although many of the existing homes have exhibited serious problems over time, a case can be made for resurrecting the system using new technology. Design possibilities will be explored, and prototype walls will be built, tested and evaluated.



**DAYLIGHT, GLARE AND FACADES: AN EVALUATION METHODOLOGY FOR ANALYZING TRANSMITTED AND REFLECTED GLARE THROUGH BUILDING ENVELOPES (University of Southern California)**

Jae Yong Suk, Ph.D. Candidate

Glass on a building facade is widely used and successfully introduces more natural light into indoor spaces. However, this material also causes problems such as visual glare and thermal discomfort inside and outside of building facades due to properties of transparency, reflectance and specularly. It is not difficult to experience these problems in buildings around us. People can easily experience exterior glare problems from sunlight reflected by highly specular materials, such as glass or polished stainless steel on exterior building facades. The reflected glare often comes from unexpected directions within the field of view and there are chances to get multiple or intensified glare effects from unique building facade geometries such as concave shapes. People in buildings also have similar glare problems from daylight through the huge windows. Discomfort glare from the sun is result of the very high brightness of the lighting source, and existing technology limitations make it difficult to capture the glare scene. Computer simulation tools can be partially helpful in minimizing the chances of glare, but the software does not guarantee glare elimination in all the possible situations after the completion of a building. Therefore, it is necessary to develop an analysis method for post-occupancy daylight glare evaluations.

Visual glare issues inside and outside building facades will be studied in this research. The existing glare analysis methods do not provide accurate glare evaluations when extremely bright glare sources are involved. The goal of this research is to develop a new glare analysis methodology which can quantify absolute and relative glare caused by daylight. This research investigates all the existing glare analysis methods and finds out all the variables and errors from these methods. Correcting and updating a current method would be a reasonable goal of this research but creating a new methodology including computer software will be considered if it's necessary. Subjective tests using a survey may be also required to confirm the accuracy of the new methodology.

## **JOB BOOM CREATES HOUSING CRISIS: TEXAS' EAGLE FORD SHALE (University of Texas San Antonio)**

In south Texas, Eagle Ford Shale [EFS] is prominent for the *Hawktville* oil and gas discovery that is regarded as one the 10 major discoveries in the US. The shale is producing numerous new jobs, and creating a significant economic impact in the region. The entire EFS, a 24-county play, has produced a boom in housing demand and economic development plans as workers and often their families continue to commute and relocate to the region.

The Center for Urban and Regional Planning Research [CURPR] in UTSA-College of Architecture is conducting a study on Sustainable Choices for the Growing Demand of Eagle Ford Shale Housing, where a workforce boom emerged since 2010 from the oil and gas discovery. The study which covers an area exceeds 51% of the entire EFS drilling sites is led by Dr. Azza Kamal from CoA with funding from the Rural Business Program in the Institute of Economic Development. The research was undertaken through qualitative and quantitative analysis of multiple data sources including 2010 US Census data on population and housing-attribute changes from 2000 Census, Texas A&M Real Estate Center data on building permits, GIS mapping of vacant housing and overcrowded area hotels, online foreclosure listings, and focus group discussions with five stakeholder groups: small business owners, area developers, housing authority personnel, oil and gas companies staff, and local inhabitants. The research also surveyed all area hotels and motels, the majority of which were reserved for a period exceeding 30 days. Phone-interviews with the local hotels and motels staff focused on finding out the current and future occupancy status. Data from all sources was compiled and verified with the outputs of multiple informal interviews with geologists and leading staff of the major oil and gas companies to establish an estimate for the workforce and housing projections in correlation with the forecast of drilling activities.

The research findings emphasized the severe shortage in housing both the transient and permanent workforce emerging from oil and gas, absence of oil and gas employers contribution to residential development policy and programs, limitation of available family-friendly communities that are located in most of the impacted towns, lacking efficient infrastructure and public services that fulfills current and future population boom, and the challenges that faces the decision makers and developers to identify the appropriate type and tenure of housing that best accommodates the new-comers in the short and long-term production. Additionally, as rental rates had inflated by landlords, they have hindered an enormous percentage of local inhabitants homeless, and forced others to move out of the region. As such, the situation of housing voucher program placed a strain on the housing authorities in the areas as they desperately attempting to find affordable housing for relocating the local residents, and has also challenged the federal funds allocation to the local housing authorities.

Population forecast, which compiled the geologists estimate and a track of the drilling records (number of wells) from (2009-2011) concluded that the drilling activities, and consequently the workforce projections, in the region will be subject to two scenarios: 1) a high production scenario: 7 years peak production, from 2012 to 2018); and 2) low production scenario: 14 years peak production, from 2011 to 2025. Population, household, and housing data were estimated for each scenario on a five-year interval. The study also provided guidance for strategic locations for permanent development though a GIS-buffer within a 15.5-mile optimum driving distance from the drilling and extraction sites and provided a number of recommendations for policy makers.

## ARCC Information

**ARCC Information****ARCC Newsletter**

All inquiries, requests and submittals should be made directly to the ARCC Newsletter Editor, Philip Plowright.

**Philip Plowright, RA, ASA, DRS**

Associate Professor, Architecture

At-Large Director, Architectural Research Centers Consortium (ARCC)

Synchronized Research Group [synchRG]

College of Architecture and Design

Lawrence Technological University

21000 West Ten Mile Road

Southfield, MI 48075-1058

[pplowright@ltu.edu](mailto:pplowright@ltu.edu)

**ARCC Board of Directors**

President: Keith Diaz-Moore, University of Kansas

Vice-President: Michelle A. Rinehart, The Catholic University of America

Treasurer: Barbara Klinkhammer, University of Tennessee - Knoxville

Secretary: Leonard Bachman, University of Houston

Past President: Michael D. Kroelinger, Arizona State University

Directors-at-Large: Philip Plowright, Lawrence Technological University

Hazem Rashed-Ali, University of Texas, San Antonio

Aron Temkin, Norwich University

Christopher Jarrett, University of North Carolina-Charlotte

Ex-Officio members of the Board:

Victor Dzidzienyo, Howard University, ARCC Archivist,

Richard L. Hayes, Liaison to the American Institute of Architects

Brian R. Sinclair, King Medal, University of Calgary

Valerian Miranda, Texas A&M University, CIB Liaison

Kate Wingert-Playdon, Temple University, ARCC Journal,

**ARCC Member Institutions**

American Institute of Architects\*

Arizona State University\*

Ball State University\*

Catholic University of America

CERES Ball State University

CIB

Curtin University

Drexel University

Florida A&M University

Florida Atlantic University

Fundación Diego de Sagredo

Georgia Institute of Technology

Howard University\*

Illinois Institute of Technology

Iowa State University

Jia, Andrea Yunyan

Judson University

Kansas State University

Kent State University

Lawrence Technological University\*

Louisiana State University

Popov, Lubomir S., Ph.D.

McGill University

Mississippi State University

Montana State University  
New York Institute of Technology  
North Carolina State University  
Norwich University\*  
Pennsylvania State University  
Rensselaer Polytechnic Institute  
Ryerson University  
Temple University\*  
Texas A&M University\*  
Texas Tech University  
Virginia Technical University  
University of Buffalo  
University of Calgary\*  
University of Florida  
University of Hawaii  
University of Houston\*  
University of Idaho  
University of Illinois, Urbana-Champaign  
University of Kansas\*  
University of Manitoba  
University of Maryland  
University of Memphis  
University of Michigan  
University of Minnesota\*  
University of Missouri  
University of Nebraska  
University of Nevada – Las Vegas  
University of New Mexico  
University of North Carolina-Charlotte  
University of Oklahoma  
University of Oregon  
University of South Florida  
University of Southern California  
University of Tennessee  
University of Texas - Arlington  
University of Texas – San Antonio\*  
University of Toronto  
University of Utah  
University of Waterloo  
University of Wisconsin-Milwaukee