An aerial satellite photograph of a coastline, showing a mix of land and water. A prominent red vertical bar runs down the center of the image, serving as a background for the text. The text is white and bold, standing out against the red background. The overall composition is clean and modern, emphasizing the organization's focus on sustainable design.

**CUISD**

**5**

**2009-14**

**THE  
COOPER  
UNION  
INSTITUTE  
FOR  
SUSTAINABLE  
DESIGN**

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## MISSION

**The Cooper Union Institute for Sustainable Design** seeks to provide the greater Cooper Union community—architects, engineers and artists—with the cross-disciplinary knowledge and skills that are necessary for creating a sustainable society.

We define a “sustainable society” as one that prospers because its economics, social practices, physical infrastructure and engineering systems all work in harmony with the ecological dynamics and resource limitations of the earth.

# Director's Statement

**Professor Kevin Bone**

THE COOPER UNION

INSTITUTE FOR SUSTAINABLE DESIGN

## Acknowledgements

The Cooper Union Institute for Sustainable Design was established in 2009 with a generous grant from the Rudin Foundation to address issues of sustainability through the advancement and dissemination of knowledge, new methods, and emerging technologies. Since then, the Institute has spearheaded interdisciplinary efforts throughout The Cooper Union, partnering with other influential environmental institutions to fulfill its role as a resource for research, education, and public understanding of the principles of sustainability.

A special thanks to:

The Rudin Foundation

Stavros Niarchos Foundation

... and to all of our independent and corporate donors for their generous support.

Over the last several decades we have witnessed the synergistic impacts of population growth and increasing industrialization; energy—and agriculture-related natural resource destruction and economic upheaval; and the rapid decline of the natural earth upon which we depend. These compounding transformations have created problems that many in the sciences, social sciences, economics, and health fields believe compromise the viability and promise of the human enterprise. These are not problems that will manifest later in the twenty-first century; they are unfolding today, impacting the wellbeing of human communities from the family unit to the nation-state. These problems need to be addressed by the consolidated efforts of the global community, working at all levels, unified in their commitment to living within the biological and geochemical restraints and resource limitations of the planet.

Education is key to transmitting this message and to nurturing the community of those committed to exploring and cultivating sustainability. Our economic systems, our energy systems, our agricultural models, the way we build our cities, our transportation networks are all subject to reevaluation in the context of rapidly changing global environmental predicaments. Just as we must change our thinking in these and countless other areas of life, we will have to rethink our current educational models. But how to teach toward sustainability is a complex question beset by entrenched obstacles. Higher education, like many of our societal institutions, can be slow to evolve.

It is often said that the system of higher education in the United States is characterized by excellence, and this belief in our excellence reinforces the view that the status quo should be maintained. But we must ask, is higher education keeping up with the challenges of the rapidly evolving world scene? While it is evident that there are many inspired and useful programs throughout education, with regards to sustainability we clearly have our work cut out for us.

To teach toward sustainability, we will need to educate a new generation of students in ecological literacy. They must learn to understand energy and nutrient flows, and they need to become well versed in systems thinking, the nature of supply chains, consumption patterns, global and regional economics, and social justice. Engineers, architects, and artists must understand the long-term environmental impacts of what they design and reimagine how we will live. To inspire such a generation of students requires drastic changes in how we teach.

Much of the current debate about educational standards and reforms... is driven by the belief that we must prepare the young only to compete effectively in the global economy.... But there are better reasons to reform education, which have to do with the rapid decline in the habitability of the earth. The kind of discipline-centric education that enabled us to industrialize the earth will not necessarily help us to heal the damage caused by industrialization... believe that educators must become students of the ecologically proficient mind and of the things that must be done to foster such minds. In time this will mean nothing less than the redesign of education itself.

**David W. Orr**, *Earth in Mind: On Education, Environment, and the Human Prospect*, Island Press, 2004.

In his book *Preparing for the Twenty-First Century* (1993) Yale University historian Paul Kennedy, after surveying the century ahead, reached broadly similar conclusions, calling “for nothing less than the re-education of humankind.”

In order to prepare the Cooper Union student for a changing world, it is important that we recognize our distinctive strengths and acknowledge our particular institutional challenges. Ours is an institution committed, like all higher education institutions, to the future. Yet the history of The Cooper Union gives that commitment several dimensions particularly relevant to the quest for sustainability. The first is that The Cooper Union vision sees that knowledge operates for the betterment of society, making the college the home of what founder Peter Cooper called “the useful arts.” Second, The Cooper Union vision aims to encompass and mobilize all of the college’s talent to improve society, to train the talented members of the professional class to contribute their knowledge and energies to the challenges a democratic society will face. And third, it is a vision of education as an ongoing collaborative enterprise between the institutions of education and the larger society, in the project of democratic social improvement and uplift, as in Peter Cooper’s proposition that education is key not only to personal prosperity but to “civic virtue and harmony”.

Our diverse, engaged, and accomplished faculty direct a unique student population committed to excellence. The small scale of the school allows for independent initiatives that can advance nimbly without the encumbrance of overbearing academic bureaucracy, as in the case of the Institute itself. Independent studies, research agendas, proposals for exhibitions, and a general embrace by the overall community of spirited and lively discourse have helped keep The Cooper Union at a level of productivity that is well beyond what one would expect from a college of such modest size.

The CUISD has set to work with our strengths by providing opportunities that supplement the existing curriculum and work in concert with established programs. Exposure to disciplines not represented in the curricula is enhanced through lectures, films, workshops, summer research initiatives, the support of independent programs and projects, and through ongoing partnerships with other institutions. These initiatives have sought to broaden understanding—for students and faculty—of issues underlying the discussions of sustainability. By presenting scholars, scientists, designers, poets, and artists involved in this quest to reimagine the patterns of human expression, we will help our students become more deeply engaged in the critical issues of the twenty-first century.

The CUISD is moving forward on a path centered on our three core areas of focus: informing and engaging the public; educating future engineers, architects, and artists to contribute their skills and leadership to sustainability; and helping to build a sustainable New York City. The Institute advances models in integrative education, which promote innovation in design and sustainability. This is an educational project we see as immensely valuable to the entire Cooper Union community. Through these efforts, as well as student programs and course offerings within the four schools, the Institute helps The Cooper Union with sponsorship of long-term development of solutions to the challenge of educating in sustainability. Ultimately, the success of the CUISD will turn on whether these lines of effort can establish an enduring commitment to sustainability in The Cooper Union environment, and produce students able and eager to disseminate its principles and enterprise. In short, the CUISD supports The Cooper Union's evolution, as an institutional resource in which sustainability is a self-sustaining social effort.

# OVERVIEW | 2009-2014

The CUISD's series of public exhibitions, lectures, and forums has been an instrumental tool in informing the college campus and the broader academic and professional community of new practices and developments in the field of sustainability. Over the past five years, the Institute has coordinated numerous public events and programs.

## Core Team

### STAFF AND PRIMARY ADVISORS

#### **Kevin Bone | Director**

Since 1983 Kevin Bone has been a professor of architecture at The Cooper Union, where he teaches design (at various levels) and advanced concepts in sustainability. Prof. Bone has organized numerous public exhibitions about architecture, engineering, infrastructure, and history, and organized and participated in lectures and panel discussions on issues of environment, resources, and design. Prof. Bone has been a principal in his practice shared with partner Joseph Levine that has pursued a mix of contemporary architectural design, technical consulting, and historic preservation for over twenty-five years.

Bone directed research that has resulted in two publications on New York City infrastructure and served as both editor and writer on each. These are *The New York Waterfront: Evolution of the Port and Harbor* (Monacelli Press, 1997) and *Water-Works: The Architecture and Engineering of the New York City Water Supply* (Monacelli Press, 2006). Bone lectures widely about these topics, most recently at the University of Texas, the City College of New York, the New York City Public Library, the Yale Club, Pratt Institute, and The Cooper Union, as well as participating in documentary films on water and infrastructure.

#### **Albert Appleton | Adjunct Professor and Advisor**

See bio under "Visiting Faculty"

#### **Sunnie Joh | Consultant And Advisor**

Sunnie Joh is an ecological designer and builder whose focus is on building regenerative land-based systems that support and foster community-led development and local sustainability through landscape, building, and plant systems design. After graduating with a Bachelor of Architecture degree from The Cooper Union, she worked as a freelance designer concentrating on experimental fabric structures and furniture design while learning hands-on management of a small New York fashion design studio. In 2009 she formed Sunnie Joh Design.

Joh was an associate with The Cooper Union Institute for Sustainable Design from 2010 to 2014. She is currently an active advisor and works to further the Institute's goals through independent projects. Joh received her Permaculture Design Certification from Whole Systems Research Farm in the summer of 2011 and is pursuing a Certificate in Sustainable Building and Design from the Yestermorrow Design/Build School in Vermont. She lives and works in New York, splitting her time between New York City and the Catskills.

#### **Michael Ben-Eli | Collaborator and Advisor**

See bio under "Visiting Educators"

#### **Susannah Drake | Adjunct Professor and Advisor**

See bio under "Visiting Faculty"

#### **David Turnbull | Professor and Advisor**

See bio under "Faculty Collaborations"

#### **Board of Advisors**

The members of the board of advisors contribute individually on an as-need basis and at annual meetings.

Albert Appleton  
Daniel Barber  
Michael Ben-Eli  
Adrian Benepe  
Susannah Drake  
J. Henry Fair  
Josh Fox  
Steven Hillyer  
Sunnie Joh  
Joseph Levine  
Nicholas Pevzner  
David Shearer  
David Turnbull  
Jason Vollen

#### **Partnerships and Associations**

The Institute continues to have an array of productive partnerships with a wide variety of stakeholders, including but not limited to:

The Architectural League of New York  
The Buckminster Fuller Institute  
Wright-Ingraham Institute  
The Solutions Project  
Damascus Citizens for Sustainability  
The Sustainability Laboratory  
SEA2M3  
Pilot Projects  
The Fourth Arts Block

## SELECTED PROJECTS AND PROGRAMS

## EXHIBITIONS

The Institute has coordinated several exhibitions and has hosted thousands of public visitors since 2009. Receiving significant accolades from academic institutions, industry professionals, foundations, and the general public, the Institute's exhibition program has been a cornerstone of its success to date. The exhibitions described are characteristic of the depth of content, immediacy of subject matter, and interdisciplinary position that the Institute seeks to instill through its public programming.

# Landscapes of Extraction

THE COLLATERAL DAMAGE  
OF THE FOSSIL FUELS INDUSTRIES

**2011** JANUARY 20—MARCH 1

This was the first public exhibition curated by The Cooper Union Institute for Sustainable Design. The exhibition examined the fossil fuel industries' increasing reliance on unconventional, high-risk methods for extracting fuel resources. Such methods frequently result in widespread environmental damage and dangerous levels of pollution. Jointly presented with The Irwin S. Chanin School of Architecture in the spring of 2011, the exhibition featured analytical graphics and didactic text prepared by the CUISD team and Cooper Union students, as well as the photography of J. Henry Fair, an internationally renowned photographer whose work has focused on radical environmental degradation and the associated resource-extraction operations. His photographs, which straddle the beautiful and uncanny, counterbalance a widespread industry effort to hide detrimental environmental consequences. The exhibition also included thirty original maps and diagrams produced by the Institute, documenting the extent of infrastructure and landscape impact associated with industries such as hydraulic fracturing—or hydro-fracking—mountaintop removal of coal, and deep-water drilling.

With the partnership and funding support of the Natural Resources Defense Council, the CUISD was able to publish an exhibition catalog of the materials that included the photography, analysis and supporting information. The CUISD also built a website to further illustrate a variety of fossil fuel industrial processes and their environmental and social impacts. The web platform has provided a fossil fuel information base that continues to grow. Interactive media stations at the exhibition allowed individuals to see how their own energy use impacts the planet. The photographs and supporting graphics were made available online through the Institute's website, along with a contextual overview of the processes described in the show.

In April 2011, a portion of the exhibition was installed in Vanderbilt Hall of Grand Central Terminal, through the Institute's partnership with Earth Day New York. The Grand Central exhibition focused awareness on the damaging consequences of hydro-fracking in New York.

*Burn-off Oil, BP Deepwater Horizon Spill,*  
J. Henry Fair, Photographer



## LANDSCAPES OF EXTRACTION

THE COLLATERAL DAMAGE OF THE FOSSIL FUELS INDUSTRIES

FEATURING THE WORK OF PHOTOGRAPHER J HENRY FAIR







*Oil and Gas Infrastructure,  
Mississippi River Delta,  
CUISD*

*Athabasca Tar Sands Development,  
CUISD*

# Lessons From Modernism

ENVIRONMENTAL DESIGN CONSIDERATIONS  
IN TWENTIETH CENTURY ARCHITECTURE 1925-1970

**2013 JANUARY 2—MARCH 23**

In the spring of 2013, The Cooper Union Institute for Sustainable Design, working in collaboration with The Irwin S. Chanin School of Architecture (SoA), opened *Lessons From Modernism: Environmental Design Considerations in Twentieth Century Architecture, 1925-1970*. The exhibition was part of an assemblage of programming that included dedicated course work, summer research internships, lectures, a symposium, and a publication. Much of the work was made possible through a grant from the Stavros Niarchos Foundation.

Through an analysis of the influence of nature and the environment in architectural design, *Lessons From Modernism* provided new insight into works by a diverse selection of architects, including Le Corbusier, Paul Rudolph, Jean Prouvé, and Oscar Niemeyer. The exhibition demonstrated how these architects integrated environmental concerns into their designs and explored the extent to which these practices have produced environmentally efficient and distinctive architecture. The twenty-five buildings explored in *Lessons From Modernism* demonstrate the importance of the aesthetics of clarity and utility, which characterize twentieth-century modern architecture and, to some degree, inform the contemporary green building movement.

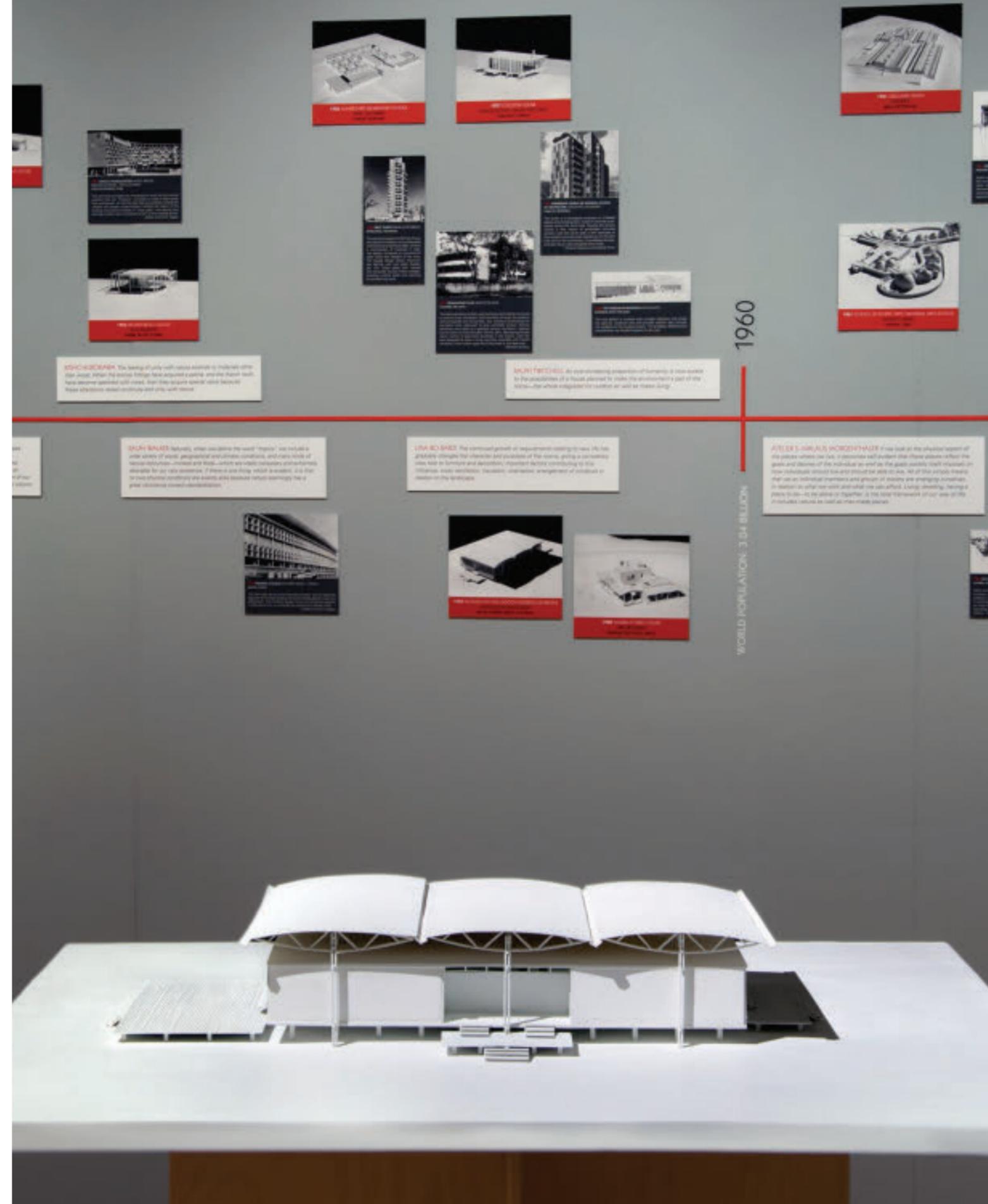
The exhibition sought to demonstrate how the accommodation of natural agency within a work of architecture could be done in way that enhanced design and produced some of the great buildings of the modern era. The exhibition was curated to be accessible to a diverse range of visitors, from practicing architects and designers to those with little exposure to the field.

This exhibition was the result of two and a half years of research, planning, and implementation. Seventeen alumni of The Irwin S. Chanin School of Architecture completed the initial research, a selection process that considered over two hundred potential projects. Twenty-four architecture students researched, drew plans, and fabricated models of the selected works. The core advisors included Kevin Bone, director of the Institute; Prof. Anthony Vidler, then dean of The Irwin S. Chanin School of Architecture of The Cooper Union; Kenneth Frampton, distinguished scholar and historian focused on modern work; Prof. Lydia Kallipoliti, former senior associate at the Institute; and Carl Stein, principal of Elemental Architecture and alumnus of the SoA. Markers of the exhibition's success are many. The exhibition received glowing reviews in the press, fueling attendance of over 1,300 individuals and an extended closing date. The Architect's Newspaper blog said:

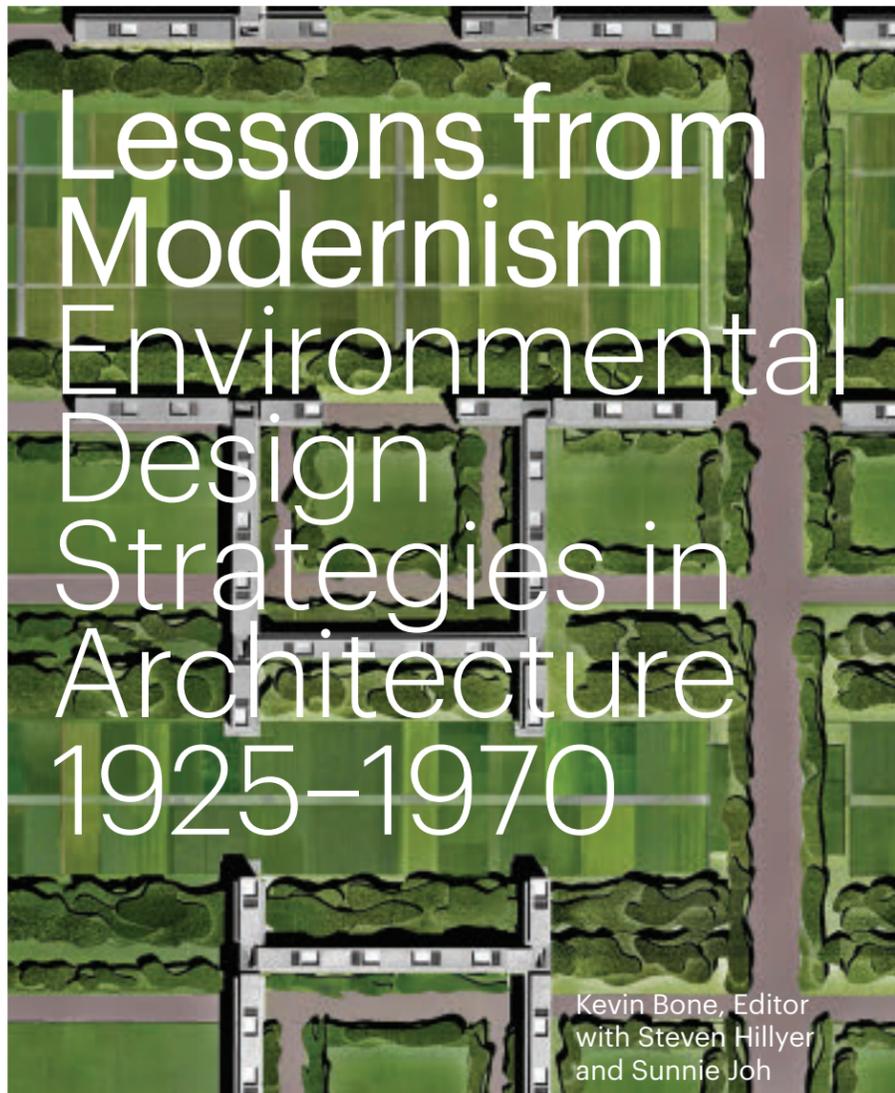
*Lessons From Modernism* is the smartest and most compelling exhibition ever mounted in New York (and maybe anywhere) on the influence of nature and the environment in architectural design.... LFM brilliantly demonstrates... how modern architects integrated environmental concerns into their designs and “explores the extent to which these practices have produced environmentally performative and distinctive architecture.”

**William Menking, 2013.**

The research and materials produced for the exhibition, along with supporting essays by six contributing scholars, were recorded in a richly illustrated, 223-page publication (Monacelli Press, 2014) highlighting the projects and providing additional insights into the selected case studies. The CUISD received numerous requests for the exhibit to travel to other institutions. The Cooper Union is currently in preparations to exhibit the work at Elmhurst Art Museum near Chicago (exhibition targeted for fall 2015) and Vilnius Gediminas Faculty of Architecture in Lithuania (TBD). Due in part to the success of *Lessons From Modernism*, and the many questions that the study raised, the Institute is currently developing the concept for a follow-up exhibit on sustainability in contemporary architecture.



Elizabeth O'Donnell, Acting Dean of The Irwin S. Chanin School of Architecture and Kevin Bone, Director of The Institute for Sustainable Design invite you to a reception to celebrate the book



With generous support from the Stravros Niarchos Foundation

Friday, May 16, 6-8pm

The Peter Cooper Suite  
The Cooper Union Foundation Building  
7 East 7th Street, 8th Floor  
New York City

Please RSVP to sburrell@cooper.edu

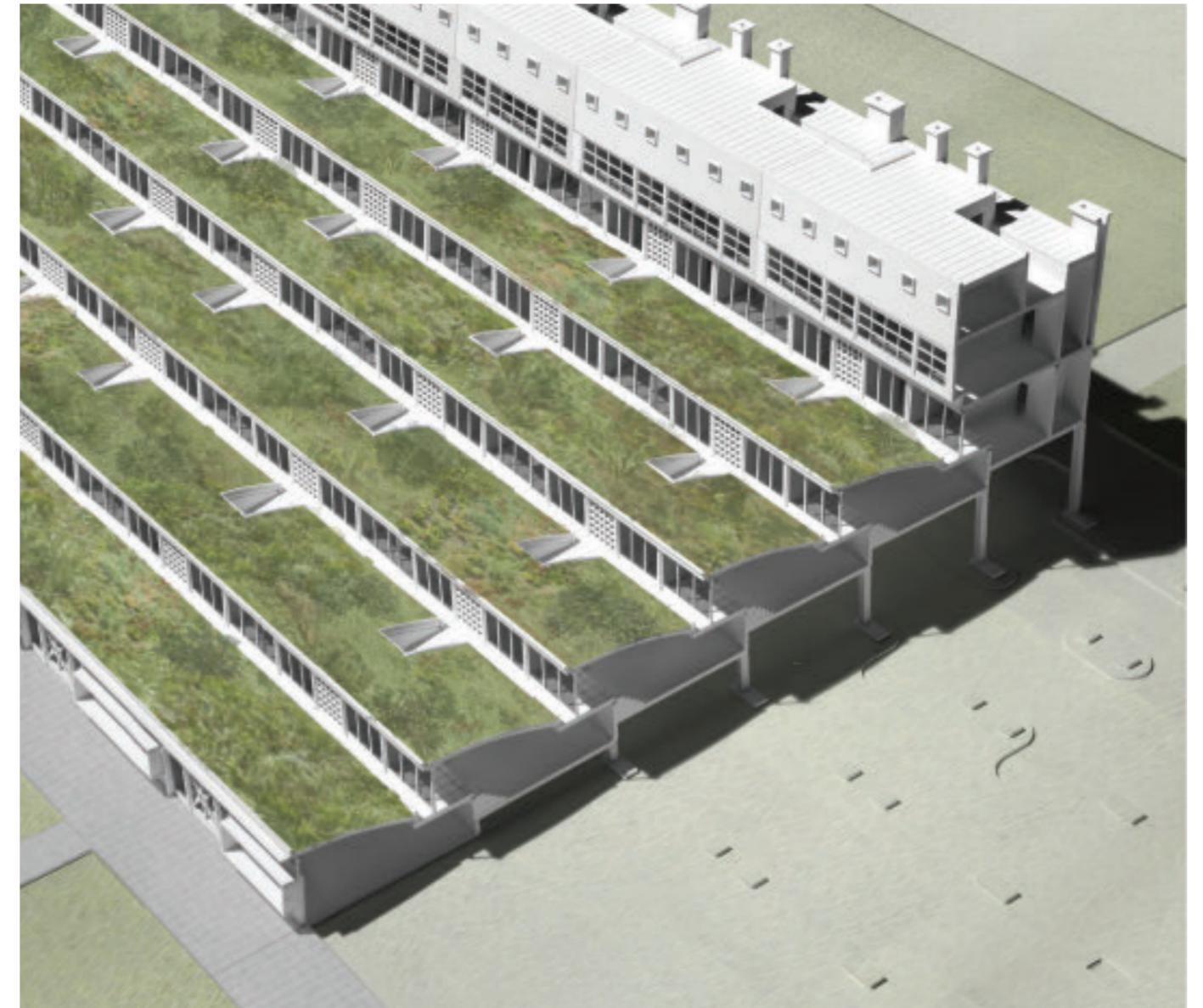
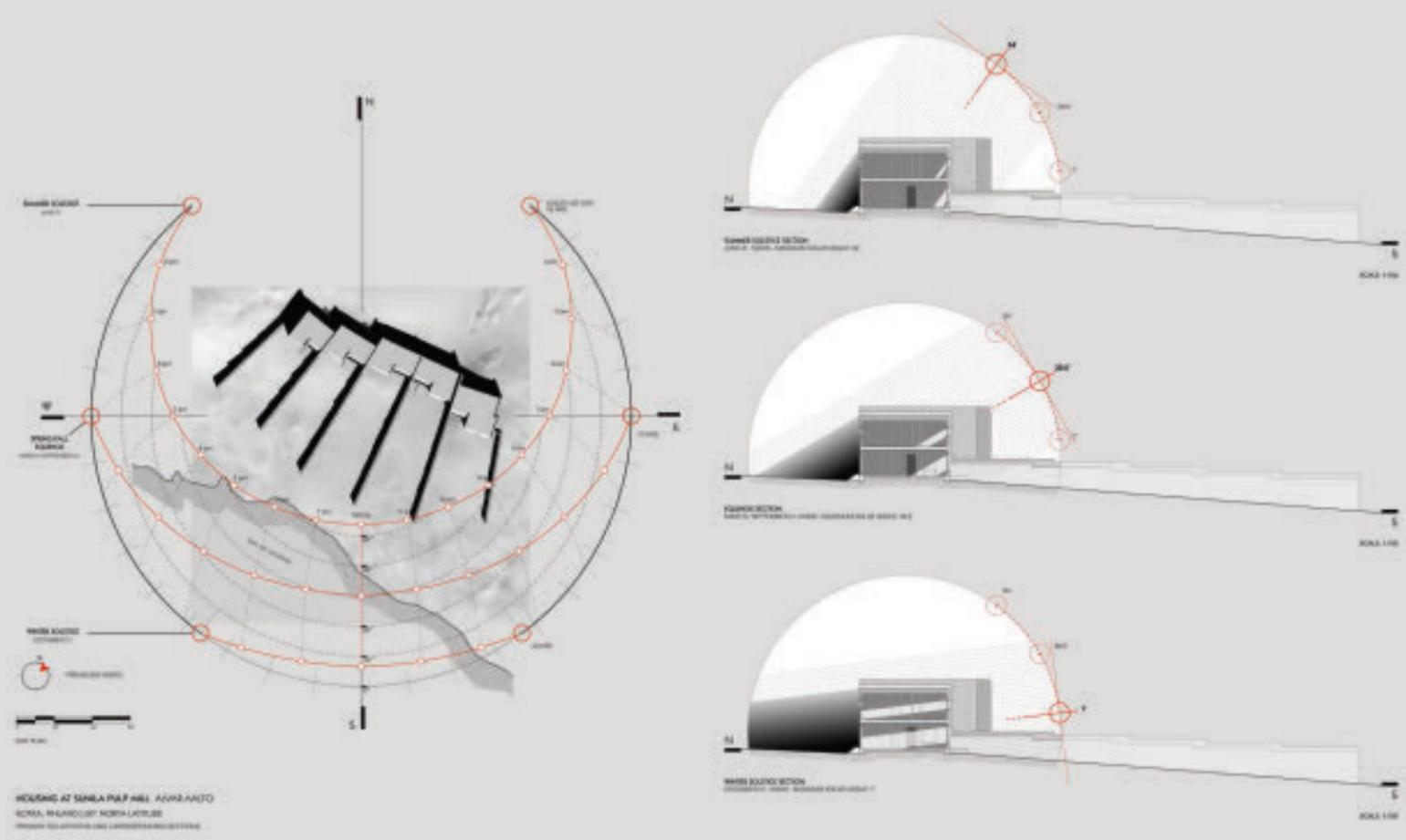
Essays by

Daniel A. Barber  
Michael Ben-Eli  
Alan Berman  
Kevin Bone  
David Rifkind  
Carl Stein

Published by

The Cooper Union  
Institute for Sustainable Design,  
The Irwin S. Chanin  
School of Architecture and  
The Monacelli Press





*Housing at Sunila Pulp Mill, Alvar Aalto, Architect; Drawing by CUISD*

*Bachelor Flats, Katz and Vaughan, Architects; Drawing by CUISD*

*Houses in Space, Amacio Willimas, Architect; Drawing by CUISD*

# Dymax Redux

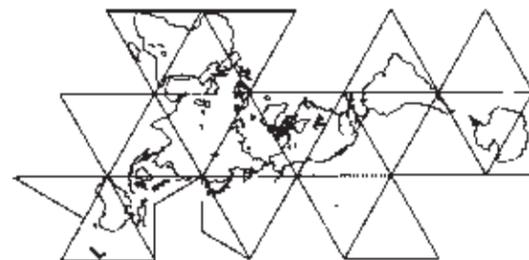
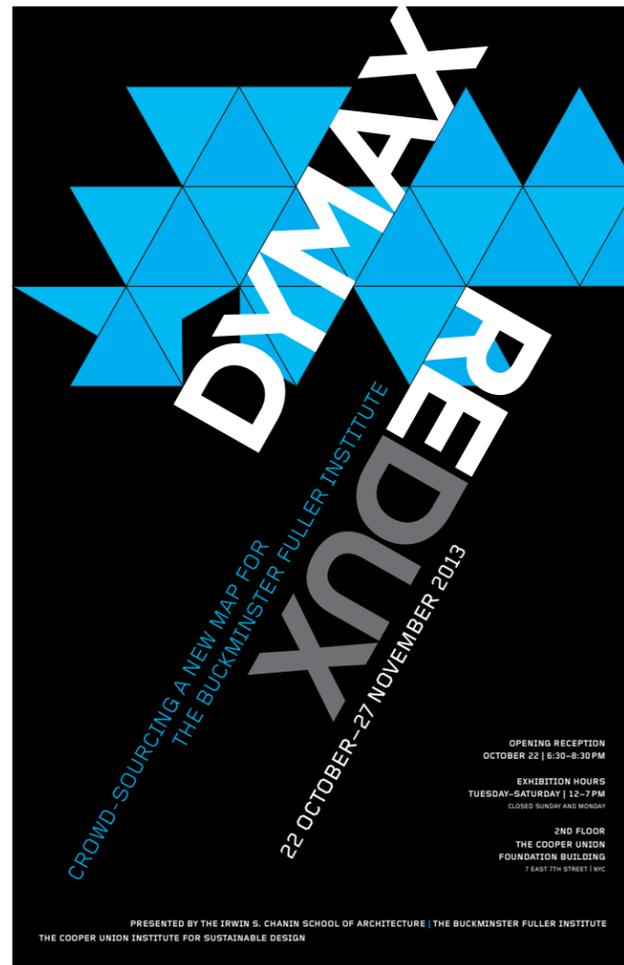
IN PARTNERSHIP WITH THE BUCKMINSTER FULLER INSTITUTE

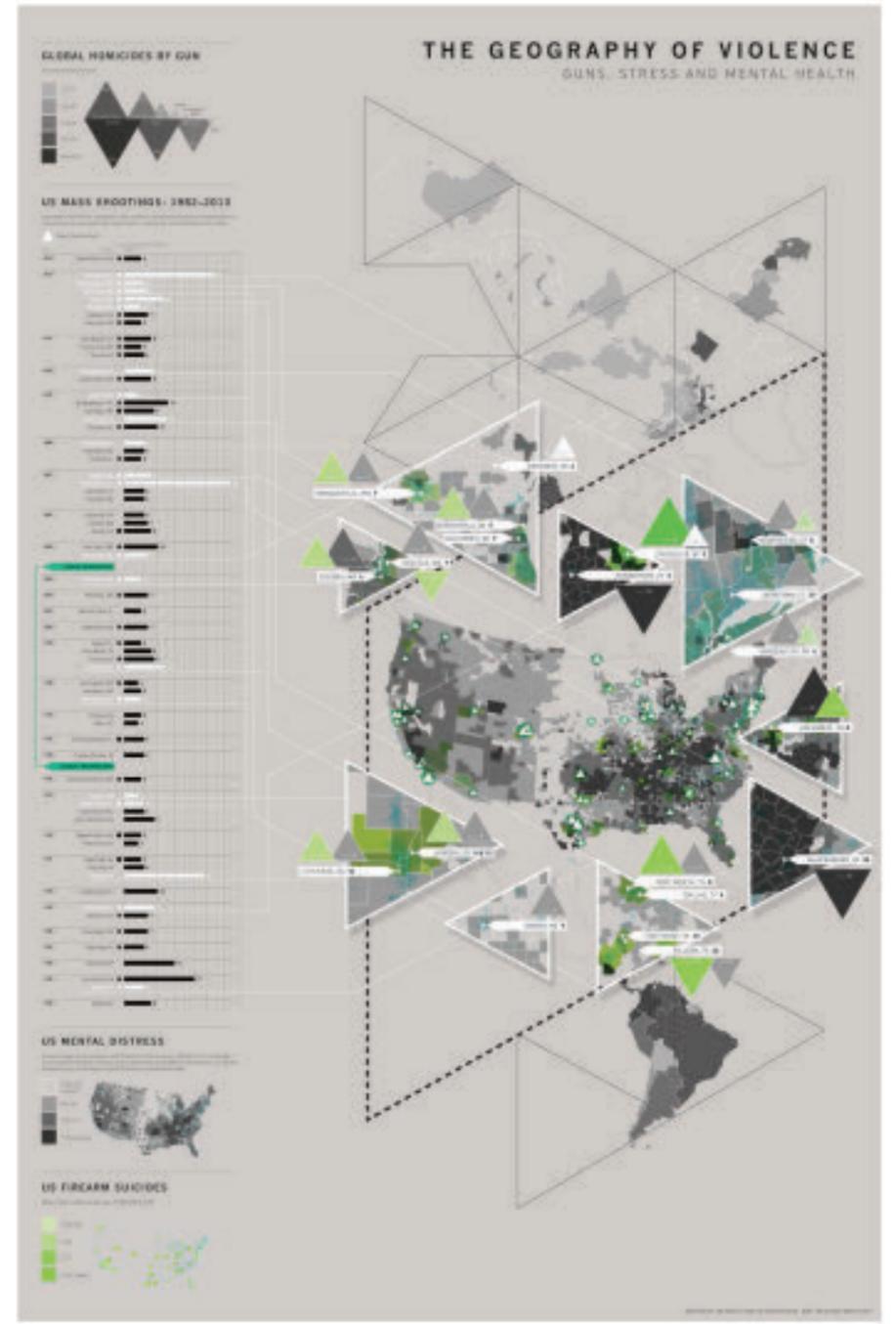
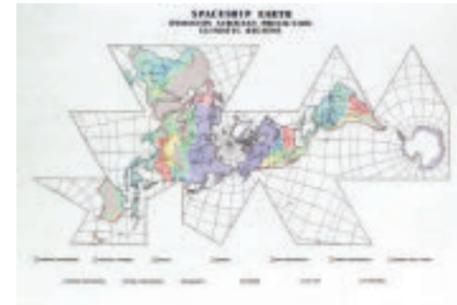
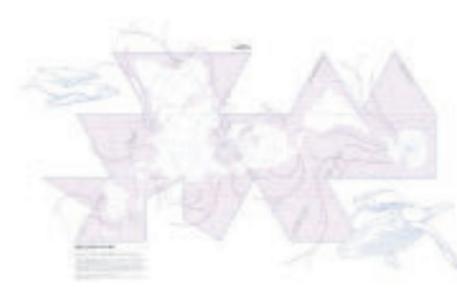
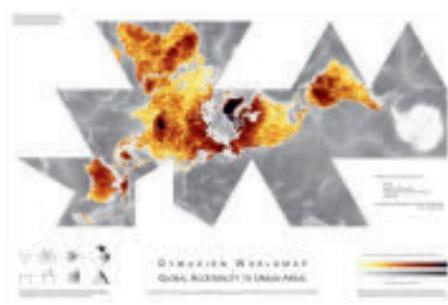
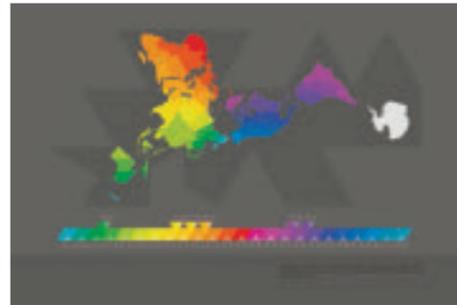
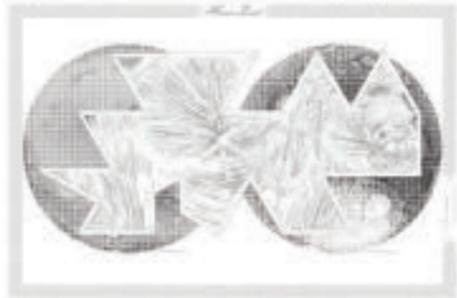
2013 OCTOBER 22—NOVEMBER 27

The CUISD has cultivated a resource sharing and intellectual partnership agreement with the Buckminster Fuller Institute (BFI). The institutes have produced a number of events together. The CUISD has twice partnered with BFI and collaborated with The Irwin S. Chanin School of Architecture of The Cooper Union to exhibit Dymax Redux, a crowd sourced design competition that highlighted contemporary graphic designers' and visual artists' interpretations of Buckminster Fuller's iconic Dymaxion Map. The exhibit included a selection of Fuller's own maps, which provided background and context for the project. Originally published seventy years ago, Fuller's map was a cartographic breakthrough showing one island in one ocean, a design that has inspired generations since.

The exhibit featured prints of all eleven finalists from the Dymax Redux competition. These offer a variety of beautifully original, informative, and interpretive projections onto the Dymaxion world map. Using the map as a canvas, these finalists explored a range of topics, including deforestation, climate and atmospheric conditions, historic events, migration routes, water use, gun violence, urbanization, time zones, and lunar topography.

First opening at The Cooper Union on October 22, 2013, the exhibit was on view, open to the public, through November 27 of the same year. The exhibit was remounted for a second showing in November 2014, at the Wythe Hotel in Brooklyn, as part of BFI's annual Fuller Challenge awards program.

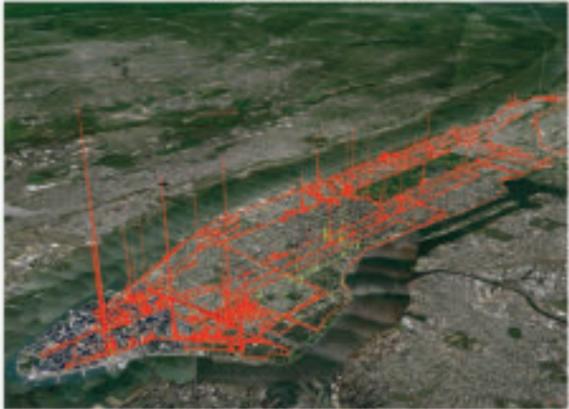




# Emissions

IMAGES FROM THE MIXING LAYER

2013 OCTOBER 22—NOVEMBER 8



**THE COOPER UNION**  
For the Advancement of Science and Art

**EMISSIONS: IMAGES FROM THE MIXING LAYER**

**PANEL DISCUSSION**

WEDNESDAY, OCTOBER 30TH AT 6:30 PM *Event open to all ages*

The Great Hall at The Cooper Union  
7 East 7th Street at Third Avenue | NYC  
Free and open to the public

**PANEL PARTICIPANTS**

AL APPLETON | Executive Senior Fellow for Sustainable Environments, The Cooper Union Institute for Sustainable Design, former Commissioner of the NYS Department of Environmental Conservation

BARBARA ARRINDELL | Artistic Director and Director of Domestic Offices for Sustainability, RFP + HARDINGER | Interim

BRUCE PAYNE, PhD | Associate Research Professor, Wake Forest University, Winston-Salem, NC, Senior Fellow of Wood Forest University U2E2, Winston-Salem, NC

REBECCA SMITH | Artist

SAMARA SWANSTON | Legislative Counsel to the Environmental Protection Committee of New York City Council

Sponsored by  
**THE INSTITUTE FOR SUSTAINABLE DESIGN AT COOPER UNION** for  
**MARFA DIALOGUES/NY** in cooperation with  
**THE RAUSCHENBERG FOUNDATION**

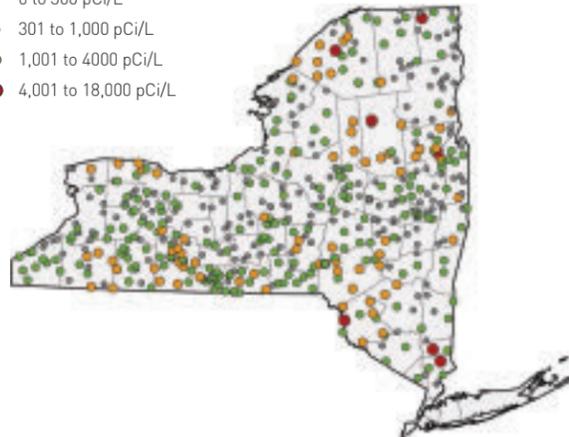
MO/INY Rauschenberg

An exhibition and panel discussion sponsored by CUISD for Marfa Dialogues and in cooperation with the Robert Rauschenberg Foundation, *Emissions* explored issues of methane gas and atmospheric pollution. Analysis centered on the idea that what we cannot see can, in fact, cause harm. Accordingly, the exhibition sought to visually display these issues in the face of climate change. The project, developed by Ruth Hardinger and Rebecca Smith, called to attention different methods of sourcing information, sharing it, and visualizing it in creative ways. The ultimate aim of the project was to both provide a counterpart to data collected by Gas Safety Inc. in 2012, and generate conversation around methane awareness. This project demonstrated that natural gas is far from the clean energy source it is sometimes purported to be.

The panel, composed of professionals from a wide array of fields, focused discussion upon the connections between art and science, as well as the rich and fragile aspects of earth's air and atmosphere. Panel participants included Al Appleton, Barbara Arrindell, Ruth Hardinger, Bryce Payne, Rebecca Smith, and Samara Swanston.

#### Radon Samples

- 0 to 300 pCi/L
- 301 to 1,000 pCi/L
- 1,001 to 4000 pCi/L
- 4,001 to 18,000 pCi/L



We have lived our lives by the assumption that what is good for us would be good for the world. We've been wrong. We must change our lives so that it will be possible to live by the contrary assumption, that is, what is good for the world will be good for us.

Wendell Berry *Nature as Measure*, April 4, 2014

## LECTURES AND FORUMS

### RESOURCES—ENERGY, LAND USE, AND WATER

Since the start of the industrial revolution, the human family has grown by over six billion people. Along with these growing numbers come greater impacts on both human social systems and the many ecosystems of the earth, from microbial communities to regional biomes. More and more resources are being used to meet the needs of the ever increasing and more affluent global population. The by-products and ecological damage associated with resource production and consumption are altering the geo-chemical conditions that have evolved synonymously with life. We are drawing down on finite amounts of fertile soil, fresh water and abundant fuels and in the process are compromising the beauty and nurturing qualities of the natural landscapes that have been the physical home and spiritual root of humankind since the beginnings of pre-history. The need to consider our settlement and resource use patterns, in the context of rapid degradation of the natural systems, is at the core of all critical narratives on sustainability.



## Hydro-Fracking for Natural Gas

SYMPOSIUM, FILM SCREENINGS, LECTURES

**2010 APRIL 14 & 15**

In the summer of 2008, the term *hydro-fracking* (hydraulic fracturing) had just surfaced in public discourse. The use of this new unconventional method for extracting natural gas from shale formations was just gaining momentum. The Energy Policy Act of 2005, based on Bush-era industry oversight, allowed this largely untested technology to proceed with minimal regulation, opening a whole new sector of natural gas development. This is now known to be a process with numerous adverse health and environmental impacts, from surface runoff of toxins, to groundwater contamination and the destruction of landscapes and their ecologies. Hydro-fracked natural gas has proved to be carbon-intensive, despite industry representations to the contrary. Measured from wellhead to final burn, some natural gas production is producing equal or greater CO2 emissions than that of coal.

In the fall of 2009, the founding year of the CUISD, it became clear that this issue was going to demand attention. The public was clamoring for information about this new fracking process, and evidence demonstrates that the impacts were profound. The CUISD made a commitment early on to bring this issue into public forums.

The first major symposium undertaken by the Institute concerned the issue of new technologies for natural gas extraction. "Hydro-Fracking for Natural Gas: How This 'Clean' Fuel Technology Threatens Our Water, Our Health, Our Landscapes And Our Energy Future" took place on April 14-15, 2010. The symposium included a screening of *Split Estate*, a film examining the results of the combination of an unregulated industry and mineral-rights laws that allowed companies to occupy private land and set up large-scale industrial drilling operations. The symposium included a roundtable discussion by academics and industry experts that brought together some of the most important voices on the issue.

At a time when hydro-fracking had only just entered the national debate as a potential new direction for US energy policy, this forum provided an essential overview for people who had questions about the practice. Presenters outlined the negative impacts that natural gas extraction poses for rural landscapes, where much of the gas is extracted, as well as for cities like New York, where drinking water and food are potentially tainted by the toxic chemicals used in the extraction. An overview and transcript of the discussions was made available for free download from the Institute's website.

Event participants included Prof. Michel Boufadel, chair of the Department of Civil and Environmental Engineering at Temple University; Dr. Theo Colborn, the nation's foremost expert on the health effects of endocrine-disrupting chemicals and president of the Endocrine Disruption Exchange (Dr. Colborn passed away in December 2014); Calvin Tillman, then mayor of Dish, Texas, a town hard-hit by the drilling boom; Josh Fox, director of Oscar-nominated *Gasland*; Brooklyn assemblyman Jim Brennan; attorney Jeff Zimmerman; and Albert Appleton, former commissioner of the New York City Department of Environmental Protection, a leading authority on water-use management.

By bringing together such a diverse and highly qualified group of participants, this event explored the complex aspects of hydro-fracking at a time when the mainstream media was still paying scant attention to this critical issue. Six months later the Institute followed up with a public information session in anticipation of city, state, and regional hearings on hydro-fracking. The Cooper Union is now credited with providing leadership and important public information on the hydro-fracking issue.



Hydro-Fracking Drill Site, Dimock, Pennsylvania, J. Henry Fair, Photographer

# Nature as Measure

WES JACKSON AND WENDELL BERRY

COSPONSORED BY THE LAND INSTITUTE  
AND THE BERRY CENTER

**2014 APRIL 4**

The Institute brought together two men who have each invested a lifetime of work and thought into the state of our agricultural systems and the problems of our industrial agricultural practices. "Nature as Measure" was a discussion on the future of the agricultural system between two of the senior statesmen of environmental discourse: author, poet, and farmer Wendell Berry, the recipient of numerous awards and honors, including a Guggenheim Foundation Fellowship; and Wes Jackson, MacArthur Fellow and founder of The Land Institute. Both are recognized as leaders in the movement for more sustainable agriculture and land use practices, and both have published important books on agrarian questions. This event, moderated by *New York Times* columnist Mark Bittman, generated an overwhelming amount of interest, and reflected the growing awareness of food and agriculture systems as critical to the health of people and cities.

Our scientists are developing perennial grain species with an eye to their being diverse mixtures that will require less fossil fuel, conserve soil and water, and weather the drought and deluge that will become more frequent with climate change.... Annual crops require cheap energy and lots of it. Field preparations. Pesticide treatment, the manufacture of fertilizer—all is fossil fuel dependent. Global demand for fossil fuels is colliding with dwindling supplies, which will drive up the cost of producing food with annual crops. Perennial crops provide for years without replanting and interact in complementary ways to manage fertility and pests. They have a much smaller energy footprint.

The Land Institute's informational documents, 2014

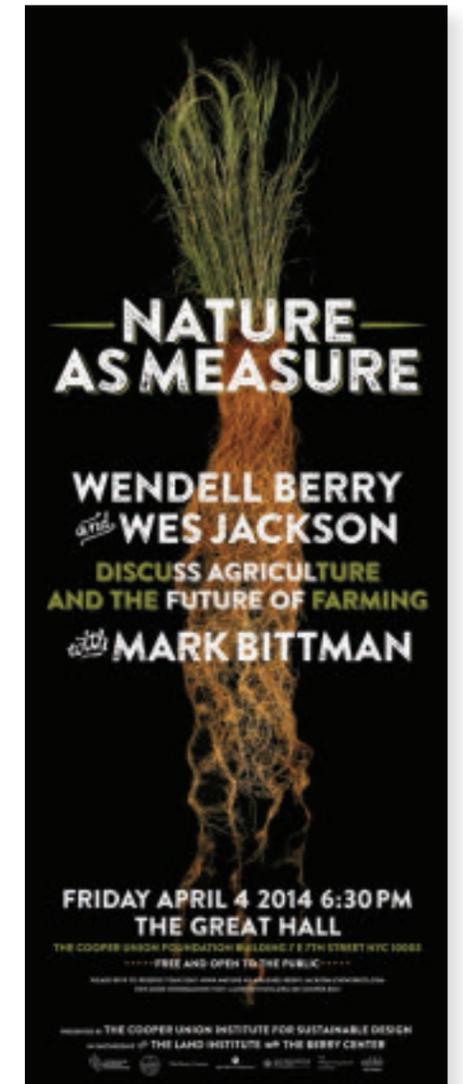
At the event, Bittman asked Berry, "Is... sustainability becoming a fundamental issue? Are things getting better or are things getting worse?" Berry replied:

Things are getting better in the sense that this event would not have been imaginable three decades ago. Well, actually, it wouldn't have been imaginable a decade ago. There are lots of places now in the country that are involved in the development of local food economies and the conversation about food and its obvious dependence on the land. You can go to these places and speak the language that Wes and I have been speaking with each other [for thirty-five years] and people know what you are talking about. You can go to some city governments and people know what you are talking about. You can go to some state governments and people know what you are talking about. I know you can't go to my state [Kentucky] government and be understood. And I don't think you can go to the capital in Washington and be understood. There is a growing conversation that's using the same language, concerned about the same issues. Things are getting worse in the sense that the corn and bean economy, for instance, a totally market-determined, technologically limited way of land use, is now invading the extraordinarily vulnerable landscapes where I live, and we are a long way from being able to stop that.

... [A]nd so when I talk to people to say that we now have a beginning. It's an authentic beginning and it's not going to be undone. It's going to go on—I'm fairly confident of that—but it is a beginning. Most of the land now being used is being badly used.

**Wendell Berry**, *Nature as Measure*, April 4, 2014

The "Nature as Measure" event has been recorded on a CD that is available through the partner organizations. It was one of the very rare times that both Jackson and Berry were willing to leave their work and their books and speak to the public about their ideas. The Cooper Union and the Institute were fortunate to host what was certainly one of the greatest events in the history of the Great Hall.





Wes Jackson and Wendall Berry  
at The Great Hall, The Cooper Union  
April 4, 2014



**THE ARCHITECTURAL LEAGUE OF NEW YORK AND THE COOPER UNION INSTITUTE FOR SUSTAINABLE DESIGN**

The Five Thousand Pound Life: Land addresses the need to consider settlement patterns and competing land uses in new ways given the reality of climate change. The value assigned to various forms of land use, and various attitudes towards land as a resource, must be understood in terms of ecological services and impacts, rather than narrowly-defined economic imperatives. In sessions on "Nature and the City," "Spatial Logistics," and "Density," speakers will consider American approaches to development, attitudes toward nature, and whether the current dominant narrative of the environmental superiority of concentrated high density development might be challenged by a counter-narrative of lower density land-use that takes advantage of distributed energy production and localized treatment of waste. Ultimately, The Five Thousand Pound Life: Land will ask what the desirable and politically achievable mix of these narratives could be.

The Architectural League launched The Five Thousand Pound Life—an initiative of public events, digital releases, and a major design study—in September 2013 to address the intertwined challenges of reimagining the American way of life to address climate change and to rebuild a robust economic structure that offers viable livelihoods across the income spectrum. The League brings the perspective of the design professions to these issues, as its contribution to what must be a broad collective effort spanning geographies, generations, occupations, disciplines, and ideologies.

Photo by Robert Geller (www.robertgeller.com)

**FREE** to current Cooper Union students/faculty/staff and Architectural League members.

**OPENING REMARKS**  
**Kevin Bone** Director, The Cooper Union Institute for Sustainable Design  
**Rosalie Genevro** Executive Director, The Architectural League of New York

**A CONVERSATION ON NATURE & THE CITY**  
 Eric Sanderson & Ted Steinberg  
 Moderated by Rosalie Genevro

**SPATIAL LOGISTICS**  
 Alex Klatskin  
 Rob Holmes  
 Jesse LeCavalier  
 Moderated by Coral Davenport

**DENSITY**  
 Emily Talen  
 Charles Waldheim  
 Albert Pope  
 Moderated by Vishaan Chakrabarti

**A CONVERSATION ON LAND, CLIMATE, AND CULTURE**  
 Rebecca Solnit  
 Cassim Shepard

**09/26/14**

FRIDAY SEPT 26 2014 2-6 PM THE GREAT HALL FOUNDATION BUILDING 7 EAST 7TH STREET NEW YORK CITY

**THE 5000LB LIFE: LAND**

## The Five Thousand Pound Life: Land

SYMPOSIUM COSPONSORED WITH THE ARCHITECTURAL LEAGUE OF NEW YORK

2014 SEPTEMBER 26

"The Five Thousand Pound Life: Land" was a symposium on rethinking land and its value, in light of climate change. Speakers included: Kevin Bone, Vishaan Chakrabarti, Coral Davenport, Rosalie Genevro, Rob Holmes, Alex Klatskin, Jesse LeCavalier, Albert Pope, Eric Sanderson, Cassim Shepard, Rebecca Solnit, Ted Steinberg, Emily Talen, and Charles Waldheim.

This symposium addressed the need to consider settlement patterns and competing land uses in new ways, given the reality of climate change. The value assigned to various forms of land use, and various attitudes toward land as a resource, must be understood in terms of ecological services and impacts, rather than narrowly defined economic imperatives. In sessions on "nature and the city," "spatial logistics," and "density," speakers considered American approaches to development, attitudes toward nature, and whether the current dominant narrative of the environmental superiority of concentrated, high-density development might be challenged by a counternarrative of lower-density land use that takes advantage of distributed energy production and localized treatment of waste. The panels examined what the desirable and politically achievable mix of these narratives could be.

[There is] the need [for] new paradigms for human working society, now that we have reached the point where we have machines that can do a great deal of the work we do, we really, possibly, don't need all the people in the world that we used to [need] before. And so we must find a new role for people. We must disengage people from their dependence on traditional jobs for their survival, for their compensation, for their health care, for everything. **George Bugliarello** *Science, Technology and Society: The Tightening Circle*, December 2, 2010

## ECONOMIES AND SOCIETIES

The extraordinary economic progress of the last two centuries has left humanity unwilling to accept the historic norms for economic activity that for eons have doomed much of humanity to toil in hardship at the edge of subsistence. Today that traditional goal of subsistence has been replaced by a new goal, the elimination of poverty and the maintenance of a level of economic activity that will bring to all the prosperity that has traditionally been the prerogative of the West and a small sliver of elites. We must learn how to create prosperity by living in harmony with the planet and its processes; we must capture the environmental wealth we have historically wasted or ignored and build our economic future around its wise use. We must turn our backs on basing our economic survival on manipulating the planet's resources and ignoring the resulting costs, and discover a new way to be wealthy. It is a historically transformative challenge of unprecedented dimension in reorganizing our social and economic behavior.

## Degrowth

David Barkin

2010 APRIL 23

2013 APRIL 23  
with Giorgos Kallis

David Barkin, professor of economics at the Universidad Autónoma Metropolitana in Mexico City, has been a frequent guest of the CUISD. He has presented several lectures and participated in classroom discussions about the implications of the present global capital framework on societies, justice, and sustainability. Prof. Barkin examined the process of unequal development that creates profound imbalances throughout society and promotes environmental degradation. His recent research focuses on the implementation of alternative strategies for the sustainable management of resources. Much of his work is conducted in collaboration with local communities and regional citizens' groups.

Clearly, in the midst of multiple economic, social, and environmental crises we must construct new ways to understand the operation of the social and ecological systems in which we live. Accordingly, Dr. Barkin's presentation explored the idea of "degrowth": a concept in which economies are socially and economically sustainable, yet do not promote growth. The talk examined the progress that scholars on the frontiers of creative thinking have made in developing degrowth as a way of integrating a broad series of constructive proposals to overcome these systemic crises. In conclusion, Barkin suggested that decreased production and consumption could facilitate environmental sustainability, social equality, and well-being.

In this article, we offer a number of examples in which university based teams were able to identify ways in which they could interact with indigenous groups and other social organizations associated with these communities to help strengthen their collective projects. This experience is based upon the idea that people codify their knowledge systems in such a way as to attempt to manage their environments as well as possible and to produce the goods they need for their own well-being as well as to assure themselves the possibility of improving their conditions.

If there is one lesson that can be extracted from the Mexican experience in rescuing traditional knowledges, it is [that] for tradition to survive it must become a living process, a resource that is constantly renewed to assure its currency and its value to those that depend on it for their survival as a people, as a culture. In Mexico... indigenous epistemologies are truly a building block for constructing alternatives to globalization: and thus to turning into reality the slogan of yesterdays' marchers: MANY OTHER WORLDS ARE POSSIBLE.

**Barkin.** 2010, *Incorporating indigenous epistemologies into the construction of alternative strategies to globalization to promote sustainable regional resource management: The struggle for local autonomy in a multiethnic society.* In: Esquith, S. and F. Gifford, editors. *Capabilities, Power and Institutions. Towards a More Critical Development Ethics.* University Park, PA Penn State University Press. pp. 142-161.

The second "Degrowth" lecture, in 2013, was given by Giorgos Kallis, a professor at the Institute of Environmental Studies and Technology in Barcelona. Kallis followed the same argument as Barkin, positing that models of growth within Euro-American countries are not sustainable and in the future, may not even be possible. Barkin moderated this event.

## Science, Technology and Society: The Tightening Circle

George Bugliarello

2010 DECEMBER 2

In a world where the highly specialized and technical side of engineers and engineering is often emphasized, George Bugliarello unswervingly pursued an ideal that harkens back to the first great generations of modern engineering, that engineers should be society's problem solvers, that engineering solutions should be integrative and embody the best thinking of all sectors of society, that [an] academic education must never cease to engage the larger community in which it sits and never forget that its ultimate purpose is to manage the tension between the most rigorous and disinterested pursuit of knowledge and science and putting that knowledge and science to work in the service of the community. George was a man whose life might well serve as a model for what an engineer should be.

**Albert Appleton,** *Science, Technology and Society: The Tightening Circle* December 2, 2010

The CUISD was honored to host the last public lecture delivered by this remarkable thinker, Dr. George Bugliarello, president emeritus, university professor, and former chancellor of Polytechnic Institute. Bugliarello passed away on February 18, 2011. A renowned visionary who brought about significant changes in engineering and education, Bugliarello had a broad background ranging from fluid mechanics to computer languages, the environment, biomedical engineering, and scientific policy. He was a member of the National Academy of Engineers. He received the Marconi Society's Beacon of Light Award in recognition of his leadership in the creation of MetroTech, one of the nation's largest urban university-industry parks.

Rocketry, it was the Chinese that first developed it, to be followed more systematically by the Mughals in India in the seventeenth century. Two hundred years later, Goddard in Massachusetts launched rockets. Then twenty years later, Von Braun really developed them in a much more sophisticated way. From Von Braun, in fifteen years, to Sputnik. This led to the materialization of space, changes in international laws... changes in national sovereignty, a new game of politics. And of course with Sputnik, it took only twelve years to the moon landing. And the moon landing again changed our views of the world. We were able to see how finite and small our world was in comparison to the rest of the universe. It was extremely exhilarating - the accelerating, tightening, if you like, of this relation.

**Bugliarello,** *On The Tightening Circle* December 2, 2010

How to modify nature? But then there is the accompanying question of when we do, even if we know how to do these things, how far should we go doing it? We may want to look again at the relation between what we are, how we operate in a society. We at Cooper Union, a classroom, a nation, and the machines we are inextricably interconnected with. I define [machine] very broadly: my suit is a machine; my eyeglasses are a machine. These are the connections. We have plenty to study. The connection between biology and machines is well recognized, in the new field that we call bioengineering. E.O. Wilson at Harvard has proposed the connection between society and biology very cautiously. It is controversial. The connection between machine and society is really what now for about thirty years has been called sociotechnology, but it is still not clearly defined as a discipline.

**Bugliarello,** *Science, Technology and Society: The Tightening Circle* December 2, 2010

## The Economics of Happiness and Voices Of Hope

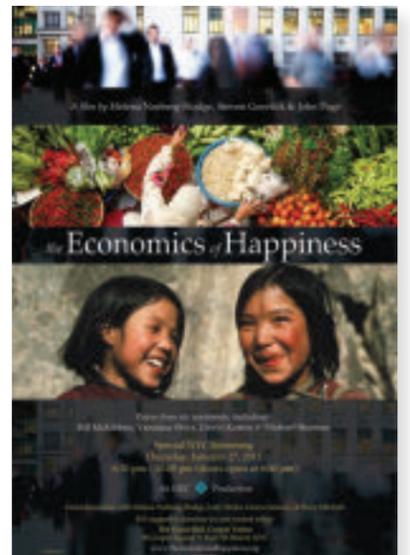
Helena Norberg-Hodge

2011 JANUARY 27

2014 NOVEMBER 8

In the traditional economy, everyone knew they had to depend directly on family, friends and neighbors. But in the new economic system, one's political and economic interactions take a detour via an anonymous bureaucracy. The fabric of local interdependence is disintegrating as the distance between people increases. **Norberg-Hodge,** *Ancient Futures,* Sierra Club Books, 2009

In January 2011, the CUISD welcomed filmmaker, economic analyst, and activist Helena Norberg-Hodge to the Great Hall for the East Coast premiere of the feature-length film *The Economics of Happiness*, a documentary about the worldwide movement for localization. Norberg-Hodge had previously delivered a compelling lecture to the Cooper Union community, which presented the cultural, psychological, social, and ecological benefits at stake through the strengthening of local communities and economies. Helena's introduction included rough cuts from *The Economics of Happiness*. The final film cut viewing was followed by panel discussions with the co-director and additional special guests. Norberg-Hodge has since returned to the Great Hall to host the symposium "Voices of Hope." Held in November 2014, the symposium formally launched the International Alliance for Localization, an organization aimed at resisting corporate power in favor of supporting local economies. The daylong event included lectures from philosophers, economists, farmers, poets, and scientists.



## Opportunities and Challenges on the Way to Sustainability

Alexander J. B. Zehnder

2011 MARCH 3

Dr. Alexander "Sascha" J. B. Zehnder, a Swiss national who is based in Zurich, has a worldwide set of scientific, academic, and business involvements. He is renowned for his cutting-edge successes both in sustainability research and in turning sustainability from an academic hope into a business reality. He played a key role in designing the Dow Jones Sustainability Index to help guide investors in the long-term implications of their investment decisions, and he is a founder and director of the Sustainable Performance Group, the largest sustainable investment fund in Europe.

The Cooper Union hosted Zehnder to give the annual Rudin-Shaftner lecture in 2011 in the Great Hall. His topic was "sustainability and its opportunities." He discussed how financial markets and sustainability complement one another. Zehnder argued that sustainability has gone from academic hope to business reality, thanks to efforts such as the Dow Jones Sustainability Index and the 2000-Watt Society. The 2000-Watt Society offers a practical strategy for achieving visionary urban energy use goals, and its framework has just been adopted by Zurich as the long-term guide to its energy management. Zehnder's lecture described how externalities of business could be arranged to guide investors toward decisions that are both economically sound and environmentally responsible. Zehnder's approach to the challenge of sustainability combines rigorous scientific and research analysis with an entrepreneurial sense of practical opportunity. Here, he creates the strategies needed to meet the growing challenge of reconciling humanity's economic aspirations with the natural-resource limitations of the planet.

Zehnder, scientific director of the Alberta Water Research Institute, is recognized as one of the world's leading experts on water and water management. He is the founder and director of Triple Z Consulting and is professor emeritus of ETH Zurich.

## Urban Sustainability in the Age of Climate Justice:

LESSONS FROM METRO PHOENIX

Andrew Ross

2011 NOVEMBER 18

Andrew Ross, professor of social and cultural analysis at New York University, and contributor to the *Nation*, *the Village Voice*, and *Artforum*, delivered a lecture in The Cooper Union's Rose Auditorium based on his book *Bird on Fire: Lessons from the World's Least Sustainable City* (Oxford: Oxford University Press, 2011). This lecture drew from personal experience and examined some of Phoenix's biggest challenges in sustainability, including water management, urban growth, immigration policy, pollution, energy supply, and downtown revitalization. He ultimately argued for policies that promote environmental justice.

Prof. Ross shared with The Cooper Union audience that key solutions need to be understood less as quantitative bottom lines, and more as qualitative behaviors that can be made available for adoption by citizens of all economic statuses. Ross delivered anecdotes of both wisdom and contradiction garnered from personal interviews with state lawmakers, government officials, urban planning and economic development professionals, real estate brokers and attorneys, policy analysts, land developers and homebuilders, nonprofit operatives, small business owners, civil rights champions, energy lobbyists, solar entrepreneurs, engineers and technicians, utility regulators, industrial ecologists, banking economists, art curators, gallerists, community activists, affordable housing providers, land trust officials, opinion journalists, archaeologists, tribal activists and officials, green business advocates, environmental watchdogs, trade unionists, university administrators, and sustainability scholars.

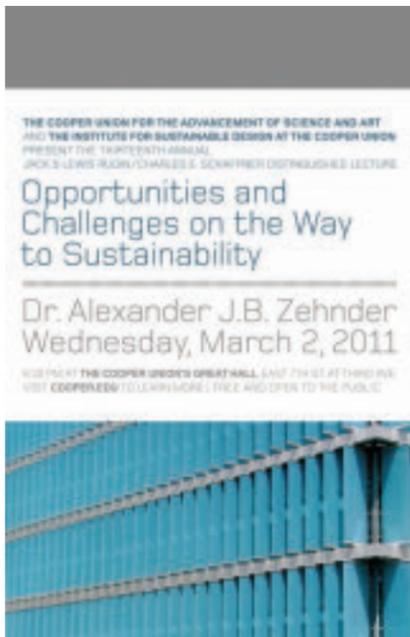
Ross's methodological analysis underpinned his thesis that the crucial progress, if Phoenix is ever to become sustainable, will occur more through political and social change than through technological fixes. Ross argued that this change will best occur evocatively.

## BUILT ENVIRONMENT— ARCHITECTURE, URBANISM, INFRASTRUCTURE

## SYMPOSIA, LECTURES AND WORKSHOPS

Today architecture finds itself at a crossroads. The green building movement is gaining momentum but the elite expressions of the profession, the grand architectural speculations that characterize our time, and the supporting critical establishment tend to address green building as a technical specialty that is best dealt with by consultants, no different than code conformance or an engineering problem. Or worst, the very idea of an ecologically based, climate-oriented design agenda is seen as a threat to the discipline of architecture. Those arguments have a great deal of influence in both university studios and in the field, which is unfortunate, because they are wrong. Beautiful, innovative, and inspired design can engage and work with the agencies of nature. Great architecture can express that design agenda in the identity of the work. Indeed, our times suggest there cannot be great architecture—not truly influential, important, and modern architecture—made today that is not effectively addressing our unfolding epoch of environmental travails.

**Kevin Bone** *Lessons from Modernism*,  
*Monacelli Press, 2014*



# One Planet Architecture

## THOMAS RAU

2012 FEBRUARY 2

Netherlands-based architect Thomas Rau delivered a lecture in the Great Hall, in which he presented the fundamental methodological position on value and sustainability as it pertains to architecture and the relationship of materials to production and consumption. He explained that in the Netherlands:

We have to close the casino and really start the value-based economy. The way we are organizing society is over. The time of how we are organizing energy is over. [The time of how we are organizing] food, water, material is over. The green movement now tries to optimize in the old system. We don't have to optimize in the old system; we have to start the new system, the value-based economy. It's possible.

**Thomas Rau**, *One Planet Architecture*, February 2, 2012

Rau's concept of sustainability is centered on a radical shift in the economic relationship of producers and consumers, and materials. Rau proposes a similar concept to William McDonough's cradle to cradle. Yet he differs in his assertion that the producer maintains ultimate ownership and subsequently perpetual care of use, in both products and buildings. Through his architectural practice, Rau offers suggestions for reorientation of the relationship between raw materials and health. He sees potential for progress in the new value-based economy through a reconsideration of "the building as a bank of materials" defined as an "integral" approach to architecture.

Driven by universal principles of sustainability—respect for nature, the built environment, and cultural context—Rau sets new standards through his work and practice. Best known for the ING bank offices and World Wildlife Fund headquarters, Europe's first carbon-neutral building, Rau produces buildings that are exemplary in new technology and architectural design. They ultimately demonstrate the potential of advanced concepts in a value-based society, and they are beautiful works of architecture.

oneplanetarchitecture

THE COOPER UNION INSTITUTE FOR SUSTAINABLE DESIGN

Thomas Rau WEDNESDAY, FEBRUARY 2, 2011 | 6:30 PM

MODERATED BY ROGER DUFFY

THE GREAT HALL THE COOPER UNION 7 EAST 7TH STREET NYC

FREE AND OPEN TO THE PUBLIC

RAU's sustainable entrepreneurship stems from a specific attitude towards the world. Working and living in the constant awareness that any action ultimately produces significant effects in the world at large: ecological, economic and social. This way of working creates healthy, energy-producing buildings that adopt a people-oriented approach and enhance awareness of our planet. This is what RAU calls oneplanetarchitecture.

AIA AND NEW YORK STATE CONTINUING EDUCATION CREDITS ARE AVAILABLE.

# Bridging the Gap

A LECTURE BY **DIÉBÉDO FRANCIS KÉRÉ**  
ON SUSTAINABLE DESIGN IN AFRICA

**2012 FEBRUARY 9**

In February 2012, the Institute worked in partnership with the Architectural League of New York to host architect and educator Diébédo Francis Kéré, for a lecture and roundtable discussion on his perspectives into contemporary architecture. He is a pioneer of sustainable architecture in both his native Burkina Faso and around the world. Kéré is known for his philosophy of “self-building,” in which he works with communities to develop the capacity to monitor climatic circumstances using local materials. This philosophy has shaped his recent and current projects, which have won both Aga Khan and Holcim Awards.

Kéré’s lecture was followed by a roundtable of professionals and experts discussing challenges of sustainably building across the African continent. Each of the twelve participants gave a brief description of his or her work. Prof. David Turnbull of The Irwin S. Chanin School of Architecture and Prof. Toby Cumberbatch of the Albert Nerkin School of Engineering directed open discussions following the presentations. Shared local knowledge and communal conversations regarding the challenges of building in rural Africa proved to be a common influence in developing workable strategies for architectural practice in the continent.

During the symposium, Yutaka Sho described how knowledge transfer—within Africa, within the West, and between the two—informed her work as a teacher of an architectural theory course in Kigali. Instead of beginning with Western theory, Sho’s students documented and photographed their own built environments, and were taught to understand theoretical positions through their own native environment.

There are different methods of construction that are worth mentioning here. One, is when building is done by local association and cooperation. More typical is the program in which genocides, the offenders, will construct infrastructure and housing instead of serving sentences in jails. Offenders go back to their villages and rebuild housing in the villages directly for the people they hurt, and for this case, a public space is built directly within the domestic space. It is illegal to speak about ethnic differences in Rwanda, so there is no other space to talk about what happened there and what should be happening in the future. The walls become magnetic to both sides of the war and creates spaces and time for them to reconcile.

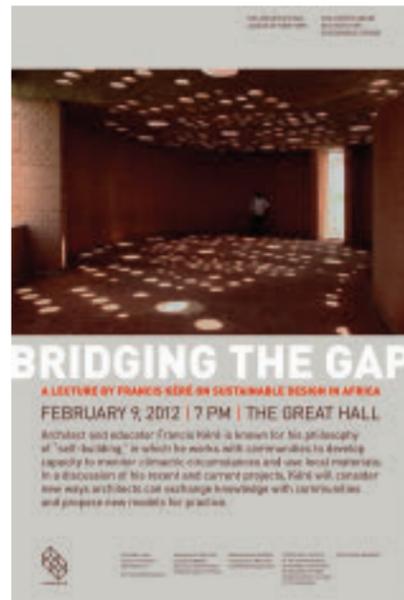


But it is difficult to find funding for these projects. We tend to think of Africa as a single entity so that when something bad happens in one nation we consider the entire continent dangerous. Therefore, investment into the whole continent goes down. Studies show... that image of Africa that we are exposed to, which portrays Africans as primitive and violent, controls investments and political policy making in Africa. It is quite rare that we get to see life here as sweet and as beautiful as it is shown be in Malick Sidibé’s photographs. So what I tried to do when asked to teach architectural theory at a very small school in Kigali, I gave them cameras, and of course papers and pencil, and asked them to make texts and pictures of their space. Of course, violent spaces are everywhere, because the violence happened everywhere in Rwanda, but in order to deconstruct and think about the future cities that they were going to build, it is unavoidable to talk about it. And it is important to talk about it in a more nuanced way than the typical monolithic portrayal we are used to.

Sustainability has to be cheap enough. It has to work. It can’t be experimental, because they have so much more to lose than we do. It has to be easy enough and clear enough so that the population can maintain their infrastructure on their own.

**Yutaka Sho**, *Bridging the Gap*, February 9, 2012

*Primary School Interior. Gando*, Eric-Jan Outwerkerk, Photographer



## Urban Planet

EMERGING ECOLOGIES

2012 APRIL 10

The symposium examined the urgent need for change in urbanization practices as many cities become increasingly unviable. The speakers examined the immanent hyperurbanization of our planet—exploring aspects of the situation under alternative social structures, “cities without governance”—and shaped an explicit understanding of different urban contexts examined via the lens of ecological viability and spectacular open-ended alternative urban futures.

In his introduction, Thomas Schneider, then consulate general of Switzerland in New York, said the symposium was the start of a series of exchanges showcasing the importance of science and research in architecture and the built environment.

Speakers for the event included Alfredo Brillembourg from Urban Think Tank and S.L.U.M. Lab, Jean-Claude Bolay from Ecole Polytechnique Fédérale de Lausanne and director of the UNESCO Chair in Technologies for Development, and Mitchell Joachim of Terreform and Planetary ONE. Brillembourg pointed out that 60 percent of projected urban growth over the next few decades is expected to occur in slums—regions of de facto urban development that defy central planning and have historically acted as nodes for poverty and crime.

Following the lectures, the speakers joined a panel discussion that included: Carolina Barco, project manager of sustainable cities for the Inter-American Development Bank; Prof. Denise Hoffman-Brandt, director of landscape architecture at the Bernard and Anne Spitzer School of Architecture at the City University of New York; Prof. Grahame Shane of Cooper Union and Columbia University; and Alexander Felson, director of the Urban Ecology and Design Laboratory, partner at Planetary ONE, and assistant professor and director of the joint degree at the Yale School of Forestry & Environmental Studies and the Yale School of Architecture.

“Urban Planet” sought to provide a new model for addressing the rise of ‘countersituations’ by bringing together leaders from a range of disciplines who could begin to shape an understanding of our new global urbanity. The symposium embodied our commitment to bringing a multidisciplinary approach to contemporary design problems. Prof. Lydia Kallipoliti largely coordinated the event. Kallipoliti is an assistant professor adjunct at The Cooper Union and assistant professor at the University of Syracuse.

## Future Imperfect

REFLECTIONS ON THE SCIENCE OF GREEN BUILDING AND

## Measured Expectations

POST-OCCUPANCY EVALUATION OF SUSTAINABILITY IN BUILT WORK

Sarah Wigglesworth

2013 FEBRUARY 28 AND 29

As part of The Irwin S. Chanin School’s Eleanore Petterson Lecture series, and in conjunction with the *Lessons From Modernism* exhibition, the CUISD partnered with The Architectural League of New York to host architect Sarah Wigglesworth for a lecture and roundtable discussion. Over three hundred practitioners, scholars, and other interested parties came to Cooper Union’s Great Hall to hear the lecture, which explored the architect’s ongoing development of a sustainable architectural practice based on principles of design excellence, ecological innovation, and inclusive decision making. Wigglesworth began with a reflection on her discovery of ecology, environmental sensibilities in vernacular architecture, and the necessities of contemporary architectural practice. She pointed out that, at the time, these were conversational taboos in the academic establishment. She subsequently presented a series of her major works that reflected the development of her building ethic, including her own home office, where she continues an ongoing post-occupancy evaluation of the sustainable components of the building. Wigglesworth elucidated this development through an emphasis on the importance of perspective.

A trip abroad was a revelation. Standing outside of your worn patch and seeing it from a distance, seeing it from another culture is a very good way of assessing what’s going on in your own backyard, ways to produce, where there are sustainable farming practices, oil, moving at speed, consumer materials, finite resources. We returned to England in 1991 a completely different kind of architect than we were when we left, and it seemed to me that architects were part of the problem and that by overtechnicizing solutions and not looking at what was really going on and not being interested in people’s behavior, the interface of people and the built environment, the abstraction that [we] tend to apply to the problem meant that we were not offering the solutions which have any resilience. **Wigglesworth**, *Future Imperfect: Reflections on the Science of Green Building*, February 28, 2013

The following afternoon, in partnership with The Architectural League of New York, a roundtable discussion was held at Cooper Union, focusing and furthering the topics that Wigglesworth broached in her lecture. The discussion, titled “Measured Expectations: Post-Occupancy Evaluation of Sustainability in Built Work,” incorporated a small group of leaders in urban design, architecture, and sustainability, who each presented for discussion a case study of a built work that underwent a formal post-occupancy evaluation.

Participants included: Jason Vollen, an associate professor of architecture at Rensselaer Polytechnic Institute and associate director of the Center for Architecture, Science and Ecology; David Turnbull, professor of architecture at The Irwin S. Chanin School of Architecture at Cooper Union and director and founder of Atopia Research; Alan Berman, a principal of Berman Guedes Stretton; Hillary Brown, professor of architecture at the City College of New York and director of its MS program in sustainability; Susannah Drake, principal of dlandstudio, a multidisciplinary design firm, and a visiting professor at The Cooper Union and senior associate at The Cooper Union Institute for Sustainable Design; Lydia Kallipoliti, assistant professor adjunct at The Cooper Union and assistant professor at the University of Syracuse;

Susan Kaplan, director of specifications and sustainability at HLW International; Julie Moskovitz, principal of the Brooklyn-based design firm Fabrica 718; and Carl Stein, principal of Elemental Architecture, author, and consultant.

## Lessons from Lessons from Modernism

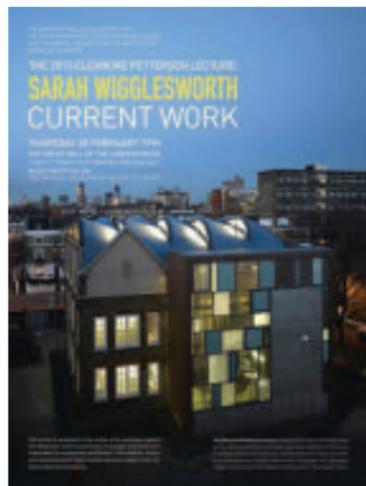
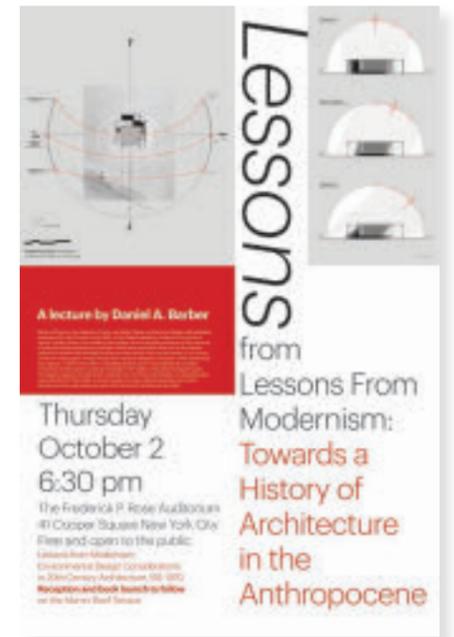
Daniel Barber

2014 OCTOBER 2

Prof. Daniel Barber gave a lecture in the Rose Auditorium to formally launch the publication *Lessons From Modernism: Environmental Design Considerations in Twentieth Century Architecture, 1925–1970*. Barber delivered a complex picture of the shifting concept of “man” within the environmental crisis of the mid-twentieth century, the effect this centrality of the redefined humanity had on architectural potential, and the representation of this centrality that both accompanied and was in part responsible for the changing cultural perceptions of any particular design subject. Barber recognized the importance of representation in effecting large-scale cultural change and took this as a lesson when mapped onto the potential of the LFM exhibition to classify, disseminate, and promote an awareness of environment and climatic importance in architecture.

The inextricable connections between social patterns, cultural desires, and climatic effects is both a threat and an opportunity—an opportunity to live differently, to construct... different relationships between human and natural systems. New ideas about the human, in the contested space-time of the anthropocene, are thus wildly ambivalent: simultaneously centered and diffuse, at risk and powerful.

**Barber**, *Lessons From Lessons From Modernism*, October 2, 2014



## DESIGN AND MATERIALS LECTURES

### Be Bionic

LEARNING FROM NATURE  
AS A TOOL FOR  
ARCHITECTURAL INNOVATION

**María Rosa Cervera and Javier Pioz**

**2009 NOVEMBER 24**

Since its inception in 1979, the Spanish firm of Cervera & Pioz has worked to develop new architectural and urban models inspired by bionics: an integral understanding of the principles of flexibility, adaptability, and energy-efficiency that are prevalent in all natural species. Architects María Rosa Cervera and Javier Pioz presented their firm's research and work. They argued that in the face of overpopulation, climate change, and unsustainable development, the practices of architecture and urban planning need to evolve in order to provide viable solutions to these global problems.

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### The Role Of Structure in Sustainable Design

**Gregory Kelly**

**2010 FEBRUARY 19**

In his lecture held at the Rose Auditorium, Gregory Kelly, then director of sustainable design at Weidlinger Associates, elucidated how the structural elements of buildings can be made more sustainable through advancements in structural engineering tools that support environmental modeling for sustainable systems design. Topics included: embodied carbon and its role in Life Cycle Environmental Impact Assessment (LCEIA), the use of BIM in LCEIA, architectural durability, sea level rise, green and blue roofs, wind turbines, green concrete, and the manner in which structure contributes to LEED.

Kelly has increasingly focused on the role of structures in sustainable design. His research has regarded sustainable structural and civil design strategies, technologies that integrate knowledge with client engagement through a comprehensive education component. Kelly also lead Weidlinger's building-integrated solar panel research collaboration with Columbia University, funded in part by grants from the Department of Energy and NYSERDA.

### Bamboo Structure

**Simón Vélez**

**2011 FEBRUARY 24**

Presented in Collaboration with  
The Architectural League of New York

Simón Vélez, a celebrated architect from Colombia and pioneer in the contemporary use of bamboo as an essential building component, presented and discussed his recent work. Vélez's use of bamboo has resulted in spectacular architectural works.

Often working in rural areas, Vélez took the opportunity presented by lack of regulation and availability of conventional materials to experiment with local materials. In partnership with local masons, he developed a mortar-filled joinery system that allows long-span and cantilevered structures to be built out of bamboo. By building only with his own well-trained crew of workers, Vélez has been able to create a unique vocabulary, with details largely based on the expertise gained in the field. Vélez's simple process is mirrored in his drawing method: simple, usually freehand, drawing on single sheets of letter graph paper.

Completed work ranges from low-cost houses that can be built by their inhabitants to large-scale pavilions and commercial projects, including: a bamboo pavilion for the Expo Hanover 2000; the Zócalo Nomadic Museum in Mexico City, which houses Gregory Colbert's *Ashes and Snow*; and a bridge for Crosswaters Ec lodge, the largest commercial project in the world to use bamboo. In 2009 Vélez was the recipient of the Principal Prince Claus Award, a prestigious Dutch award, for his contribution to a positive interaction between culture and development.

### Black Fungi in Energy Transduction, Radioprotection and in Melanoma Therapy

**Ekaterina Dadachova**

**2012 MARCH 23**

Dr. Ekaterina Dadachova of the Rockefeller Institute delivered a lecture that explored various aspects of black fungi. Speaking from a unique perspective that fuses biology and mycology with engineering and design, she presented a compelling account of how natural systems' design influenced her environmentally responsible innovation. Dr. Dadachova's research has found that melanin-containing mushrooms have the capacity to form internal shields that protect the gastrointestinal tract from ionizing radiation. In a nonmedical (but still nuclear) application, black fungi have been observed to thrive in high-radiation areas inside nuclear reactors, including the damaged Chernobyl reactor. The event was held in The Cooper Union's Foundation Building, in partnership with the New York Mycological Society.

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### Ecovative

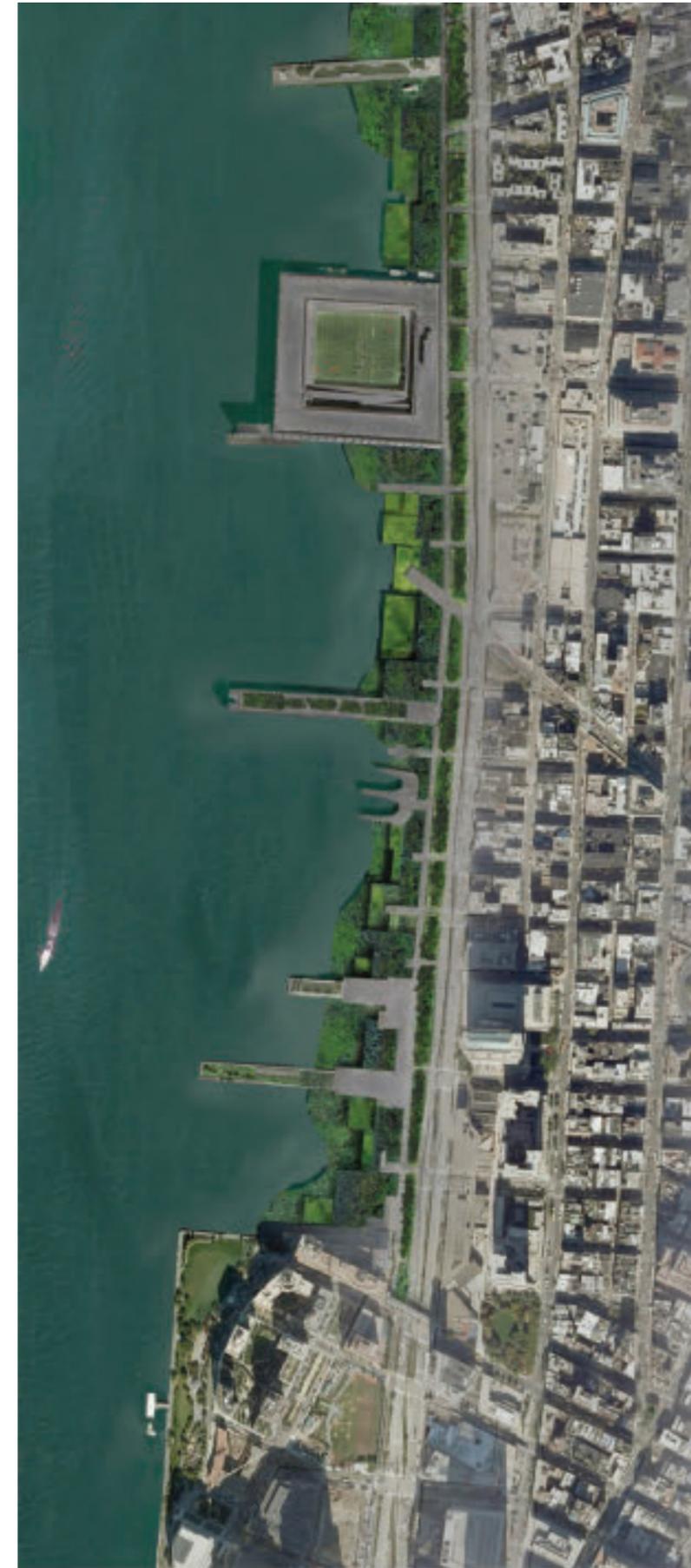
**Sam Harrington and Sue Van Hook**

**2013 FEBRUARY 22**

Sam Harrington and Sue Van Hook of Ecovative presented a lecture outlining the baseline motivation and sustainability initiative of their company. The start-up, using a fungi-based medium, developed an alternative to the petroleum-based plastics typically used in packaging. It is a simple concept whose brilliance lies in the potential for widespread impact and adoption of sustainable industrial ecologies by small scale localized eco-manufacturing. The duo presented their alternative material that is grown over the course of a five-day cycle using agricultural waste upon which the fungi-based structure, mycelium, grows. The team was the recipient of the 2013 Buckminster Challenge Award.

# PROJECTS

A major focus of the CUISD is environmental and resource questions related to New York City. The Institute is committed to a vision of New York's infrastructure, civic life, urban ecology, and building stock in which resources are used wisely and construction is undertaken with consideration for the whole environment. The Institute has worked in conjunction with city agencies, nonprofit groups, and Cooper Union community members to improve the quality of New York's environmental assets. The projects described below serve to demonstrate our ongoing investigations into environmental questions impacting the city of New York.



## One Prize

WATER AS THE SIXTH BOROUGH

### 2011

One Prize is an annual design and science competition promoting green design in cities. For the 2011 competition, the Institute produced a series of original studies on waterfront transformation. The design strategy showcased prototypical solutions, applicable to a set of riparian sites. Out of over eighty submissions, originating from eighteen countries and four continents, the Institute was recognized as a semifinalist, one of three groups to be awarded an honorable mention.

The proposal resulted in three deployable typologies, based upon existing technologies and known construction methods: terraced flats at tidal sea walls, floating wetlands in tidal shallows, and upland ecological restoration. These are strategies that the Institute will continue to explore and promote through specific projects, community outreach, and forum initiatives.

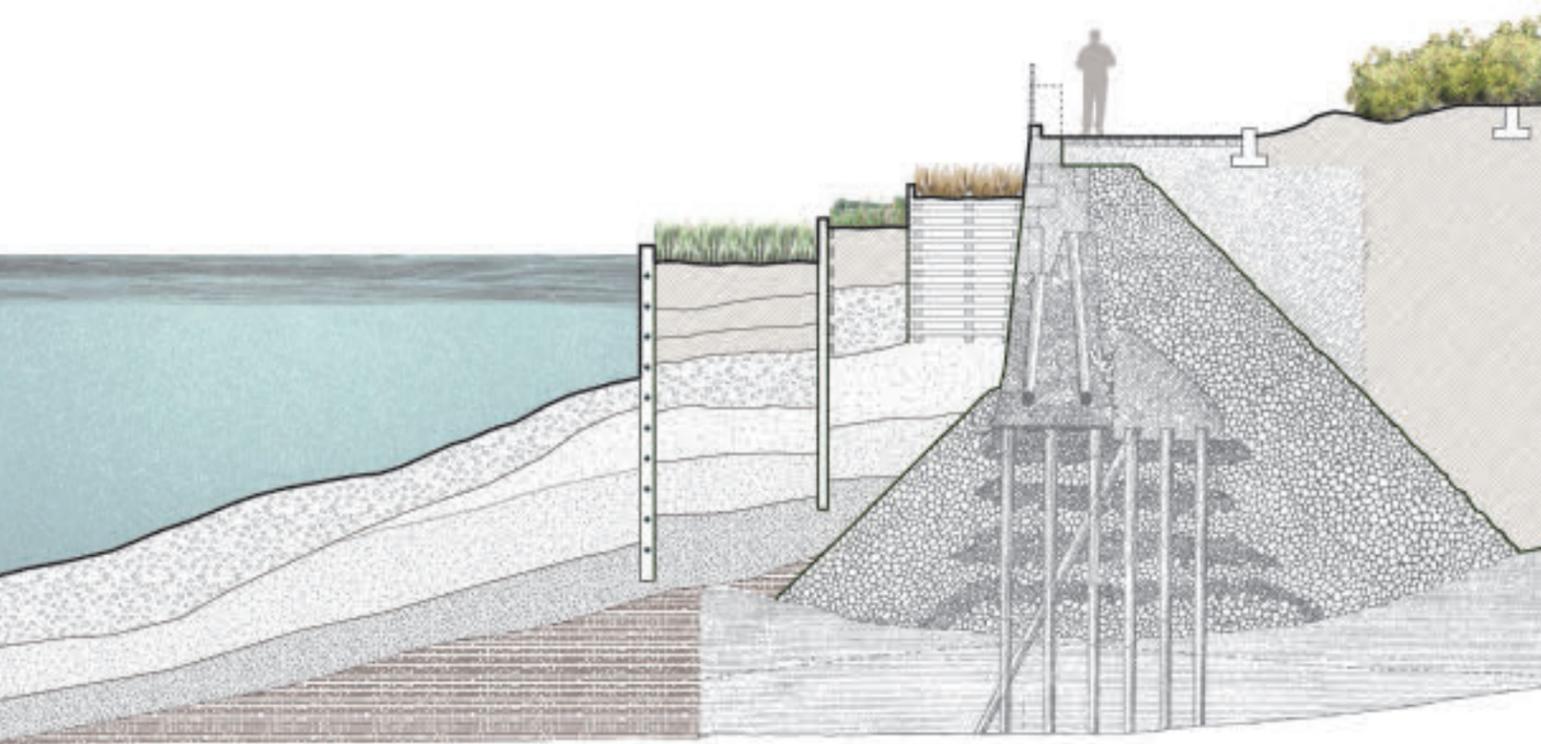
The proposals are posted on the Institute's website and were included in an exhibition at the Center for Architecture in New York City. Adrian Benepe, then New York City parks commissioner, who regarded the submission as the most promising of the eighty entries, invited Institute staff to present the work to the Department of Parks & Recreation. The Institute continues to work with the Parks Department to explore strategies to implement these and other ideas relating to the New York City environment.

*Plan for Estuary Restoration, Wards and Randalls Islands, CUISD*

# SUSTAIN

## Fourth Arts Block

2012-2014



Through a number of grant-funded projects, the Institute has partnered with the Fourth Arts Block, or FABnyc, a nonprofit group dedicated to the cultural and ecological development of the East 4th Street Cultural District. This cultural district houses over forty art groups, cultural facilities, and performance venues that attract an annual audience of 250,000 and serve 1,500 artists.

In collaboration with FABnyc from 2012 through 2014, the CUISD was project partner in the successful execution of a two-year grant, for the SUSTAIN project, from the Rockefeller Foundation Cultural Innovation Fund. The SUSTAIN project outlined a plan to work toward a model sustainable city block in the urban environment of New York City. Built upon an examination of building typologies, including their energy and water use, and waste recovery in the neighborhood, the project was responsible for community engagement sessions and the generation of collaborative ideas based on the experiences of residential and commercial tenants of the East 4th Street Cultural District.

A group of Cooper Union architecture and engineering students conducted research and surveys, mapped and documented the city block in a set of two- and three-dimensional drawings, and measured energy use on the block. The second phase of the project was aimed at engaging the community through installations and art, and changing public behavior through providing information on wise resource use and reduction. At the close of this two-year project, the Institute and FABnyc mounted an exhibit at Cooper Union. The lively and informative display gave an overview of the partnership and provided a showcase for the design interventions throughout the neighborhood. The exhibit highlighted the success of the process as a model for community-based sustainability efforts throughout the city.

For community residents, the project highlighted information about the economic savings that efficiency improvements, and other sustainable adaptations can bring about, as well as the health benefits resultant from sustainability. Throughout the project, the process was intended to establish a virtuous cycle through which information from engineers, students, merchants, artists, and residents is continually integrated into development. Referencing our Model Block work, through ongoing outreach, community meetings, surveys, and targeted trainings to keep residents, merchants, artists, and audiences informed and engaged, the collaboration puts art and innovation at the center of communication. We bring findings to the public through interdisciplinary art projects, exhibitions, and creative communication on practice, presented and available to small nonprofits and community groups throughout New York City.

*Plan for Terraced Sea Wall,  
Hudson River, CUISD*

*New York City Metropolitan Area,  
Map of Urbanization*

## Green Roofs

### FOURTH ARTS BLOCK

The collaboration between CUISD and FABnyc yielded the award of a Green Infrastructure Grant from the New York City Department of Environmental Protection. The plan presented by the team worked within the guidelines of the Department of Environmental Protection to improve the management of storm-water runoff in the neighborhood surrounding the Cooper Union campus. Incorporating a renovation of surrounding sidewalks and a green roof installation, the project addressed a critical need for improved storm-water stewardship, given that streets and sidewalks contribute to one-quarter of New York City's combined sewer overflow. The project was also notable in that Cooper Union's school of engineering, working with Prof. Joseph Cataldo, contributed design and detailing to the proposal.

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## JASA

This project was a follow-up to the first of the Green Infrastructure Grant proposals done by The Cooper Union with community groups. JASA, the Jewish Association Serving the Aging, is a neighbor of the college and closely tied to the Fourth Street social structures. The Institute prepared a design, in collaboration with Prof. Joseph Cataldo (and senior engineering students), and working with CUISD advisor Susannah Drake and dlandstudio. The project leveraged the Institute's technical skills and resources, and designed plans to install a green roof and storm-water management system to JASA's Evelyn & Louis Green Residence at Cooper Square, an assisted living housing complex for New York City's seniors located adjacent to Cooper Union's campus. This project would yield not only financial savings for JASA, but also a mutually beneficial relationship between JASA and The Cooper Union, including the opportunity for hands-on student learning. Because of bureaucratic inertia, both of these green infrastructure projects have not yet been implemented, yet they continue to serve as useful models for other communities to study and replicate.

# EDUCATIONAL INITIATIVES

Education and the preparation of the next generation of professionals are increasingly understood as a critical part of the larger global sustainability initiative. If we are to imagine and carry out a societal transformation that includes governance, economics, agriculture, manufacturing, energy, transportation, land use management, the built environment, and virtually every other aspect of human activity, society is going to have to work towards a new set of educational priorities and emphases. These priorities and emphases would recognize that achieving sustainability is the pivotal challenge of the twenty-first-century world.

Our small, specialized urban college represents a unique opportunity to advance the educational changes being demanded by the rapidly evolving environment. The Cooper Union's focus on art, engineering, and architecture gives it a unique role in working with three disciplines whose activity will be critical to achieving environmental balance. Its campus in the heart one of the world's most important and dynamic urban areas provides it with a distinctive laboratory to explore the realities of pursuing sustainability through both classroom and project-based research. Its modest size promotes the creation of an academic culture in which all share in engaging with sustainability and what this will mean, both intellectually and operationally. These strengths will reinforce The Cooper Union's importance and relevance in the development of an education agenda and will put the college at the forefront of the changing educational environment.

In the five years since its inception, the Institute has had a significant impact on the educational environment at The Cooper Union, achieved by offering public programming, lectures, forums, exhibitions, workshops and panel discussions.

The CUISD has assisted the deans of the schools in identifying choices for visiting professors that contribute to our mission of teaching toward sustainability. Through development of symposiums on sustainability by Kevin Bone and Albert Appleton, and through new emphasis in design studios by visiting professors Susannah Drake and Rafi Segal, and in the Faculty of Humanities and Social Sciences courses by Appleton, the Institute has worked to strengthen sustainability within the college's pedagogy. The following classes are selected examples of course offerings within the established schools of The Cooper Union that place an emphasis on questions of environment and sustainability.

## Curriculum

### Advanced Concepts, The Irwin S. Chanin School of Architecture

Elective classes are typically open to all upper-class students from all schools of The Cooper Union (with approval of the course professor).

### Sustainability Primer

Elective in The Irwin S. Chanin School of Architecture  
Professor Kevin Bone and others

In the fall of 2007, Prof. Kevin Bone led a course in the School of Architecture that was devoted exclusively to the issues of sustainability. This Sustainability Primer included visiting lecturers from various disciplines and presented topics covering the basics of ecology, the economics of sustainable development, the concepts of ecological servicing, and other key principles. This class, and the many experts brought in to teach, helped lay the groundwork for building new course offerings at The Cooper Union devoted to sustainability.

### Environmental Sustainability

Faculty of Humanities and Social Sciences  
Professor Albert Appleton

A seminar exploring sustainable development, the concept that the future of modern society will depend on living in harmony with the natural environment, began with the ecological character of human life and human history, reviewed the current status of the world's environment and the economic forces shaping it, and examined the meaning of sustainable action. Additionally, it explored how to create such a future through understanding the interplay of economics, politics, technology, design, culture, values, and ecological dynamics that shape human society. This seminar has been a very popular class attracting many in the engineering disciplines at Cooper Union.

### Environment, Sustainability, and Architecture

Elective, The Irwin S. Chanin School of Architecture, Professor Kevin Bone; Guest Lecturers: Al Appleton, Susannah Drake, Michael Ben-Eli, and others

The architectural community has moved well beyond the discussion stage of sustainable building, green design, and eco-development. Components of sustainable design have become imbedded in building codes, and further regulations are on the horizon. Issues of sustainability already impact the work of planners, architects, and builders. Sustainable design's significance will only increase in the future. The intention behind this class was to give students a basic understanding of the issues, and basic familiarity with the key discussions in the field. The class included a review of the origins of the conservation and environmental movements. Students were required to become generally familiar with key critical works, including those by Henry David Thoreau, John Muir, and Aldo Leopold. The class examined some of the current impacts that the principles and paradigms of the sustainability movement are having on the design disciplines.

### Integrative Studies in Urban Sustainability

The Irwin S. Chanin School of Architecture, Professor Kevin Bone; Guest Lecturers: Al Appleton, Susannah Drake, Michael Ben-Eli, and others

This class was built around a curriculum of integrative studies, focused on current research about urban environmental issues, particularly in relationship to New York City. The module brought together a small group of diverse educators: Prof. Kevin Bone oversaw the class and lectures on architecture, infrastructure, and environment. Prof. Al Appleton focused on the basics of sustainability and ecological literacy, Prof. Michael Ben-Eli presented three lectures on systems thinking, cybernetics, and the core principles of sustainability, and Prof. Susannah Drake gave three lectures on green infrastructure, and the role of landscape and nature in the city in the face of climate change.

## Lessons from Modernism

Environmental Design Considerations in Twentieth Century Architecture, 1925 to 1970  
Elective, The Irwin S. Chanin School of Architecture

Throughout early modernism architects employed design ideas and building strategies that could today be labeled as green architecture, understood as sustainable design. This class looked at modernism through the lens of environmental design considerations. Students studied how architects developed approaches that emphasized natural lighting, natural ventilation, and passive cooling and heating. Works were designed with a specific knowledge of the climate and site-design strategies that sought to limit the disturbance of natural landscapes and to respond to the specific conditions of local ecologies. The class focused on the study of these ideas through drawing and three-dimensional graphics and developed various notational systems for demonstrating the principles. The first offering of this class included guest lectures, by Alan Berman on technology in James Stirling's work, Carl Stein on his book *Greening Modernism*, and Lydia Kallipoliti on her research project EcoRedux.

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## Urban Architecture Design Studios The Irwin S. Chanin School of Architecture

Growing awareness and societal forces are leading to more and more emphasis on environmental understanding in core architecture curricula. The fourth-year design studio marks the point in the design curriculum in which the students are asked to synthesize many factors and bring together diverse influences in a complex design problem sited in the urban arena. Curricula requirements call for the studios to emphasize the development of an architectural proposition that successfully integrates program, plan, section, and structure. Prof. Kevin Bone and visiting faculty have worked to add to these fourth-year studios issues of environment, landscape, and infrastructure. Below are descriptions from three of these studios.

## Suburban Transformations: Architecture, Landscape and Infrastructure

Fourth-Year Design Studio, 2011,  
Professors Kevin Bone, Rafi Segal, and Susannah Drake

Since post-World War II, the suburban lifestyle has become embedded in the American consciousness as the popular manifestation of the American Dream. Rapid world transformations have led us to question the sustainability, economy and the broader cultural value of this automobile dependent, often placeless form of human settlement. The studio called to challenge patterns of American sprawl and the lifestyle it fosters. Student investigations sought to imagine a better environment through the transformation of existing suburbs. The studio emphasized a study of the natural systems in six various eco-zones underlying the selected study areas.

## Urban Territories: Architecture, Landscape And Infrastructure

Fourth-Year Design Studio, 2013,  
Professors Kevin Bone, Rafi Segal, Tulay Atak, and Teddy Kofman

This studio investigated the possibility of integrating architecture, landscape, ecology and infrastructure, and worked to imagine ways in which designs may offer strategies that transcend the limitations that the traditional definitions of these disciplines impose. The studio pursued an exploration of an archetype of modern urbanism: the under utilized, transitional zones occupied by arterial transit routes, and abandoned industrial corridors. These territories, common to aging postindustrial cities, stand dormant and resist becoming part of the city fabric. In rethinking the role and relationship between landscape, infrastructure and architecture, the studio examined the pertinent socio-cultural and urban themes. At the same time, they critically appropriated environmental and ecological factors as an integral part of the design process. The studio addressed a twofold program, that of connecting the upland area heights with the areas of the Harlem River waterfront. Here they defined and programmed a Harlem River center for urban agrarian culture.

## Defensive Strategies for the Lower Manhattan Waterfront: Architecture, Landscape and Infrastructure

Fourth-Year Design Studio, 2014,  
Professors Kevin Bone, Rafi Segal, Tulay Atak, and Teddy Kofman

The line between terra firma and the aquatic environs of New York City has been in a fluid and dynamic state since the ice of the Pleistocene era receded 11,700 years ago. For the past 490 years this relationship has been modified and exploited throughout the course of human settlement. The radically changing relationship between land and sea that characterizes the contemporary era, most notably evident in the storm events of Hurricane Irene in 2011, Hurricane Sandy in 2012 and in the rising baseline of mean high tide due to global warming, have made evident this changing relationship between land and sea. In the realm of architecture and infrastructure, this has led to new attempts to establish predictable stability between land and sea. Establishing constructive forms of exchange between analytic research and design, the studio engaged in an exploration and re-imagining of one of the archetypes of urbanism, the "defensive edge."

## Visiting Faculty

FACULTY BROUGHT IN BY  
THE SCHOOL OF ARCHITECTURE  
AND THE SCHOOL OF HUMANITIES  
AND SOCIAL SCIENCES

### Albert Appleton

Prof. Albert Appleton, the former commissioner of the New York City Department of Environment Protection, is regarded as a global authority on ecological services and water resources, with interlocking expertise in water resource and water utility management, infrastructure economics, public finance, land use, and landscape preservation. Appleton teaches an interdisciplinary seminar on the principles of sustainability. Appleton lectures widely and has contributed to numerous papers and publications on topics concerning water, energy, environmental preservation, and sustainable development. Appleton is senior fellow at The Cooper Union Institute for Sustainable Design.

### Susannah Drake

Prof. Susannah Drake is a leading architect and landscape architect working in landscape urbanism and ecologically based design and natural infrastructure. Drake is the principal of dlandstudio, an award-winning multidisciplinary design firm, and she lectures globally on how to make cities more resilient to climate change impacts. Prof. Drake was invited to join the CUISD as an associate and subsequently was invited as a visiting design professor to the SoA. Drake is the first landscape architect to join the SoA faculty and collaborates on the ongoing development of the fourth-year urban architecture studios with Prof. Kevin Bone.

### Rafi Segal

Prof. Rafi Segal leads an office engaged in architecture and urbanism as two distinct preoccupations; each represents different modes of thought arrived at by different means, yet each informs the other. The urban projects undertaken seek out opportunities to reimagine architecture. Each architectural project aspires to be a unique expression that reflects the building's role within its urban, cultural, and sociopolitical context. Segal was recently appointed professor of architecture at MIT. He has also taught architecture and urban design at the Harvard University Graduate School of Design.

## Visiting Educators

EDUCATORS BROUGHT IN BY  
THE SCHOOL OF ARCHITECTURE

### Michael Ben-Eli

Dr. Michael Ben-Eli is founder of The Sustainability Laboratory, which was established in order to develop and demonstrate breakthrough approaches to sustainability practices, expanding prospects and producing positive impacts on people and ecosystems all over the world. As an international management consultant, Ben-Eli pioneered applications of systems thinking and cybernetics in management and organization. Over the years he worked on synthesizing strategy issues in many parts of the world and in diverse institutional settings, ranging from small high-technology firms to multinational enterprises, manufacturing companies, financial institutions, health care and educational organizations, government agencies, NGOs, and international multilateral organizations. Ben-Eli is the author of the widely acclaimed paper *Five Core Sustainability Principles*. He is leading the development of The Sustainability Laboratory as a worldwide network of advanced research, development, and education centers. Focusing on significant sustainability-related issues, the lab is conceived of as a new kind of global instrument for initiating, scaling up, and accelerating change.

### David Barkin

Dr. David Barkin is professor of economics at the Xochimilco campus of the Universidad Autónoma Metropolitana in Mexico City. He received his doctorate in economics from Yale University and was awarded the National Prize in Political Economics in 1979 for his analysis of inflation in Mexico. He is a member of the Mexican Academy of Sciences and of the National Research Council. In 1974 he was a founding member of the Ecodevelopment Center. Barkin's most recent books include *Wealth, Poverty and Sustainable Development* and *Innovaciones Mexicanas en el Manejo del Agua* (Mexican Innovations in Water Management). He is interested in the process of unequal development that creates profound imbalances throughout society and promotes environmental degradation. Barkin's recent research focuses on the implementation of alternative strategies for the sustainable management of resources. Much of his work is conducted in collaboration with local communities and regional citizens' groups.

## The Cooper Union Faculty Collaborations

### David Turnbull

Prof. David Turnbull has been a key academic advisor to the CUISD, partnering on several important events including the Educator’s Workshop in the spring of 2015 and Bridging the Gap, a program on sustainability on the African continent presented in the winter of 2012. Prof. Turnbull is a director of Atopia LLC, and a founder and design director of Atopia Research. Atopia Research is a nonprofit firm that works in some of the most ecologically challenging areas of the world, such as Sri Lanka, Sudan, and Haiti. Atopia, a for-profit entity, works on projects that have the potential for ecological or technological innovation in commercial or institutional environments. Prof. Turnbull’s work in Africa most notably includes the development of sites that double as sports facilities or schools and rainwater catchment and storage basins. His work aspires to the ultimate efficiency of addressing a wide variety of considerations—from social relationships to local environmental considerations—in a single architectural work. Prof. Turnbull is on the School of Architecture faculty and is a senior advisor to the CUISD.

### Toby Cumberbatch

Prof. Toby Cumberbatch has been a distinguished visitor to the CUISD lecture programs, has partnered with the CUISD on various projects, most recently working with Cooper Union engineering students to develop a passive greenhouse system installed on the roof of a neighborhood cultural building. Prof. Toby Cumberbatch has taught at The Cooper Union since 1994. Based in the Electrical Engineering Department, he founded the Center for Sustainable Engineering, Architecture and Art—Materials, Manufacturing and Minimalism (SEA2M3) to bring students from the three schools together to develop sustainable solutions for the problems facing those in remote regions of the developing world. Over the past decade, Prof. Cumberbatch has traveled to Ghana with a group of students every summer conducting research and implementing projects such as creating housing out of local materials and solar light kits. Prof. Cumberbatch is on the CUISD Board of Advisors and works on various collaborative initiatives with the CUISD. In 2013 the Institute awarded the Special Projects Grant to him for his work on the Reuse of Available Material, Energy, and Structures.

### Lydia Kallipoliti

Prof. Lydia Kallipoliti was an associate at the CUISD from 2010 to 2013. Her academic interests include a detailed study of environmental and ecologically thinking in the architectural speculations of the 1960’s and 1970’s. The product of this study was the first exhibition that the CUISD mounted at The Cooper Union. Prof. Kallipoliti’s project EcoRedux assembled an unexplored genealogy of ecological material experiments that underground architectural groups conducted during those decades. The research documented the disciplinary transformation and experimental mindset of the 1960s. Provisional structures and small-scale strategies—pneumatics from used parachutes, hand-made domes from discarded materials, electronic-lawn carpets, pills, capsules and self-sufficient systems, garbage houses, foam shelters—became part of a new equation that reflected the intense sociopolitical concerns of the time concerning how new technologies can become remedial tools to save the planet. In connection with the CUISD SUSTAIN project, Prof. Kallipoliti directed classwork with students from art, architecture and engineering to experiment with off-line electrical generation strategies. The research resulted in the installation and performance piece, Grid Off | Lights On.

### Joseph Cataldo

Prof. Joseph Cataldo has initiated and directed several programs working with engineering students and the CUISD team. Prof. Cataldo partnered with the CUISD to develop and submit a proposal for storm water management, using passive and ecological strategies to be implemented at the neighborhood scale. In partnership with the CUISD and with CUISD associate Susannah Drake of D-Land Studio, the team prepared a detailed submission to the NYC Department of Environmental Protection. The project was selected from hundreds of entries for funding. The work is presently on hold at the DEP. Cataldo also directed a group of engineering students as part of the CUISD SUSTAIN project. The 4th Street block between Second Avenue and Bowery was studied to determine energy efficiency, flooding potential, CSO, and storm-water management. At The Cooper Union, Dr. Joseph Cataldo teaches in the undergraduate and graduate civil engineering curricula on fluid mechanics and hydraulic engineering. He is also responsible for the development and operation of The Hydraulic

Engineering Laboratory in the Civil Engineering Department. Prof. Cataldo has conducted experiments on jet dynamics, the interaction of a jet and a wave, thermal plume behavior, and oscillatory phenomena in the hydraulic laboratory, as well as infiltration studies in a semiarid climate. Cataldo has also been conducting research on sustainable design of green roofs and green streets. He has developed a program to determine the thermal behavior of a green roof in a number of storms during varying seasons. He has been experimentally modeling green roofs in the laboratory under a variety of thermal and hydraulic conditions. Cataldo is currently studying the hydrologic and hydraulic conditions on green streets in the Bronx and Queens to determine the effects of reducing combined sewer overflow (CSO).

### Robert Dell

Prof. Robert Dell began working with CUISD support in 2010 to demonstrate how waste heat from The Cooper Union facilities could be used to support a prolonged growing season for small scale roof top agriculture. In 2010 Prof. Robert Dell worked with six Master of Engineering students to install experimental green roof plots on the college’s Foundation Building using excess mechanical equipment heat to support a model of urban agriculture. The project extended the growing season and lessened storm-water runoff that collectively overtaxed the city’s sewer system. That same year the Institute awarded a Special Projects Grant to Dell, an adjunct professor at The Cooper Union and director of the Laboratory for Energy Reclamation and Innovation for his Waste Heat Roof Garden. Prof. Dell is the founding Director of the Center for Innovation and Applied Technology, the Laboratory for Energy Reclamation at The Cooper Union, and a C.V. Starr Research Foundation Research Fellow. Prof. Dell is an Adjunct Professor of Mechanical Engineering. He also is a Visiting Scientist with the Keilir Institute of Technology, Visiting Academic with the University of Iceland and the Research Fellow for the C.V. Starr Research Foundation. Prof. Dell was the Principal Investigator for numerous research grants from Consolidated Edison, and is the Project Research Scientist on a New York State Energy Research and Development Authority (NYSERDA) grant for regenerative braking in elevators.

## Research Fellows

### Patrick Robbins

Patrick Robbins’s focused efforts supported the Institute primarily through editorial writing. Robbins published frequently on the CUISD website, highlighting timely sustainability issues and presenting them in a way that was easily digestible while maintaining pertinent scientific detail. Robbins’s background study in climate and society gave him the contextual grounding to be a strong voice for the CUISD. He is currently writing and researching for Naomi Klein.

### Martha Giannakopoulou

Martha Giannakopoulou is the founder and director of Untitled Architects, a London- and Athens-based firm that was established in 2003. Since 2008 she has acted as the lead coordinator for Pecha Kucha, Athens, and as the founder and director of Circle Arts, a nonprofit for the promotion of arts and architecture in Athens. Additionally, Cooper Union hosted Giannakopoulou in 2012 as a Fulbright Scholar working on the project Greening New York. She assisted in preparation of materials for SUSTAIN, including the exhibition.

## Awarded Grants

### Special Projects Grant

RECIPIENTS

#### Toby Cumberbatch

##### 2013 Summer

In 2013 the Institute awarded the Special Projects Grant to Prof. Toby Cumberbatch for his work on the RAMESSES project. A leader in the field of sustainable design at The Cooper Union, Cumberbatch has performed several investigations into the design of shelters constructed from freely available materials in economically disadvantaged countries. Building on this experience, he has taken on the challenge of disseminating design for shelters constructed from available materials in the streets of Somalia and in the environs of the Dadaab camp in northern Kenya.

#### Joseph Cataldo

##### 2012–2013

Prof. Joseph Cataldo received the grant for his report *4th Street Infrastructure Investigation*. The report displays weather roof data, electrical monitoring, infrared data and photographs, as well as information on water resources and demographics.

#### Robert Dell

##### 2013 Winter/Spring

Prof. Robert Dell was awarded the Special Projects Grant for his waste-heat roof garden project. For this project he has installed green roof plots on the Cooper Union Foundation building. These experimental garden plots absorb waste steam condensate, with the effects of both cooling the condensate and increasing plant growth by 20 percent.

#### Lydia Kallipoliti

##### 2014 Spring

The Special Projects Grant was awarded to Prof. Lydia Kallipoliti for her project Grid Off | Lights On. The project cumulated in an exhibition for New Ideas City Museum that was powered through alternative energy-generating technologies. The exhibition was part of the CUISD and FABnyc’s SUSTAIN project.

## Disseminating Best Practices

One of the Institute’s goals is to serve as a resource for the professional design and construction communities on the topics of green building and environmental sustainability. The Institute imagines a long-term plan to use its online presence and civic connections to serve as a design resource. The Institute has continued to enhance its online presence through improving website functionality, augmenting its online resources on alternative energy practices, and hosting original news articles and research papers on key developments in the field. By making sustainability information available to the public, the Institute furthers its mandate to educate the broader community and improve discourse surrounding these issues.

These online initiatives include, our Cooper Union webpage; Water Watch, a series examining global water sustainability; and Twenty-first Century Choices: Economic Frameworks for a Sustainable World.

The Cooper Union Institute for Sustainable Design’s website is <http://cooper.edu/isd>

## CURRENT WORK

## EVENTS

### The Five Thousand Pound Life: Water

SYMPOSIUM COSPONSORED WITH THE ARCHITECTURAL LEAGUE OF NEW YORK

2015 FEBRUARY 7

This symposium considered how the energy intensity of providing a clean and adequate water supply can be minimized and how planning and design—including regional planning, urban design, landscape design, architecture, and engineering—can contribute to that goal. Los Angeles, the Great Lakes, and New York were case studies for the symposium.

**THE ARCHITECTURAL LEAGUE OF NEW YORK AND THE COOPER UNION INSTITUTE FOR SUSTAINABLE DESIGN**

The Five Thousand Pound Life: Water considers how the energy intensity of providing a clean and adequate water supply can be minimized, and how planning and design, including regional planning, urban design, landscape design, architecture, and engineering, can contribute to that goal. Los Angeles, the Great Lakes, and New York will provide case studies for the symposium.

The Architectural League launched The Five Thousand Pound Life—an initiative of public events, digital releases, and a major design study—in September 2013 to address the intertwined challenges of reimagining the American way of life to address climate change and to rebuild a robust economic structure that offers viable livelihoods across the income spectrum. The League brings the perspective of the design professions to these issues, as its contribution to what must be a broad collective effort spanning geographies, generations, occupations, disciplines, and ideologies.

**FREE** to current Cooper Union students/faculty/staff and Architectural League members.

**OPENING REMARKS**  
Rosalee Genevro

**OPENING LECTURE**  
James Wescoat

**CASE STUDY: LOS ANGELES**  
Hadley Arnold  
Peter Arnold  
Josh Newell  
Stephanie Pincetti

**CASE STUDY: THE GREAT LAKES**  
Maria Arquero de Alarcón  
Ira Berman  
Henry L. Henderson  
Jen Magret  
Peter Mulvaney

**CASE STUDY: NEW YORK CITY**  
Al Appleton  
Kevin Bone

**02/07/15**

SATURDAY FEB 7 2015 | 1-7 PM | ROSE AUDITORIUM | THE COOPER UNION | 41 COOPER SQUARE | NEW YORK CITY

**THE  
5000LB  
LIFE:  
WATER**

### Infrastructure's Public Landscape: Civic Imagination and the End of Public Works

NICHOLAS PEVZNER  
LECTURE COSPONSORED BY CUISD AND CAREER CENTER/ALUMNI AFFAIRS

2015 MARCH 3

As part of the CU@Lunch Alumni Talks, the CUISD cosponsored a lecture by Nicholas Pevzner, a lecturer in Landscape Architecture at The University of Pennsylvania School of Design. Pevzner lectured on infrastructure and the way it alters the land on a grand scale, unifying cities and territories, and stitching together natural and cultural systems into one collective hybrid network. Pevzner spoke of how infrastructural landscapes have always been political; the design of infrastructure is an act of regional cartography and territorial reorganization, formerly carried out with grand ambition on a national scale. He argued that today, the era of public works is over and encouraged thinking around new visions of infrastructural landscapes.

# Educators' Workshop

AT THE COOPER UNION

**2015 MARCH 14 & 15**

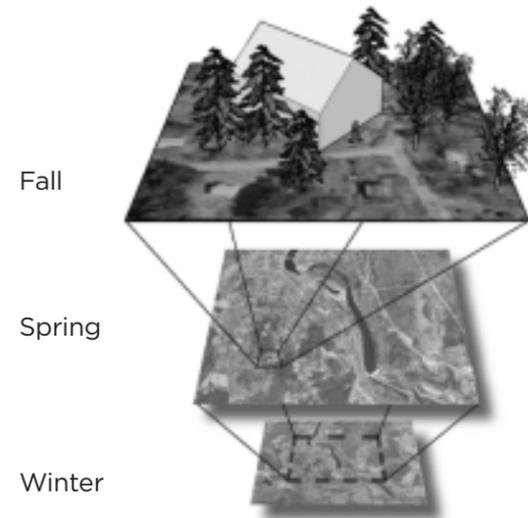
The Educators' Workshop brought together a cross section of educational innovators who are working to meet the urgent pedagogical challenges of our time: understanding what sustainable societies might look like, where and how they might work, and how we can best educate for proficiency in environmental systems and critical resource management to anticipate the work of the future.

The workshop looked at precedents from the late 1960s and 1970s and a range of current approaches. The goal was to find common threads and agreements among the participants about what is (or may be) working and where the weaknesses and potential failures lie. The workshop examined how several models and particular strategies might be adapted to a range of environmental situations, institutions, cultures, and economic conditions.

Different sets of questions were utilized to direct workshop discussions: qualitative questions focused on the values and priorities within teaching toward sustainability, quantitative questions investigating the most effective tools and strategies to employ within sustainability education, lifetime questions concerning the evolution of sustainability education and how sustainable pedagogies can remain relevant through generational changes, and finally, design questions examining the role of systems design in teaching toward sustainability.

Key participants included:

Prof. Kevin Bone, Prof. Catherine Ingraham, Prof. David Turnbull, Dr. Michael Ben-Eli, Elizabeth Thompson, Sarah Skenazy, Prof. Diana Agrest, Prof. Paul Cawood Hellmund, Irwin Silverberg, Prof. Phoebe Crisman, Frank Miller, Prof. Hadley Arnold and Prof. Peter Dean.



## Multiple project scales in 10 months.

From the Conway School projects



*PITCHAFRICA Waterbank School—Community 'Harambee' preparing the foundations. Uasonyiro Primary School. Laikipia, Kenya. Brian Reed, PITCHAFRICA photographer*

# Sustaining Architecture

DESIGN PRACTICE AND THE MATTER OF CARE

**NICHOLAS D'AVELLA**

LECTURE, COSPONSORED BY CUISD AND  
THE CENTER FOR CAREER DEVELOPMENT

**2015 MARCH 24**

Nicholas D'Avella, a post-doctoral fellow in The Cooper Union Faculty of Humanities and Social Sciences, lectured on his fieldwork in the architecture school at the University of Buenos Aires in the years following Argentina's economic and political crisis in 2001. In the aftermath of the crisis, buildings had become an important form of economic investment for many middle class Argentines, resulting in a boom in investment-driven construction. The talk examined the politics of architectural education in this context, taking a longer historical view at the politics of architectural education in Buenos Aires from the dictatorship years of the 1970s through the neoliberal policies of the 1990s and into the present. D'Avella analyzed drawings and models as political technologies through which students were invested with ways of caring for the built environment that extend beyond market value, offering the possibility to conserve particular human-building relations in the face of the economic priorities that threatened to overtake them.

# SUSTAINING ARCHITECTURE: DESIGN PRACTICE AND THE MATTER OF CARE

TUESDAY  
MARCH 24  
12:00PM  
ROOM 315F  
FOUNDATION  
BUILDING  
LUNCH WILL BE PROVIDED



"ENTREGA FINAL, FACULTAD DE ARQUITECTURA, DISEÑO, Y URBANISMO, UNIVERSIDAD DE BUENOS AIRES" NICHOLAS D'AVELLA

## NICHOLAS D'AVELLA

This talk is based on fieldwork in the architecture school at the University of Buenos Aires in the years following Argentina's economic and political crisis in 2001. In the aftermath of the crisis, buildings had become an important form of economic investment for many middle class Argentines, resulting in a boom in investment-driven construction. The talk examines the politics of architectural education in this context, taking a longer historical view at the politics of architectural education in Buenos Aires from the dictatorship years of the 1970s through the neoliberal

policies of the 1990s and into the present. I analyze drawings and models as political technologies through which students were invested with ways of caring for the built environment that extend beyond market value, offering the possibility to conserve particular human-building relations in the face of the economic priorities that threatened to overtake them.

Dr. D'Avella is a Postdoctoral Fellow in the Faculty of Humanities and Social Sciences at The Cooper Union. He is an anthropologist and ethnographer of contemporary Argentina. His current manuscript,

*Concrete Dreams: Markets, Politics, and the Lives of Buildings in Post-Crisis Buenos Aires* is an ethnographic study of a construction boom in the years following Argentina's economic crisis of 2001. Based on fieldwork with real estate investors and market analysts, architects, and neighborhood residents, the book describes how buildings were incorporated into emergent practices of economic investment, and how other forms of value were made to endure in the face of buildings' increasingly central place in Argentine investment cultures.

SPONSORED BY THE INSTITUTE FOR SUSTAINABLE DESIGN IN COLLABORATION WITH THE CENTER FOR CAREER DEVELOPMENT  
THE COOPER UNION

## WORKS IN PROGRESS

### Visualizing Climate Change

CUISD Summer Challenge Fellowship

### Lessons From Modernism

Exhibition to travel to Elmhurst Museum near Chicago, other venues possible

### Understanding Iowa

Ongoing research initiative

### Chasing Ice

Film screening

### Glacial Balance

Film screening

### Strategies for Resource Conservation in Contemporary Architecture.

Research for future publication in progress

### CUISD

School exhibition on the first five years

### Twenty-First Century Choices

A blog discussing economic sustainability

### CUISD

White Paper Series, editing and posting papers and transcripts of CUISD events

### Fall Lectures: Naomi Klein

September 2015

### Cooper Union Greenprint

A plan for making the campus and The Cooper Union operations more resource efficient

## Sustainability And Education

### Professor Albert Appleton

Visiting Professor At The Cooper Union  
Faculty Of Humanities And Social Sciences,  
Senior Fellow At The Cooper Union Institute  
For Sustainable Design

*Sustainability* has become one of the twenty-first century's working words, a kind of synonym for fixing humanity's relationship to its environment. Most members of the public sense this relationship is badly in need of repair, but if asked what sustainability is, they tend to respond in terms of good planetary housekeeping: don't waste water, conserve energy, don't dump toxic chemicals and other pollutants into the environment, preserve natural habitats, keep other species from going extinct, recycle materials, and don't destroy natural resources through overuse. This checklist approach, with its implication that we just have to tweak the way we humans conduct our economic activity to fix the staggering impacts of modern industrial life on the planet and its resources, trivializes the crisis that sustainability represents and does not even begin to suggest the dimensions of the response that it will require.

Beginning in 1765, when James Watt invented the reciprocating steam engine and multiplied our ability to do work by two orders of magnitude, our manipulations of nature became immense and successful. The resulting increase in impacts on the earth and its resources has produced the crisis we face today. In a mere seven generations, the population of earth has increased tenfold and the total economic output of humanity by 100 to 150 times. Humanity has become the equivalent of a geological force, one that is altering basic weather patterns, raising the level of the seas, changing the chemical composition of the vast waters of the oceans, transforming the shape and composition of our landscapes and stream systems, and creating the largest mass extinction of other life forms in sixty-five million years. The last mass extinction event was created by a five-mile-long meteorite slamming into earth at twenty-two thousand miles per hour. It is not hyperbole to say that, in our current impact on the earth, humans have become the equivalent of that hurtling, exterminating meteorite.

At the same time, the extraordinary economic progress of the last two centuries has left us unwilling to accept historic norms for economic activity: humans toiling in hardship at the edge of subsistence. Today subsistence has been replaced by a new goal, the elimination of poverty and the pursuit of prosperity for all people, not just in the West and a sliver of international elites.

But this idealistic and humane goal has left us with the following dilemma. The economic progress of the last century that has awakened such hopes has been purchased at the price of disregarding the unprecedented damage to the natural environment that has accompanied it. If humanity continues to pursue its economic hopes and dreams in this way, the earth's natural resources will be depleted to the point where the economic growth humanity strives for will become unfeasible. Trying to solve that dilemma is a task that's at the heart of sustainability efforts. We need to figure out how to create a prosperity that the planet can support on an ongoing basis.

Deeply embedded habits of mind must change. We must learn how to create prosperity by living in harmony with the planet and its processes; we must capture the environmental wealth we have historically wasted or ignored and build our economic future around its wise use. We must turn our backs on pursuing our economic survival by manipulating the planet's resources and ignoring the resulting costs, in order to discover a new way to be wealthy. This is not a checklist problem. To reorganize our social and economic behavior is a transformative challenge of unprecedented dimension.

There is no blueprint that tells us how to make social activity sustainable or how to create productive economies that, by operating in harmony with the planet and its dynamics, can fulfill our aspirations for a world with economically secure and prosperous societies. All we essentially know about sustainability is that the environmental costs of our existing economy are growing to a point where they will outweigh and undermine any financial gains. If we are to reverse that current trend, we will have to build new economies and the infrastructure and buildings to support them, by saving and using the environmental wealth we are currently destroying. And, as we do so, we will have to demonstrate to all those people embedded in the past, or scared of a different economic future, that transformative change will be better, and a sustainable future more prosperous, happy, and equitable.

This enterprise is loaded with unknowns that can only be resolved by doing. What makes the Cooper Union ethos so pivotal to the effort is our action. The road map to sustainability will be created by collaborative efforts among the different disciplines of useful knowledge, and among institutions like Cooper Union and the larger society it serves. This collaboration will create the networks that will make it possible to identify what sustainability is and how to implement it.

The challenge this presents to our society is immense, and it places an institution like Cooper Union on the front line of the twenty-first century. Consider what we do not know yet about creating sustainability:

1. We do not really know when something is sustainable.
2. We do not know how to make sustainability a self-generating social dynamic.
3. We do not know what we want to teach about sustainability.
4. We do not know what we want a Cooper Union student to learn about sustainability and when they can be considered educated in it.
5. We do not know what a sustainable approach is to the professions we teach at The Cooper Union.
6. And above all, we do not know what we want the student we educate to be capable of doing with respect to sustainability.

None of these unknowns can be resolved by theoretical inquiry. A challenge of this magnitude and immediacy can only be answered in the doing. In such a quest, the Cooper Union tradition of combining action with learning will be an invaluable asset.

Since its founding in 2009, the Institute has learned several critical things, which will be central to its efforts in the future. The first is the fact that efforts to turn sustainability into a traditional academic discipline, like political science or electrical engineering, are doomed to failure. To teach sustainability requires study into the roots of long-standing human economic strategies—including the financial, behavioral, political, and ethical issues involved in those strategies—drawing on many sources of knowledge. This is a more complicated endeavor than the often used (and misused) concept of interdisciplinary studies. It means thinking in new ways—particularly, the employment of collaborative thinking with those who share many different sources of expertise and experience. The study of sustainability must be not only an intellectually syncretic activity, but also a symbiotic one.

The second is that the problem of sustainability is fundamentally a problem of economics, of the wise use of resources, and of the utilization of entrepreneurship to identify and pursue opportunities for wealth-creating sustainability programs must be equitable and socially just.

Third is the fact that the ultimate arena of sustainability must be the community. In no area is this clearer than in green building programs. The buildings being designed to meet standards like LEED are usually capitol-intense projects for elite consumers. If we are to create architecture that supports a sustainable society, we must learn to apply the principles of sustainability across the entire building stock. This can only be done successfully through collaborations with communities and their organizations.

Finally, we have seen in our public education programs and stakeholder engagements with particular sustainability initiatives that there is profound public unease about the environmental costs of our modern economy and a deep desire to explore alternative ways of creating wealth that do not impose enormous planetary costs. The public gets sustainability. It is eager to engage with sustainability's concepts and hungry for information that is not technobabble or insider speak. People want sustainability translated into information and concepts that they can use to participate in this great social debate.

The ambitious scope of the CUISD is justified by the dimensions of the sustainability crisis, the insights obtained in our first five years of work, our knowledge of the strategic value of the four lines of activity we propose, and our compatibility with the Cooper Union tradition of applying the “useful arts” to the challenges facing society. These justifications make imperative a concomitant commitment by The Cooper Union to intellectual leadership in sustainability based in the kind of practical working experience that is the focus of the CUISD. The Institute enables The Cooper Union to expand its leadership role in what will be a historic transformative quest to face and meet the challenge of sustainability in the twenty-first century.

# Concluding Remarks

## FINAL THOUGHTS ON TEACHING TOWARD SUSTAINABILITY

The question of how to imagine and realize a sustainable world is under discussion in many forums—architecture, urban planning, energy and agriculture—by nations, communities, and families, and by cultures of all sizes and economic circumstances. While there are many inspired speculations and remarkable experiments in place, the future upon which a productive discourse on sustainability hinges is dynamic and unpredictable. A solution that seems like a breakthrough one day may reveal myriad unintended consequences when put into practice. The question of educational strategies to address these novel demands presents both risk and potential for teachers of all levels. It is within this stratus of risk and potential that the CUISD seeks to further its work and purpose. In order to do so, it must critically and mindfully engage with the situations at hand.

Looking to the future, several key questions are apparent:

- What are the fundamental values, priorities and goals concerning sustainability education?
- What are the most effective tools and strategies to employ within sustainability education?
- How can sustainability education evolve into a lifelong pursuit and remain relevant throughout generational changes?
- What are the roles of systems design within sustainability education and how can these roles become better investigated?

It is the continuing mission of the CUISD to engage with these questions, and others, in the pursuit of an effective and engaged sustainable society.

**THE COOPER UNION  
INSTITUTE FOR  
SUSTAINABLE DESIGN**

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