IF THE DUST NEVER SETTLES

By Phu Hoang, MODU

Uncontrolling weather control.

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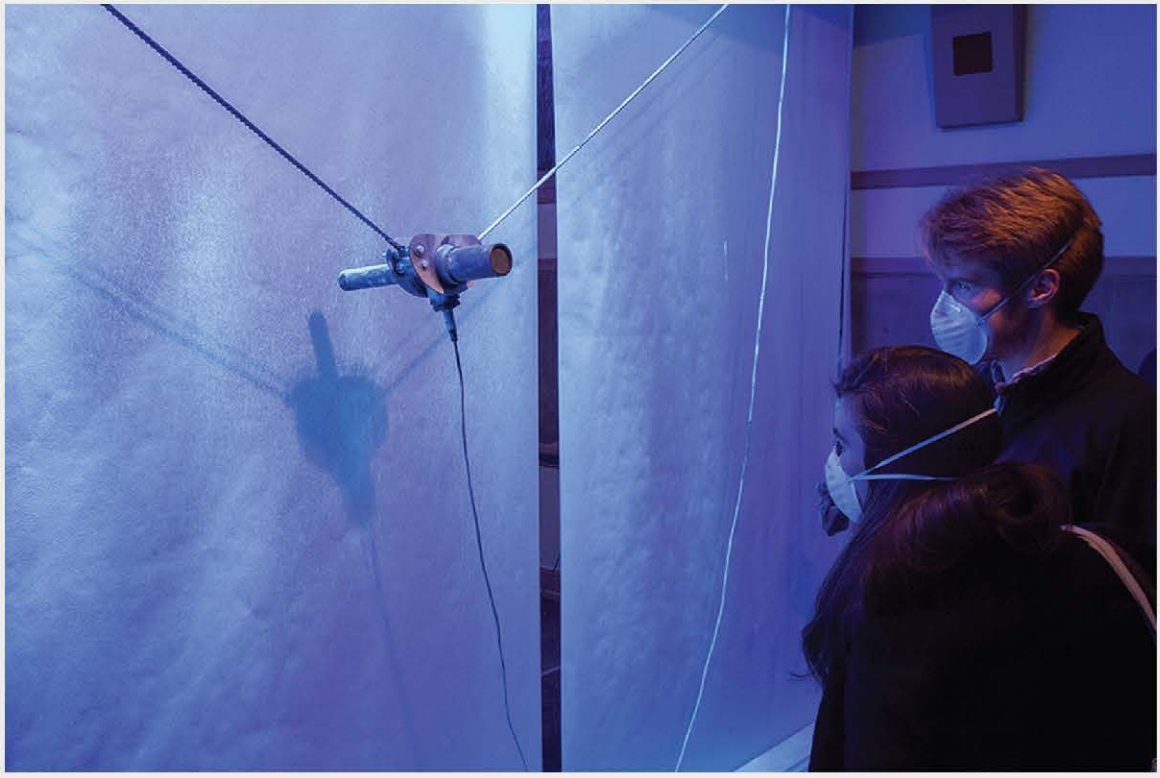


Weather (Un)Control exhibition. Robotic Plotter with Static Electricity Generator (Positive). Photo: Brett Beyer.

Research in all architecture "camps"—from formal explorations to material innovations to environmental technologies—shares a common desire to control the excess of information and variables involved in design. Architects' desire for control sometimes draws predetermined conclusions from research and causes further segregation of these "camps" within the discipline. Instead, architects can expand the discipline by embracing the notion of "uncontrol." Research in our practice, MODU, explores the realm of the uncontrolled, especially in the relationship between architecture and weather. Can public environment installations produce experiences that are unpredictable, active, and speculative?

HISTORY OF ENVIRONMENTAL CONTROL

Control is at the core of the urban, environmental, and financial systems that enabled New York City's rapid growth over the past two centuries. It is important to clarify that these forms of control stem not from autocratic governance but from regulations, infrastructure, and organizational systems. Zoning regulations, first enacted in 1916,

define boundaries throughout the city—between one building and another, between buildings and the public realm, and, importantly, between the built and natural environments. Zoning regulations also control the air within and around buildings. Through regulations of building height and setback, boundaries emerge between interior and exterior by managing access to light and fresh air, as well as pollution and noise sources. As a result, the slender New York City high-rise, with its requisite setbacks, has become the city's most recognizable building form.[1] Higher floors, as a result, have more access to light and air than lower floors, creating a vertical socioeconomic stratum of the city. This vertical class division highlights the disparity between those who can afford to consume fresh air and those who cannot.

Environmental control, especially of indoor climates, played an essential role in architectural and urban innovations in the postwar period. In 1952, Wallace K. Harrison (in a design collaboration with Oscar Niemeyer, Le Corbusier, and others) completed the United Nations complex. The Secretariat building was one of the first large-scale uses of artificial climate control systems and appeared to demonstrate that it was finally possible to create indoor weather.[2] In actuality, the expansive glass curtain wall caused massive heat gain problems on the south face that would prompt its replacement in 2013. These shortcomings did not impede the integration of climate control systems into every building type in the city, but rather reconfirmed architects' belief in their ability to control even the most extreme forms of weather. In the humid subtropical climate region that experiences extreme cold in the winter and high heat and humidity during the summer, climate control was synonymous with the late modern movement. The city's milieu of glass-sealed high-rises recalls Le Corbusier's 1933 vision of a "weatherless city."[3]

By the 1960s and '70s, indoor volumes of conditioned air would allow for vast interior gardens, demonstrating the possibility of total environmental control. The Ford Foundation, designed in 1968 by Kevin Roche and Dan Kiley, utilized the ameliorating effects of gardens to clean air sealed within the office building. As David Gissen wrote, "This group of managers and experts conceptualized the garden as a place to redirect urban office work in a more 'humane environment.' "[4] This "air management" system served as a physical embodiment of the Ford Foundation's social mission, enabling twenty thousand plants to grow within a 200,000-cubic-foot atria. It became possible to breathe clean indoor air, regardless of the weather, next to the entrance of the Queensborough Bridge—one of the most polluted areas in the city. As it demonstrated the health benefits of clean air, the building also reinforced—albeit falsely—Reyner Banham's assertion that the environment is external to architecture and could be mediated through technology.[5] In reality, the total separation of indoor air from outdoor air would eventually lead to health problems. Sick building syndrome (SBS) would become recognized as the result of prolonged exposure to sealed indoor building environments. It would become apparent that the total subjugation of the environment produced invisible yet harmful contaminants.

As a result of the past two decades of global efforts to mitigate human impact on the earth, sustainable design practices have developed a wide-ranging catalogue of "techno-natural" solutions.[6] The approach is best exemplified by environmental building standards like Leadership in Energy and Environmental Design (LEED). This building standard risks over simplifying environmental thinking into a checklist of applied high-tech solutions. One instance is New York City's "The Solaire," the first high-rise residential building to obtain a LEED Gold Rating. Completed in 2003 by Pelli Clarke Pelli, the building boasts the full catalogue of environmental technologies—photovoltaic panels, low-E glass, and air humidification systems. Despite these technologies, the building's captured solar energy could not be stored for emergency use during Hurricane Sandy. It also does not present any conceptual, organizational, or even formal innovations with the environmental techno-science image adopted for real estate marketing. This is not to diminish the crucial role that architects have in mitigating climate change and conserving the earth's rapidly diminishing energy resources. However, sustainable design practices' "good intentions" should not become more important than the ideas-based discipline of architecture. The over-reliance on sustainable technologies represents a missed opportunity for architects to use the discipline's conceptual methods to radically reconceive architecture's relationship to the environment.

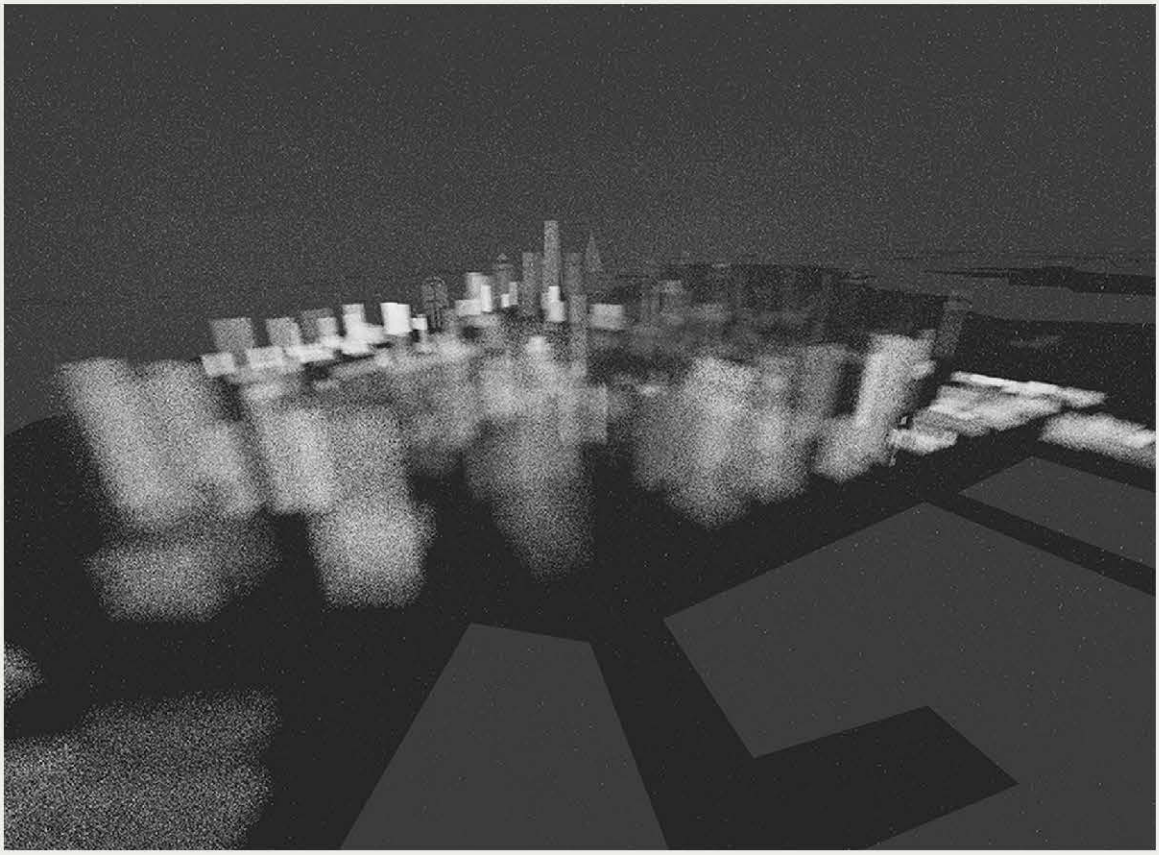
EXPERIMENTING WITH UNCONTROL

The uncontrollability of weather lies at the core of MODU's body of architectural research. Uncontrol is not simply a lack of control. Nor is it a mere recognition of the myriad natural forces that affect architecture. Instead, uncontrol requires the transformation of unpredictable environmental forces into productive, scenario-based design processes.

MODU tests the temporality of weather through public environmental installations. Weather's inherent unpredictability is apparent in the daily weather report, which forecasts possible future weathers without any definitive outcomes. Forecasting the weather involves studying relationships that occur "in the air," such as temperature, humidity, and wind effects, as well as thermodynamic and electrostatic properties. MODU's weather-based public installations are conceived of as research tests, in which each finding is refined in subsequent building projects and proposals.

The Weather (Un)Control project presented an indoor weather system generated by two forms of air contamination: dust and static electricity. Designed by MODU with engineering development by Amanda Parkes/Skinteractive Studio, the public installation was presented at The Old School with the Storefront for Art and Architecture in 2013 as part of the Marfa Dialogues/NY events. Produced one year after Hurricane Sandy, the project examined invisible contaminants that fill indoor air long after the weather clears.

Hurricane Sandy and its aftermath have initiated crucial conversations about the relationship of New York City's built environment to its natural environment. Among many studies on urban resilience completed in the aftermath of the storm, former mayor Michael Bloomberg's extensive report "A Stronger, More Resilient New York" represented an important shift in thinking about the city's relationship to the environment.[7]

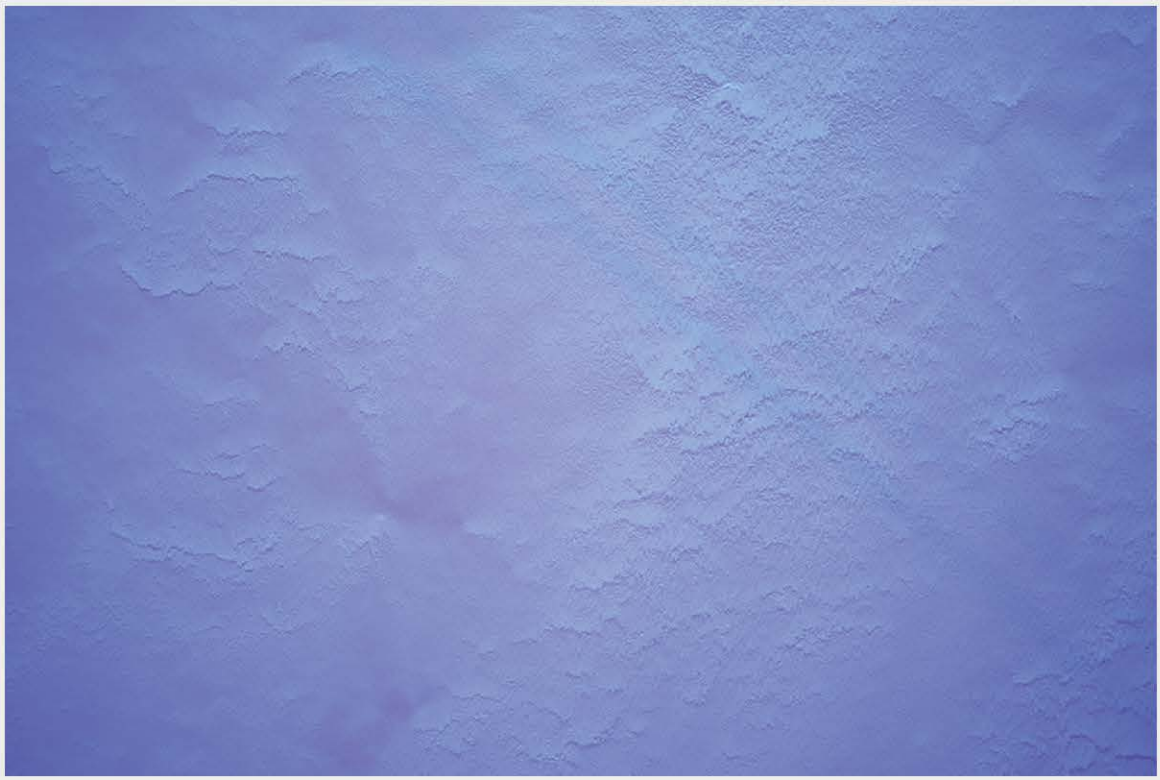


Future dust risk in New York City, based on post-Sandy federal flood zone maps.
Image: MODU.

The term "resilience" implies that it is no longer possible to prevent or control future extreme weather events. Resilience recognizes that the environment is extremely unbalanced, and that a realistic path forward will require adapting to the forces of weather. The notion of resilience is subtly different than sustainability, which argues that it may still be possible to return the environment to its natural balance.Resilience looks for ways to manage environmental imbalance, including raising buildings above the ground, using natural wetlands as a form of "soft" infrastructure, and returning sand dunes that previously existed to urban, or suburban, development. It is no longer

considered a viable option to simply build higher walls against increasing storm surges—in fact, the conversation has turned to accommodating the waves rather than fighting them.[8] This new reality should not diminish the role that sustainable design practice has in conserving the earth's rapidly diminishing energy resources. Instead, it is a call to increase environmental and social impact by relying less on high-tech solutions and adapting more to the environment. "Resilience thinking" marks a significant departure from a relationship with the environment predicated on control.

Weather (Un)Control laid claim to the fact that while billions of dollars were spent on the recovery effort, Hurricane Sandy's invisible effects still lingered in the air. Health risks in the indoor air of buildings—mold and dust—lay beyond the reach of health officials, who relied mostly on outdoor air monitors. These particles, dubbed "weaponized air" by Peter Sloterdijk, remain even today.[9] Dust in Sandy-affected buildings—including asbestos, silica, and gypsum—was produced not only by storm damage but, even more substantially, by the rebuilding that followed. In fact, much of architecture is made of dust. Cement, as found in concrete, is a mixture of rock dust and pebbles. Gypsum wallboard, used to build walls and ceilings, is a mineral dust compressed into solid form.[10] Gissen asserts that nothing haunts architecture more than dust.[11]



Photograph of Dust Wall in Weather (Un)Control. Photo: MODU.

Photograph of Static Electricity and Dust Drawing in Weather (Un)Control. Photo: Brett Beyer.

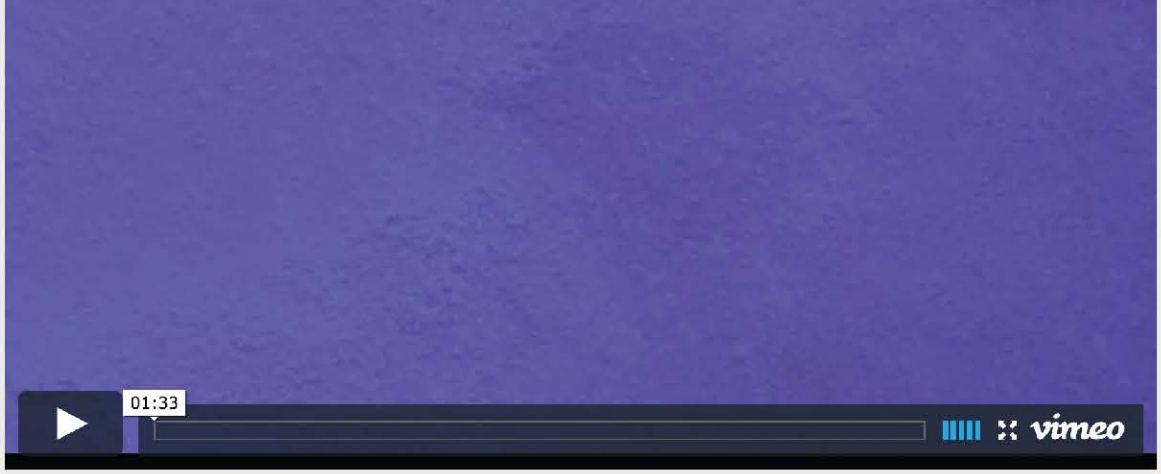
As part of its research for Weather (Un)Control, MODU conducted extensive interviews with a range of specialists, from Environmental Protection Agency scientists to the owner of a mold remediation business and the inventor of a crowdsourced app for monitoring air quality. These interviews identified information missing from the public's understanding of air quality after the hurricane. Neither the federal nor the city governments monitored indoor air quality, relying mostly on monitors on building rooftops, where the air particulate matter (PM) count tends to be lower. Since there are no government agencies that monitor indoor air quality, oversight has been left to the insurance companies that determine our access to indoor "air rights." Rather than conduct air quality tests, the insurance industry relies on simple visual inspections to measure air contamination as well as potential future risk. Subsequent inquiries to conduct quantitative air quality tests of remediated sites were met with extreme resistance.

The Weather (Un)Control installation revealed the limits of the insurance industry's visual inspections of air quality. The installation presented a "dust wall" created by two robotic plotters that drew by pairing static electricity with artificial dust. These drawings replicated the air quality—both in composition and particle count—sampled in the city a year after Sandy. The dust drawings were invisible unless lit with ultraviolet light, highlighting the ineffectiveness of visual inspections. The air samples, exhibited in bell jars, were taken from three of the Environmental Protection Agency's post-Sandy monitor locations (in Lower Manhattan, the Rockaways, and Midland Beach), including both outdoor sites and indoor air from nearby buildings. The indoor air samples were obtained at sites that had been damaged by Hurricane Sandy and were in the process of reconstruction. The air quality from the indoor sites consistently indicated high levels of asbestos, silica, or gypsum, which became the basis of the "dust wall" drawings.

Instead of drawing with ink, two static electricity–generating devices were attached to robotic plotter arms that released either positive or negative ions. Dust is attracted to positive static electricity, which traces patterns of the invisible forces of electromagnetism and air currents. The robotic plotter on one side of the wall discharged positive ions to attract the artificial dust; the other plotter used negative ions to clean the wall of dust. The positive ion device in the "dirty room" created large dust drawings encoded from the composition of asbestos, silica, or gypsum. The negative ions in the "clean room" cleaned the opposite side of the wall while also passing through it, causing even more dust to gather in the "dirty room." Weather (Un)Control revealed the cyclical and uncontrolled nature of air contamination after extreme weather events, unseen and overlooked by insurance companies that stake claim to our indoor "air rights."

Located in The Old School, a former Catholic school, the installation required each visitor to wear a dust respirator mask when entering the classroom converted into an exhibition space. Though the artificial dusk was entirely safe to humans, the act of wearing the respirator masks—Sloterdijk's "negative air conditioning"[11] —raised the fear of invisible contaminants that may be in the air. The masks also recalled the government reports of post-Sandy air quality. Within two weeks of the hurricane, government officials cited readings from outdoor air quality sensors to declare the air "clean." The dust masks provided at the installation bore quotes stamped across the mouth area, including "Sandy is still here," "What's in the air?" and "The air looks clear."

Weather (Un)Control with Storefront for Art and Architecture for Marfa Dialogues/NY
from MODU



Video of Weather (Un)Control. Video: MODU.

View of “Clean Room.” Photo: Brett Beyer.

Weather (Un)Control exhibition. Photo: Brett Beyer.

Exhibition Air Respirator Mask. Photo: MODU.

ARCHITECTURE OF UNCONTROL

MODU’s research proposes a significant shift in traditional modes of environmental thinking: architecture, as a conceptual and cultural practice, should be informed by and

adaptable to weather. The design outcome gives form to the essential formlessness of weather while also questioning architects' desire to exert control over the environment. The practice views its public installations—temporary parks, pavilions, and exhibitions—as a form of built research. The physical outcomes of this research lend themselves to design thinking at a range of architectural scales and futures, both near and distant. For example, Weather (Un)Control raises a possible future—albeit distant—of urban infrastructure that uses static electricity to filter polluted air. Is it possible to embed a network of static electric generators in the most polluted cities, such as those in Asia? Air contaminants would be drawn to the ground, where they could be collected. Or could building envelopes include electrostatically charged surfaces to filter polluted air when combined with wind currents? Reversing a typical relationship to the environment, buildings would literally clean the surrounding air.

MODU also proposes transforming uncontrollable weather, through proposals that actively produce interior—and exterior—atmosphere. Design strategies in the building projects explore the conceptual potentials of the uncontrolled while adhering to principles of extreme weather resilience. Instead of relying too heavily on environmental technologies, MODU explores the "design of environments." This expanded vision of architecture's relationship to the environment actually creates environments instead of simply reacting to—or controlling—them, capitalizing on the conceptual methods of cultural engagement in the discipline of architecture. Visitors can have a sensory engagement with natural processes, akin to the formation of clouds (as in condensation forming around a dust particle) or the creation of electricity in lightning storms (with a discharge of excess static electricity). Rather than mimicking forms and geometries found in nature, architects can actively produce atmospheric environments that adapt and exchange natural forces.

When architects relinquish some of their desire for control, environmental conditions can be experienced instead of simply quantified according to their performance data. This does not require architecture to be completely exposed to effects of extreme weather. During extreme conditions, interior environments should be nonpermeable to the outside, requiring high degrees of climate control. During mild weather conditions, weather can be selectively permitted into a building's interior, through a gradient of adaptable spaces. The resulting microclimatic spaces offer differentiated interior weather conditions, which result in varied programmatic possibilities prompted by the changing weather conditions. This relationship between the inherent uncontrollability of weather and the unpredictability of program is at the core of MODU's architecture projects. This dynamic initiates new events in architecture, producing an active engagement between the public and the environment.

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Phu Hoang co-directs MODU as an architect with extensive national and international design experience. He is a recipient of the Architectural League Prize and the Core77 Design Award. Before starting his first solo practice in 2006, he served as a director at Bernard Tschumi Architects. He holds a Bachelor of Science degree from the Georgia Institute of Technology in Atlanta and a Master of Architecture degree from Columbia University in New York. He is currently an Adjunct Assistant Professor teaching advanced design studios in the Graduate School of Architecture, Planning and Preservation at Columbia University.

MODU is an interdisciplinary architecture practice based in New York with an associate

office in London. Co-directed by Phu Hoang and Rachely Rotem, the practice has won numerous international design competitions and awards. MODU was recently awarded a commendation in the 2013 "21 for 21," an international award that recognizes architects who will "lead the next generation of architects in the twenty-first century." MODU has also been the recipient of research grants from the Robert Rauschenberg Foundation and the New York State Council on the Arts.