MoMA ANNOUNCES MONOGRAPHIC EXHIBITION OF ARCHITECT, DESIGNER, AND INVENTOR NERI OXMAN IN EARLY 2020

Neri Oxman: Material Ecology
February 22–October 18, 2020
Floor 1
#NeriOxman

NEW YORK, February 20, 2020 [Updated August 17, 2020]— The Museum of Modern Art presents ***Neri Oxman: Material Ecology***, an exhibition featuring the work of architect, designer, and inventor Neri Oxman, on view from February 22 through October 18, 2020. The exhibition includes seven major projects that Oxman has created in the course of her 20-year career. Through her work, Oxman has pioneered not only new ideas for materials, objects, buildings, and construction processes, but also frameworks for interdisciplinary—and interspecies—collaborations. *Neri Oxman* is organized by Paola Antonelli, Senior Curator, Department of Architecture and Design, and Director, Research & Development; and Anna Burckhardt, Curatorial Assistant, Department of Architecture and Design, The Museum of Modern Art.

Oxman is a professor of media arts and sciences at the MIT Media Lab, where she founded and directs The Mediated Matter Group. She has coined the term “material ecology” to explain her process of bringing together materials science, digital fabrication technologies, and organic design to produce techniques and objects informed by the structural, systemic, and aesthetic wisdom of nature. Integrating computational form-generation with in-depth research of natural phenomena and behaviors, material ecology operates at the intersection of biology, engineering, and materials- and computer science. By means of this methodology and approach, the observation of, for instance, the configuration of the bark of birch trees, the characteristics of crustaceans’ shells, the behavior of silkworms, the expressions of melanin, or the flow of human breath have generated new design and production processes. While each research project is individually groundbreaking, taken as a group, they constitute a new philosophy of designing and making—and even unmaking—the world around us.

The projects selected for the exhibition are demos for a library of originally conceived materials and processes that will in the future be available to all architects and designers. Each project will be displayed alongside videos that highlight the science behind it and its production process. The objects and structures are all designed as if grown—no assembly required. Together, these projects celebrate a new age in which biology, architecture, and design join forces to build the future.

The centerpiece of the exhibition is Oxman's *Silk Pavilion II*, a site-specific commission on view for the first time at The Museum of Modern Art, which continues Oxman's research on the relationship between digital and biological fabrication at the architectural scale, which she initiated in 2013. Harnessing silkworms' ability to generate a 3-D cocoon out of a single silk thread, Oxman and her research group created the overall geometry of a geodesic dome by using an algorithm that assigns a single continuous thread across patches providing various degrees of density. A swarm of 6,500 silkworms were positioned at the bottom rim of the robotically manufactured initial structure, composed of non-woven silk patches, and they were tasked with filling the gaps. The overall density variation of the final structure was informed by the silkworm itself, which was deployed almost as a biological printer. Unlike accepted procedures in the silk industry, this project demonstrated a novel process by which silk cocoons are not boiled and the silkworms metamorphose normally while pupating, hatching, and laying eggs, enabling the construction of additional pavilions. Seven years later, Oxman illustrates how the dynamics of this small and unique insect can influence rather than simply add to architectural forms, drawing from observations of their behavior to create a structure that guides both movement and silk deposition. In other words, the silkworm can act not only as construction worker, but as architect.

Other projects in the exhibition include *Aguahoja* (2018), which deploys some of the most abundant biomaterials on our planet, such as cellulose, chitin, calcium carbonate, cornstarch, and pectin. Derived from shrimp shells and fallen leaves, these materials are 3-D printed by a robot, shaped by water and augmented with natural pigments to create bio-compatible composites with functional mechanical, chemical and optical property gradients. They can be used to digitally produce structures and objects that embody the lightness and flexibility—as well as the biodegradability—of leaves and wings; and the toughness of seashells, varying in size from millimeters to meters. *Aguahoja* aims to subvert the industrial cycle of material extraction and obsolescence through the creation of objects that exhibit tunable mechanical and optical properties, and respond to their environments in ways that are impossible with synthetic materials. During use, these aspects allow the structure to communicate with and respond to its environment; once obsolete, it biodegrades, dissociating to its molecular components to fuel new growth.

Among the other projects in the exhibition are *Glass I and II* (2015 and 2017) and *Totems* (2019). *Glass I* and *II* are created through a high-fidelity, large-scale, additive manufacturing technology for 3-D printing optically transparent glass structures at architectural dimensions—in essence, a 3-D printer for the type of glass usually employed to harness solar energy. *Totems* speculates upon designers' abilities to chemically synthesize melanin—the pigment of life—and program its interaction across scales and species. The first prototype, commissioned as part of the XXII Triennale di Milano *Broken Nature: Design Takes on Human Survival* (2019), also curated by Paola Antonelli, demonstrates melanin production at an architectural scale for specific environmental contexts. The research at the core of this work fuses digital fabrication and design computation with chemical reaction dynamics. Each object is designed as a column—a chemical totem—and initiated with tyrosinase, an enzyme from a mushroom whose reaction allows for melanin to be synthesized. A large-scale architectural proposal for an environmentally responsive, melanin-infused glass structure is part of a long-term project initiated by Design Indaba, a yearly design conference in Cape Town, South Africa.

Neri Oxman: Material Ecology will be accompanied by a fully illustrated publication, edited by Paola Antonelli with graphic design by Irma Boom. The catalogue will feature essays by Antonelli and Hadas Steiner, Associate Professor, School of Architecture and Planning, University of Buffalo.

SPONSORSHIP:

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