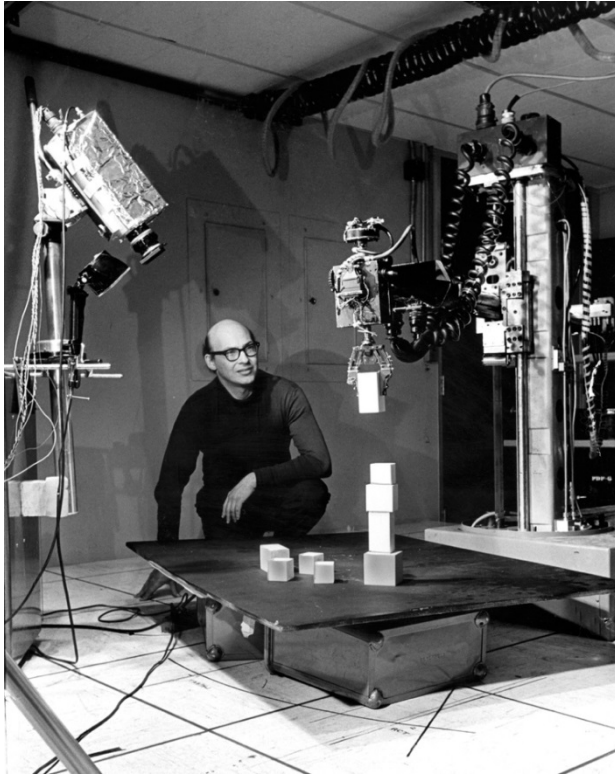


LAB CULT**An unorthodox history of interchanges between science and architecture**

Photograph: Marvin Minsky, MIT Artificial Intelligence Laboratory, 1968.
Courtesy MIT Museum

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Curator 2016–2017

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Montréal, 22 March 2018 – The Canadian Centre for Architecture (CCA) presents *Lab Cult: An unorthodox history of interchanges between science and architecture*. On view in the CCA's Octagonal Gallery, the exhibition is curated by Evangelos Kotsioris, CCA Emerging Curator 2016–2017 and investigates the concept of the laboratory as a pervasive and recurring metaphor for experimentation in both science and architecture. As a place for the conduct of rigorous research, the lab has been an incredibly productive concept for both of these fields. But at the same time, this exhibition provocatively argues, the laboratory has developed into a cult – its seeming credibility has been repeatedly mobilized in order to normalize social behaviors, discipline the performance of bodies, regulate our environments, standardize the ways we live.

Kotsioris conducted his research during a three month residency at the CCA and developed the curatorial approach of the exhibition by juxtaposing archival material from the CCA collection with models, scientific instruments, photographs and films on loan from more than twelve international archives, museums, collections and scientific institutions. The majority of these interrelated objects will find themselves sharing the same space for the first time at the CCA.

The CCA Emerging Curator program offers the opportunity to propose and curate a project at the CCA related to contemporary debates in architecture, urban issues, landscape design, and cultural and social dynamics.

Lab Cult: An unorthodox history of interchanges between science and architecture

Today, after many decades of questioning science's capacity to provide answers to architecture's social mandate, architects and designers are once again enchanted with the concept of the laboratory. Originally conceived as the physical space for the practice of alchemy and crystalized in its modern form during the Enlightenment, the laboratory has become an omnipresent term in architectural education, practice and theory. Architecture schools, corporate firms and governmental think tanks are once again saturated with "design labs," all of which promise to provide objective and precise solutions to contemporary design challenges. In its ubiquity as metaphor, physical space, and visual aesthetic, the laboratory has become an unquestioned dogma. At a moment when science and the production of scientific knowledge are once again undergoing an attack, architecture's reinvigorated faith in the infallibility of science paradoxically resembles the blind devotion of a religious cult.

Instead of reinforcing any preconceived hierarchies between these two fields, *Lab Cult* explores a more symmetrical narrative. Through an eclectic juxtaposition of case studies from science and architecture, this exhibition suggests a history of close-knit relationships and mutual exchanges. Architects are often accused of borrowing, transforming or even misappropriating scientific ideas, tools and working protocols in their attempt to systematize the intuitive aspects of the creative process. At the same time, though, scientists strongly rely on architectural concepts, representations and material means to stage and communicate sophisticated set-ups of rigorous investigation.

As the curator explains: "If science produced a new type of architect, architecture conversely molded a new type of scientist. By foregrounding these ambiguities and interconnections, *Lab Cult* seeks to position the laboratory as the space where these two cross-fertilizing cultures meet. It is a way of reclaiming the profound agency of architectural thinking in deciphering the workings of the natural world, and a provocation to critically reimagine future modes of spatial research."

Why the lab? Why now?

Laboratories are always political; whatever experiment takes places inside them has a profound impact on the world outside. Today, the curricula and exercises taught in architecture schools around the world are still indebted to late 19th century experiments on visual perception and motor skills. Contemporary understandings of ergonomics and spatial efficiency, which find applications from office environments to kitchens in our homes, can be traced back to theories of scientific management that influenced a generation of modernist architects. Present-day theories of climate control and sustainability are based on the early use of physical models in wind tunnel testing by both architects and scientists.

Similarly, the proliferation of surveillance technologies that extract information from our behavior—from CCTV cameras to the algorithms that select the ads that appear on our phones—cannot be understood without the development of behavior psychology, which fascinated both physicians and urbanists before the Second World War. And our daily interaction with sensor control systems—which are everywhere, from automatic doors and elevators to bathroom flushes and thermostats—cannot be understood outside the theory of cybernetics that was popularized during the 1940s and 50s. In order to reengineer all of these experiments and their consequences for everyday life, one needs to go back to their inception in the lab.

Themes and Case Studies

The exhibition is organized under six themes: “Designing Instruments,” “Measuring Movement,” “Visualizing Forces,” “Testing Animals,” “Building Models” and “Observing Behaviour.” Each of these themes is presented by pairing one historical case study from science with one from architecture. Ranging from the late 19th century to the early 1980s, these case studies identify the ways in which working concepts, methods and protocols have been exchanged across different time periods between scientists and architects of diverse disciplinary backgrounds, such as architecture, psychology, engineering, physiology, mathematics, industrial design, computer science and others.

1. DESIGNING INSTRUMENTS

Experimental devices to quantify human perception and normalize architectural dexterities

- **Harvard Psychological Laboratory, (1892-1916):**
German-American psychologist Hugo Münsterberg directed Harvard’s Laboratory of Applied Psychology. This laboratory sought to produce a new understanding of human psychology through the experimental study of cognition, largely focusing on sight, hearing, and the perception of space. To do so, Münsterberg both collected and designed a vast collection of testing instruments that were supposed to provide a precise way of measuring previously unaccounted for attributes of perception.
- **VKhUTEMAS Psychotechnical Laboratory (1927-30):**
Nikolai Ladovsky, a Russian architect and educator, was fascinated by Münsterberg’s theory of psychotechnics. In 1926 he established the Psychotechnical Laboratory at VKhUTEMAS, a Russian state art and technical school in Moscow. There, Ladovsky designed his own experimental instruments in order to provide a “scientific” benchmark for selecting the best-suited prospective architects and a pedagogical method for improving the dexterities of prospective and admitted students.

2. MEASURING MOVEMENT

Drawing notations to calculate and discipline the motion of the efficient body in space

- **The Chronocyclograph, (1913-17):**
Frank B. and Lillian M. Gilbreth, a couple of engineers and advocates of “scientific management,” invented the chronocyclograph, a device that allowed them to study human motion. By using photography, film and small electric bulbs that produced continuous light trails when shot in the dark, the Gilbreths mapped the movement of workers while they performed different types of labour. Using drawings and models, the Gilbreths claimed that employers could retrain their workers’ motor skills in order to minimize unnecessary movements and maximize efficiency and productivity.
- **The Frankfurt Kitchen, (1926-27):**
Margarete Schütte-Lihotzky, a young Austrian architect influenced by the management theories of the Gilbreths and others, designed a series of standardized kitchens that were mass-produced in Frankfurt between 1926 and 1927. The compact layout of the Frankfurt Kitchen was intended to alleviate the domestic labor of women by minimizing the traveling distance between the kitchen’s work areas and the dining table. Shaped by interviews with housewives and women’s groups, Lihotzky’s carefully-dimensioned design radically redefined the workflow, ergonomics and appearance of the modern kitchen.

3. VISUALIZING FORCES

Smoke machines render visible the resistance of air against objects and buildings

- **Marey Laboratory, (1899-1901):**

French physiologist and chronophotographer Étienne-Jules Marey designed and constructed a smoke machine in order to study aerodynamics. By directing a row of parallel smoke currents against different shapes of obstacles within a glass-enclosed chamber, he exposed the ways in which the kinetics of flow and turbulence behaved. In the years that followed, Marey photographed dozens of these *fumées* in order to capture the fleeting moment of experimentation in a 'mechanically objective' manner.

- **Princeton Architectural Laboratory, (1953-63):**

Marey's method would be rehearsed again by Hungarian-American architects Victor and Aladar Olgyay. Working at the Princeton Architectural Laboratory, the Olgyays employed a smoke machine in order to study the flow patterns of air as it moved through buildings and settlements. By making these invisible forces visible, the air flow studies of the Olgyays were mobilized as undisputed empirical evidence and played a central role in the conception of their bioclimatic design theories.

4. TESTING ANIMALS

Live rodents and electromechanical rodents simulate interaction between humans and artificial environments

- **Bell Telephone Laboratories, (1950-52):**

American mathematician and electrical engineer Claude Shannon was investigating machine learning and electronic memory at Bell Labs. Together with his wife Betty, Shannon built *Theseus*, a maze-solving, electromagnetically-driven mouse that could find its way through a reconfigurable maze by trial and error. Making use of the architectural typology of the labyrinth, Shannon's *Theseus* was designed as a physical demonstration of how a phone signal could find its way through the complexities of a telephone network.

- **Architecture Machine Group, MIT, (1969-70):**

Greek American architect Nicholas Negroponte also deployed actual lab rodents in a prototypical installation titled *SEEK*. Developed under the Architecture Machine Group at MIT, *SEEK* was modelled as a "city" of stacked blocks inhabited by a colony of living gerbils. Before eventually descending into total chaos, a computer-controlled manipulator was meant to establish an interaction between rodents and their habitat by "sensing" and "learning" from their unpredictable actions in space.

5. BUILDING MODELS

Intelligent robots manipulating toy blocks and inhabitable cubes into transformable structures

- **MIT Artificial Intelligence Lab, (Late 1960s):**

American cognitive scientist Marvin Minsky led a series of pioneering studies in machine vision at MIT's Artificial Intelligence Laboratory. The main objective was how to "teach" a computer to visually recognize and replicate structures by manipulating physical objects with the help of a robotic arm. The way to do this was through "architecture" and by programming the computer to identify and compile building blocks into elementary structures, such as "arches," "tables," and "chairs."

- **Generator Project, (1976-79):**

British architect Cedric Price envisioned a project in which the spatial rearrangement of cubes would be carried out at an architectural scale. The Generator project was conceived as changeable architecture for an artists' retreat that would continuously adapt to the changing needs of its users. Instead of a fixed structure, Price envisioned a flexible system of inhabitable cubes and portable elements that could be relocated in space with the help of a mobile, programmable crane.

6. OBSERVING BEHAVIOUR

The film camera as gazing technology in the medical clinic and the diagnosable city

- **Yale Child Psychology Lab, (1924-46):**

American psychologist and physician Arnold Gesell began using cinematographic cameras to observe the mental and physical development of infants. As a professor at Yale University he designed a hemispherical, metal-ribbed, cinematographic observatory, which became known as the Gesell Dome. Functioning as a one-way mirror, this mesh-screened dome created an asymmetry of power by allowing “invisible” researchers to observe their research subjects without perceptible interference.

- **The Street Life Project, (1969-80):**

American urbanist and journalist William “Holly” Whyte utilized the attentive gaze of the film camera to study what made certain urban spaces, such as the Seagram Plaza in New York, more appealing than others. Using time-lapse motion filming along with traditional observation methods, Whyte sought to understand how to make American city centres more livable again. The output of this research — its sighting maps, activity charts, books and films — had a profound impact on American urbanists and New York’s subsequent zoning amendments.

Public Programs

Opening lecture and vernissage - Thursday 22 March at 6:30 pm

The opening lecture by Evangelos Kotsioris will contextualize the lab not as built space but as a metaphor that has saturated the world of design today. From its first popularization in the mid-1920s, its use at the Bauhaus, and its origins as a reaction to studio education that emphasised individual virtuosity or artistic genius to its contemporary proliferation, the story of the lab (and of its cult) reflects on changing social values and public roles of science and architecture. The vernissage will follow from 7 pm to 9 pm.

Considering the contemporary through questions raised by the exhibition research, a pair of *Lab Tests* critically examines case studies of architectural institutions inspired by scientific movements, and the projects and ideas produced by them.

Lab Test 1: Lecture by Anna Bokov - Thursday 5 April at 6:30 pm

Lab Test 1 starts on Thursday 5 April: Anna Bokov, design director at Terreform ONE and instructor at The Cooper Union and Cornell University, will deliver a presentation on the “Science” of Architecture at Vkhutemas. Presentation in English in the Paul Desmarais Theatre.

Lab Test 2: Lecture by Bechara Helal and Enrique Ramirez - Thursday 19 April at 6:30 pm

Lab Test 2 : Bechara Helal, architect and assistant professor at the University of Montreal, and Enrique Ramirez, scholar and historian of modern and contemporary architecture, urbanism, and landscape, will tackle the topic of recent Mutations of the Architectural Laboratory. Presentation in English in the Paul Desmarais Theatre.



About the curator

Evangelos Kotsioris, CCA Emerging Curator 2016–2017, is a New York-based architectural historian, curator and architect. His research focuses on the intersections of architecture with science, technology and media. He is a Curatorial Assistant in the Department of Architecture & Design at the Museum of Modern Art in New York. In 2016 he was the Assistant Curator of the 3rd Istanbul Design Biennial, *Are We Human?* curated by Beatriz Colomina and Mark Wigley and co-curator of the ongoing collaborative research project *Radical Pedagogies*, which was awarded a Special Mention at the 14th Venice Biennale of Architecture. Currently he is completing his PhD at Princeton School of Architecture. His dissertation composes an architectural history of computerization during the Cold War and has received the Carter Manny Citation for Special Recognition by the Graham Foundation. Kotsioris graduated with first class honors from the School of Architecture of AUTH in Greece and holds a MArch II from Harvard Graduate School of Design. He has been a travelling fellow of the Society of Architectural Historians and a graduate fellow of the Princeton Institute for International and Regional Studies. Kotsioris has taught at Harvard, Princeton, the Boston Architectural Center and The Cooper Union. His writing has appeared in edited volumes and periodicals such as *Perspecta*, *New Geographies*, *The Architectural Review*, *Volume*, *Manifest*, *Conditions*, *On Site*, *Pidgin* and elsewhere.

About the CCA

The CCA is an international research centre and museum founded in 1979 by Phyllis Lambert, on the conviction that architecture is a public concern. Based on its extensive collection, exhibitions, public programs, publications and research opportunities, the CCA is advancing knowledge, promoting public understanding, and widening thought and debate on architecture, its history, theory, practice, and role in society today.

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