

The Museum of Modern Art

MoMA HIGHLIGHTS THE TRANSFORMATIVE HISTORY AND INFLUENCE OF COMPUTERS ON POSTWAR ARTISTS, ARCHITECTS, AND DESIGNERS

The Exhibition Features Nearly 100 Objects across Mediums, Illustrating Computers' Lasting Impact on New Modes of Aesthetics and Artistic Production

Thinking Machines: Art and Design in the Computer Age, 1959-1989

November 13, 2017–April 8, 2018

Floor three, The Philip Johnson Galleries

Press Viewing Hour: Friday, November 10, 2017, 9:30–11:00 a.m.

NEW YORK, September 7, 2017— Drawn largely from The Museum of Modern Art's collection, ***Thinking Machines: Art and Design in the Computer Age, 1959-1989*** brings works produced using computers and computational thinking together with examples of computer and component design. On view from November 13, 2017, through April 8, 2018, the exhibition reveals how artists, architects, and designers operating at the vanguard of art and technology between 1959 and 1989 deployed computing as a means to reconsider artistic, industrial, and economic production. The individuals featured in the exhibition exploited the potential of unprecedented technologies by inventing systems wholesale or by partnering with institutions and corporations that provided access to unique machines. The exhibition includes work from **Beryl Korot** (American, born 1945), **Waldemar Cordeiro** (Brazilian, born Italy 1925–1973), **Vera Molnár** (French, born Hungary 1924), **John Cage** and **Lejaren Hiller** (American, 1912–1992; and American, 1924–1994), **Stan VanDerBeek** (American, 1927–1984), **Alison Knowles** (American, born 1933), **Cedric Price** (British, 1934–2003), and **Lee Friedlander** (American, born 1934), alongside **Tamiko Thiel** (American, born 1957) and others at Thinking Machines Corporation, Olivetti, IBM, and Apple Computer. *Thinking Machines* is organized by Sean Anderson, Associate Curator, Department of Architecture and Design, and Giampaolo Bianconi, Curatorial Assistant, Department of Media and Performance Art, The Museum of Modern Art.

Advancing crucial conversations about the intersections of art, design, and technology that have been discussed and exhibited at the Museum since the 1930s, *Thinking Machines* reframes a strand of aesthetic and cultural relationships that have been synonymous with the postwar era. It also traces how computers transformed aesthetic hierarchies and reveals how these thinking machines reshaped art making, working life, and social connections.

Hummingbird and Early Design

The early computer film *Hummingbird* (1968), by **Charles Csuri** (American, born 1922), became the first computer-generated artwork to enter the Museum's collection soon after the film's completion. An artist and computer engineer, Csuri produced works that were included

in defining exhibitions of computer art in the 1960s, including *Cybernetic Serendipity* at the ICA, London, in 1968. Shown alongside *Hummingbird* are key examples of computing culture from the late 1950s and early 1960s, including a selection of punch cards, an early hand-drawn plan for a computer chip, and a striking, colorful circuit board for an IBM 305 RAMAC.

Olivetti and Arte Programmata

In May 1962, Bruno Munari and Giorgio Soavi organized the exhibition *Arte programmata. Arte cinetica. Opere moltiplicate. Opera aperta (Programmed art. Kinetic art. Multiplied works. Open works)* in Milan. Italian artists associated with the Arte Programmata movement, including **Gianni Colombo** (Italian, 1937–1993), **Getulio Alviani** (Italian, born 1933), and Gruppo N, imagined their production as part of a new computational world grounded in feedback systems and cybernetic thinking. Their optical and kinetic sculptures rely on the programming of a mechanical system in an attempt to produce an “open” work that is completed by its encounter with the spectator. Examples in the exhibition include Colombo’s kinetic sculpture *Pulsating Structuralization* (1959) and a poster by pioneering graphic designer **Enzo Mari** (Italian, born 1932).

Presaging later models of artistic-industrial collaboration, like Experiments in Art and Technology (EAT), these artists worked under the aegis of the Olivetti Corporation, accessing their advanced technology while purposefully blurring the lines between art, computation, and design. The artists of Arte Programmata were engaged with and inspired by Olivetti. Included in the exhibition are two devices designed by **Mario Bellini** (Italian, born 1935) for Olivetti, the Programma 101 Electronic Desktop Computer (1965) and the TCV 250 Video Display Terminal (1966). These artists were loosely considered the Italian wing of the international New Tendencies movement, and participated in exhibitions organized in Zagreb between 1961 and 1973 that were extremely influential in the development of technological, concrete, and constructive art.

Conceptual Computation

The rise of computer technology influenced a broad range of artistic practices as artists used—or sought to use—computers to advance their own aesthetic goals. John Cage’s collaboration with Lejaren Hiller, *HPSCHD* (1967), was produced using the resources of the University of Illinois at Champagne-Urbana. Stan VanDerBeek created a series of influential computer films with **Ken Knowlton** (American, born 1931) at Bell Labs in New Jersey. His *Poemfield No. 1* (1967) will be shown alongside archival papers related to its production. Similarly, Allison Knowles’s computerized poem *House of Dust* (1967) was created with composer James Tenney, whose previous residency at Bell Labs granted him knowledge of the FORTRAN programming language.

Computers also impacted artists who could not, or did not, work directly with emerging technologies. **Channa Horowitz** (American, 1932–2013) created a graphic system of notation she called Sonakinatography (meaning sound, motion, notation), after her proposal for a large kinetic sculpture went unrealized for the influential 1971 exhibition *Art and Technology* at the Los Angeles County Museum of Art. **Hanne Darboven**’s (German, 1941–2009) numerical and procedural drawings share a basis with contemporaneous data-based

artworks, and raise important questions about the overlap between art made with computers and Conceptual art. And the wide-ranging philosophical concerns of **Agnes Denes** (Hungarian, born 1938) roots the production of art in a lineage of systems thinking and technological possibilities that influenced thinkers including R. Buckminster Fuller.

Text and Commentary

At the center of the exhibition is Beryl Korot's landmark video installation *Text and Commentary* (1976–77), a five-channel video of Korot weaving at a loom, which is viewed in an installation including the four resulting weavings alongside intricate drawings and mimeographs with which Korot designed and documented the patterns for the weavings. Korot became interested in weaving in the 1970s as a historical form of women's work, and in the design and practice of weaving as an early way of transmitting complex information, referring to the loom as "the first computer on the face of the earth." In 1978, Korot delivered a lecture at MoMA titled "Video and the Loom," in which she positioned her thinking about the relationship between the new mediums of video and computation and the medium of weaving. Korot's observations about computation and information—which is translated into a purposefully old media technology, weavings produced by a loom—emphasizes the extent to which early computing influenced artists in ways that are more complex than commonly assumed. Numerous thinkers since Korot have continued to emphasize the resonance between coding and weaving, and her practice has only become more influential since its initial exhibition in the 1970s.

Korot has worked with video since the early 1970s and was a member of the video collective Raindance and an editor of the journal *Radical Software*, an important venue for early adherents to video, cybernetic thinking, and experimental computing. Viewing issues of *Radical Software* from the early 1970s reveals the substantial overlap between these fields. Their mutual influence across the works in the exhibition resonates with Korot's pivotal installation.

Machine Drawings

Artists significantly made use of the computer's potential to generate images alongside the ink-jet plotter and printer developed in the 1960s to effectively print them. Brazilian artist Waldemar Cordeiro was among the first established Brazilian artists to turn to the computer as a way of producing images, and his large scale computer-generated drawing *Gente Ampli*2* (1972) will be on view in the exhibition. Other artists including **Alan Saret** (American, born 1944) experimented with the nature of drawing using the plotter.

One of the most notable artists associated with machine drawings is **Vera Molnár** (Hungarian, 1934), who has worked steadily with computation since the late 1960s. She was a founder of the Paris-based Groupe de Recherche d'Art Visuel (Visual Art Research Group), which included artists like François Morellet and Julio Le Parc. Before accessing the computer, Molnár worked with what she called a "machine imaginaire," a set of rules and procedures she created to produce drawings by hand that would mimic the inputs and constraints of a computer. She continues to work with the computer and plotter today. The exhibition features key works by Molnár from the Anne and Michael Spalter Digital Art Collection.

Cedric Price's Generator Project

Architects also employed computational technologies to reconfigure human communities and architectures. One such example is Price's ambitious Generator Project (1978–80), an early investigation into the use of artificially intelligent systems to inform an architecture designed with no specific program, but only a desired end effect, in mind. Commissioned by Howard Gilman for a site at the Gilman Paper Corporation's White Oak Plantation in Florida, the project was intended to define a process and means for designing a new facility to house dance performances, theater, and visiting artists. Throughout Price's storied career, an exploration of new spatial typologies in architecture and urbanism affected the creation of flexible conditions previously thought impossible within a socially beneficial environment. Generator was conceived as participatory yet critical, and was intended to operate by means of a central computer with which a visitor might combine any of 150 of the Generator's four-by-four meter, fully serviced, air-conditioned cubes—along with walls, screens, gangways, and communications channels—into a structure. The computer would encourage the visitor to continually refine and improve his or her design, and was to be programmed to make unsolicited alterations should the framework remain static. Although Price's scheme to provide a catalytic environment dedicated to the arts was never built, the expansive series shown here of computer-generated drawings, sketches, and other ephemera from the Generator project suggests a process for thinking about the spaces in which we live as much as how technologies defined by us order the world.

Computers and Society

Beyond its impact on artists and art making, the exhibition also follows a history of the computer's increasing integration into society. Key holdings from MoMA's Department of Architecture and Design represent this cultural shift, including the first Apple Macintosh computers, a computer designed by the artist **Richard Hamilton** (British, 1922–2011), the DIAB DS-101 Computer (1985–89), and the CM-2 Supercomputer (1987) produced by Thinking Machines Corporation in collaboration with artist and designer Tamiko Thiel. The Hamilton-designed DIAB DS-101 solidifies the influence of computer technology on a generation of international artists revolving around Pop art, and the CM-2 is a key example of a consumer-grade supercomputer known for its combination of innovative design and industrial computing power. Together, these objects represent the wide range of computer design in the 1980s.

Alongside these objects are selections from the photographer Lee Friedlander's *At Work* series of social documentary photographs from the mid-1980s, which were shot along the Route 128 corridor in Massachusetts and at factories in the American Midwest. These images depict the space of the office as well as workers engaged at computer terminals offering parallels to the prevalence of computing technology today. Computers' transformation of the act of work is an achievement at least equal to their influence on artists and art making, and Friedlander, known for his attention to America's changing social landscape, reveals this reality with characteristic wit.

SPONSORSHIP:

The exhibition is supported by the Annual Exhibition Fund.

PUBLIC PROGRAM:**Thinking Machines: An Evening with Beryl Korot, Zabet Patterson, and Tamiko Thiel**

Tuesday, November 14, 6:00-7:30 p.m., Education and

Tickets: \$15; \$10 members and Corporate members; \$5 students, seniors, and staff of other museums

This conversation addresses the connections between art making and computing since the 1960s, with a focus on women artists and designers. The exhibition explores the postwar rise of advanced mainframe technologies, and how artists have been at the vanguard of using computing to develop new forms and reinvent traditional modes of artistic production. The impact of early computing technologies on histories of art and design in the 20th century is central to understanding how we live today.

Participants include artist Beryl Korot, whose innovative video installation *Text and Commentary* (1976–77) draws together artistic practices ranging from weaving to computing; Zabet Patterson, Associate Professor, Art History and Criticism, Stony Brook University, and author of *Peripheral Vision: Bell Labs, the S-C 4020, and the Origins of Computer Art* (MIT Press, 2015), a material and technological history of art and science at Bell Labs; and artist Tamiko Thiel, lead designer of the CM-2 Supercomputer (1987), a commercially produced device that marked a significant advance in the history of data processing. The conversation will be moderated by MoMA exhibition organizers Sean Anderson, Associate Curator, Department of Architecture and Design, and Giampaolo Bianconi, Curatorial Assistant, Department of Media and Performance Art.

A reception will follow the conversation.

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For downloadable high-resolution images, register at moma.org/press.

Public Information:

The Museum of Modern Art, 11 West 53 Street, New York, NY 10019, (212) 708-9400, moma.org. Hours: Saturday through Thursday, 10:30 a.m.–5:30 p.m. Friday, 10:30 a.m.–8:00 p.m. Museum Admission: \$25 adults; \$18 seniors, 65 years and over with I.D.; \$14 full-time students with current I.D. Free, members and children 16 and under. (Includes admittance to Museum galleries and film programs). Free admission during Uniqlo Free Friday Nights: Fridays, 4:00–8:00 p.m. moma.org: No service charge for tickets ordered on moma.org. Tickets purchased online may be printed out and presented at the Museum without waiting in line. (Includes admittance to Museum galleries and film programs). Film and After Hours Program Admission: \$12 adults; \$10 seniors, 65 years and over with I.D.; \$8 full-time students with current ID. The price of an After Hours Program Admission ticket may be applied toward the price of a Museum admission ticket or MoMA membership within 30 days.