Rebecca Allen
Flirt, 1974
Digital video (0:16 min., silent)

Refik Anadol
Machine Hallucination: Keystone-Mast Collection, 2024
AI data painting (23:10 min., silent)

Refik Anadol
Machine Hallucination: Keystone-Mast Collection process, 2024
Digital video (1:28 min., silent)

Natalie Bookchin
Databank of the Everyday, 1996
Digital video emulation of interactive CD-ROM with sound (loop)

micha cárdenas
Sin Sol / No Sun, 2020
Projected virtual environment installation, application, tablet, and video with sound (duration variable)

Liliana Conlisk Gallegos
The Coyolxauhqui Imperative 2020, 2020
Digital video (11:13 min., sound)

Nonny de la Peña
Hunger in Los Angeles, 2012
Virtual reality video (3:38 min., sound)

John Divola
George Air Force Base, 2021
Diptych; archival pigment prints

Dynasty Handbag
Oh, Hummingbird, 2017
Digital video (2:47 min., sound)

E P O C H
Purgatorio, 2024
Virtual exhibition, 8K stand-alone app with high-res audio

Elisa Giardina Papa
Archive Fever, 2011-ongoing
Real-time web video with sound (duration variable)

Elisa Giardina Papa
Technologies of Care, 2016
Downloadable zipped folder, text files, videos with audio (duration variable)

Goldin+Senneby
After Microsoft, 2007
Still image with sound, audio loop

Valerie Green
IMG1788, 2015
Dye sublimation print on aluminum

Lucia Grossberger Morales
Huaca, 1987
Mixed-media installation with interactive component

Maggie Hazen
Call of the Lily, 2019
Three-channel HD video (7:40 min., sound) and custom gaming armature; single-channel video (1:45 min.) on custom armature

Lynn Hershman Leeson
Lorna, 1979-82
Mixed-media interactive video installation with sound

Huntrezz Janos
Azon Machine ("The Wonders of Today," season 2, episode 4), 2016
HD video (10:15 min., sound)

Eugene Lally
"Mosaic Guidance for Interplanetary Travel," first presented at Space Flight Report to the Nation, New York Coliseum, October 9–15, 1961
Archival reproduction

Brandon Lattu
Photoshop and Photoshop, 2020
Pigment print

Brandon Lattu
William Henry Fox Talbot making drawings at noon in August with a camera lucida looking past horses at Lacock Abbey in the distance, kodachrome photog.png, 2022
Pigment print

Ahree Lee
Disrupting the Industry, 2019
Cotton, linen, and copper on canvas

George Lewis, Keystone View Company
The Arch of Triumph [Arc de Triomphe] and the Place de L'etoile, Paris, France, not dated
Archival pigment print

Jennifer Lopez backstage at the 42nd Annual Grammy Awards, 2000

David Maisel
The Mining Project (Butte, MT 3), 1999 (printed 2001)
Archival pigment print

Frank Malina
Reflections III, 1962
Kinetic painting with Lumidyne system (painted Plexiglas, mesh gauze, light sources, and electric motor in painted wooden box)

Judy Malloy and Cathy Marshall
Forward Anywhere, 1993
Interactive hypertext file, digital web video with sound (duration variable)

Lynne Marsh
L.A., 2003
Digital video (1:25 min., sound)

Lauren Lee McCarthy
Follower, 2016
Installation of 15 JPGs on iPhone 7s

Mobile Image (Kit Galloway and Sherrie Rabinowitz)
Satellite Arts, 1977
Digital video (20:44 min., sound)

Mobile Image (Kit Galloway and Sherrie Rabinowitz)
Satellite Arts party announcement, 1978 (reprinted 2024)

Lee Mullican
Computer Works, 1982–88
Digital inkjet prints

NASA
Hubble Ultra Deep Field, 2006
Hubble Space Telescope digital image composite

A. Michael Noll
Gaussian-Quadratic, 1962–63
Black-and-white photographic print, computer-generated image

Mendi + Keith Obadike
The Interaction of Coloreds, 2002/2018
Interactive video installation, sound

Charles O'Rear
Bliss, 1996
Digital desktop image

Oudine, Keystone View Company
Signs of the Ancient Mayan Civilization, Tegucalpa [Tegucigalpa], Honduras, with Maya Replica in Park, 1938–39
Archival pigment print

Trevor Paglen
KEYHOLE-IMPROVED CRYSTAL from Glacier Point (Optical Reconnaissance Satellite, USA 186), 2008
Chromogenic print

Trevor Paglen
Image Operations, Op. 10, 2018
Digital video (23 min., 5.1 surround sound)

Nam June Paik
Portable God, 1989
Digital video (silent) on two monitors in artist-modified altar, cabinet, antenna, mixed-media altar offerings, and ink on vintage papers

Sheila Pinkel
Red, Green, Blue Corner Cube, 1972
Silkscreen on paper in acrylic artist's frame

Sheila Pinkel
Silver/Black Corner Cube, 1972
Silkscreen on paper in acrylic artist's frame

Sheila Pinkel
Manifestations of a Cube, 1974–82
60 photograms, 9 color Xeroxes, 3 color Xeroxes, 4 cyanotypes, 1 digital print, 3 xeroradiographs, 1 cyan xeroradiograph

Sheila Pinkel
Intuition, 1977
Digital video (5 min., sound)

Sheila Pinkel
Thermonuclear Gardens, 1984–85
Photographic installation, including black-and-white gelatin silver print of Xerox with text mounted on fabric, Xeroxed modular works, a digital print of an offset print, a Xeroxed modular work mounted on Sintra, and a black-and-white Xeroxed advertisement on paper

Sonya Rapoport
Objects on My Dresser: Phase 2, 1980/2024
Mixed-media installation, dimensions variable

Sonya Rapoport
Objects on My Dresser: Phase 6, 1982/2024
Press release for Sonya Rapoport's *20th Century Portrait*, 1982 (reprinted 2024)

Marton Robinson
Mirror Mirror, No hay más que un nombre, 2019
Digital video (1:47 min., sound)

Dean Sameshima
Figures of Lust Furtively Encountered in the Night, 2001–4
Chromogenic prints made from digital images

Julia Scher
Securityland, 1995
Interactive web work

Ilene Segalove
Why I Got Into TV and Other Stories, 1983
Digital video (10 min., sound)

Sonia Landy Sheridan
Sonia through Sonia in Time, No. 18, 1974
Unique photocopy print on paper

Sonia Landy Sheridan
Sonia with Bill Flanagan Ceramic Cylinder, 1976
Unique photocopy print on paper

Sonia Landy Sheridan
Two Hands, Two Breasts, 1970s
Unique photocopy print on paper

Barbara T. Smith
Do Nut Tuch, 1966–67
Spiral-bound artist's book

Barbara T. Smith
Where Did You Get That Polka-Dot Blouse?, 1966–67
Accordion-fold artist's book

Christine Tamblyn
She Loves It, She Loves It Not: Women and Technology, 1993
Digital video with sound (loop)

Penelope Umbrico
Pirouette for CRT, 2012
Digital video (5 min., sound)

Stan VanDerBeek
Poemfield No. 7, 1967–68
16mm film transferred to digital video (4:09 min., sound)

Steina and Woody Vasulka
Noisefields, 1974
Digital video (12:05 min., sound)

Gerardo Velazquez
Audio Manipulation of Digitized Images, 1987
Three slow-scan portraits, video (46:39 min., sound)

Andrew Norman Wilson
Workers Leaving the Googleplex, 2011
Digital video (11:03 min., sound)

Andrew Norman Wilson
Selected works from the series *ScanOps*, 2012–ongoing
Archival pigment prints in aluminum artist's frames

Amir Zaki
Built in 1906. Damaged in 1908. Renovated in 1907, 1909 X, from the series *On Being Here*, 2021
Archival pigment print

Unknown photographer, H. C. White Company
The Sphinx and Second Pyramid, Gizeh [Giza], Egypt, not dated
Archival pigment print

Unknown photographer, Keystone View Company
Statue of Liberty in N.Y. Harbor, N.Y. City, 1928
Archival pigment print

Unknown photographer, Keystone View Company
Yeni-Valide Djami Mosque, Constantinople [Istanbul], Turkey, not dated
Archival pigment print

Unknown photographer, Underwood & Underwood
Magnolia Avenue—tropical beauties of Riverside, California, not dated
Archival pigment print

Unknown photographer, Underwood & Underwood
The Taj Mahal, Agra, India, not dated
Archival pigment print

Apple Computer, Inc.
Apple QuickTake 100, 1994–97

Eastman Kodak Company
Kodak digital DC20 camera, 1996

Eastman Kodak Company
Kodak digital DC260 zoom camera, 1999

Mitsubishi Electric Sales America, Inc.
Mitsubishi VisiTel Model LU-500 Visual Telephone Display, 1987

Nokia
Nokia 3600 camera phone, 2008

Sony Electronic Corporation
Sony Hi-Band Mavica camera model MVC-C1, 1988

Tomy Games, Inc.
Blip, the Digital Game, 1977

Southern California and the Pixel-Based Image World

DIGI-TAL CAP-TURE

Southern California and the Pixel-Based Image World

Curated by
Nikolay Maslov
and April Baca

UCR ARTS: California
Museum of Photography and
Culver Center of the Arts

PST ART: ART & SCIENCE COLLIDE

UCR ARTS

Rebecca Allen

Refik Anadol

Natalie Bookchin

micha cárdenas

Liliana Conlisk

Gallegos

Nonny de la Peña

John Divola

Dynasty Handbag

EPOCH

Elisa Giardina Papa

Goldin+Senneby

Valerie Green

Lucia Grossberger

Morales

Maggie Hazen

Lynn Hershman Leeson

Huntrezz Janos

Eugene Lally

Brandon Lattu

Ahree Lee

David Maisel

Frank Malina

Judy Malloy and

Cathy Marshall

Lynne Marsh

Lauren Lee McCarthy

Mobile Image

(Kit Galloway and

Sherrie Rabinowitz)

Lee Mullican

A. Michael Noll

Mendi + Keith Obadike

Charles O’Rear

Trevor Paglen

Nam June Paik

Sheila Pinkel

Sonya Rapoport

Marton Robinson

Dean Sameshima

Julia Scher

Ilene Segalove

Sonia Landy Sheridan

Barbara T. Smith

Christine Tamblyn

Penelope Umbrico

Stan VanDerBeek

Steina and Woody

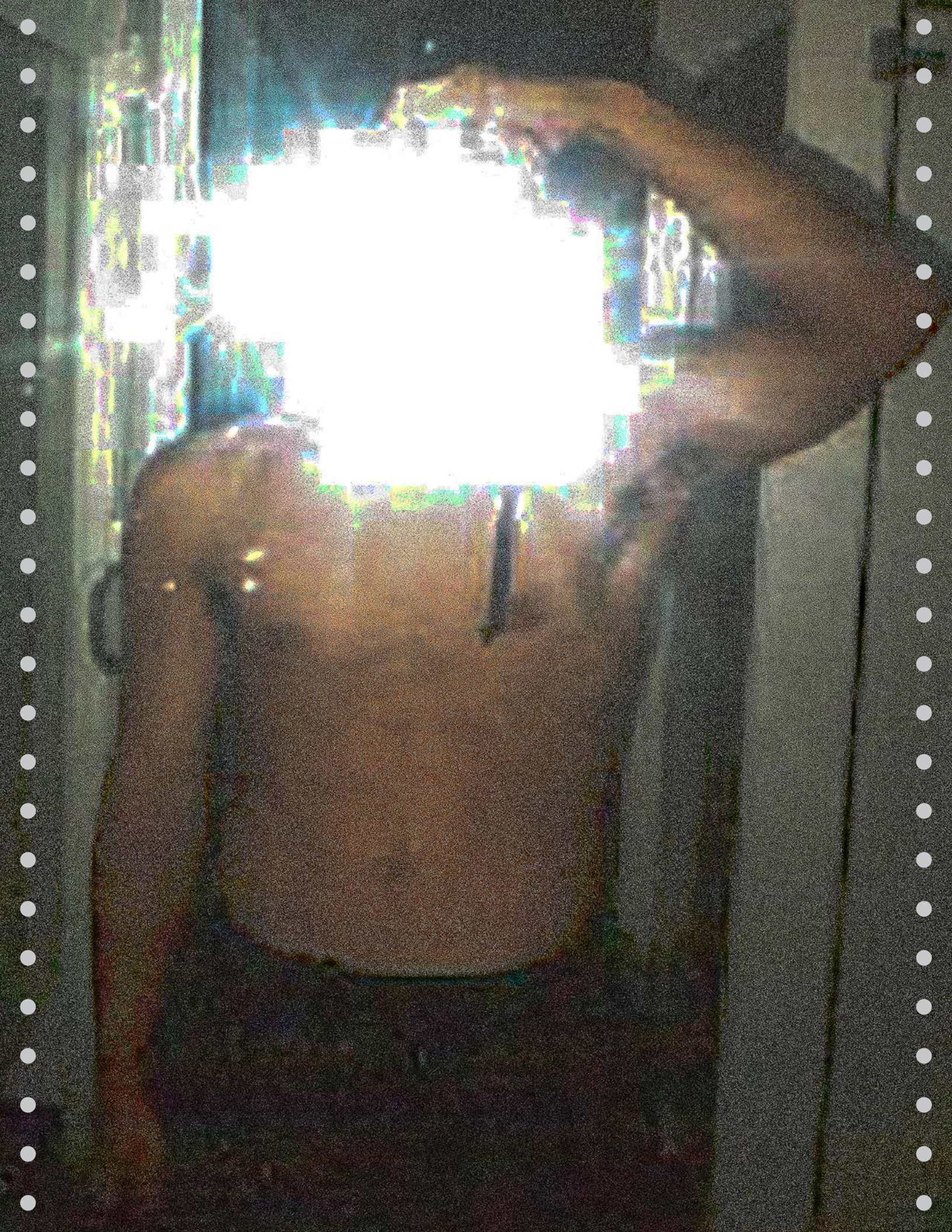
Vasulka

Gerardo Velazquez

Andrew Norman Wilson

Amir Zaki

CON-TENTS



AC-
KNOWL
EDG-
MENTS

The California Museum of Photography holds the largest, most diverse photographic collection in the western United States—more than five hundred thousand objects. In addition to photographs, the shelves and drawers of our vaults are heavy with a broad array of image-making technologies. These include more than ten thousand cameras, ranging from the dawn of photography to digital devices, sensors, cameras, and displays. Since the museum's founding in 1973, its curators have examined the links between image technologies and photographic art. Consequently, when the Getty Foundation announced the theme of the latest PST ART initiative—*Art & Science Collide*—it arrived at the California Museum of Photography like a fine-feathered bird landing on a perfectly positioned branch. Photography has always been part art, part science.

We offer our deepest appreciation to the Getty Foundation for providing the impetus for *Digital Capture: Southern California and the Pixel-Based Image World*, an exploration of digital technologies and the pioneering artists who were its earliest adventurers. We are grateful for the recurring periodic funding of the PST ART initiative, which in the past has also supported the exhibitions *Seismic Shift: Lewis Baltz, Joe Deal and California Landscape Photography, 1944–1984* (2011) and *Mundos Alternos: Art and Science Fiction in the Americas* (2017–18). Additional project support from the Carl & Marilynn Thoma Foundation; Keith Downs; the Voy and Fay Wong Family (AAPI) Endowment; the College of Humanities, Arts, and Social Sciences at UC Riverside; and the City of Riverside has enabled us to realize the best possible version of *Digital Capture*.

Digital Capture spans more than six decades, from 1962 to the current moment. It investigates the history and creative uses of digital imaging technology, from its genesis in Southern California research laboratories

DOUGLAS MCCULLOH

during the Cold War and space race to its ubiquity in our contemporary world. Through the prism of art and pioneering digital artists, the show traces the ideological shifts that occurred as newborn image technologies disseminated into art practice, the creative industries, and popular culture. Conceptually organized into themes exploring issues of agency, representation, culpability, and connection, *Digital Capture* features more than forty artists working across a wide range of technological, computing, and imaging media, probing, questioning, exploring, and ultimately reaching for personal, social, and artistic freedoms.

To prepare *Digital Capture*, we visited archives across the country. Anyone who has dived into the sea of documents on the rise of art and digital technologies will affirm that only the assistance of skilled archivists will keep you above water. We extend heartfelt appreciation to the following archives that welcomed us with warmth, efficiency, and skill: the Art Institute of Chicago; the Berkeley Art Museum and Pacific Film Archive; the Digital Humanities Center, Columbia University Libraries, New York; the Computer History Museum, Mountain View, California; the Getty Research Institute, Los Angeles; the Huntington Library Collections, San Marino, California; the Lesbian Herstory Archives, Brooklyn; the Massachusetts Institute of Technology, Cambridge; the Museum of Modern Art, New York; Nokia Bell Labs, Murray Hill, New Jersey; ONE Archives at the USC Libraries, Los Angeles; the San Francisco Museum of Modern Art; the San Jose Research Library and Archives; Stanford's Center for Computer Research in Music and Acoustics; and the University of California, Irvine, Special Collections and Archives.

Naturally, we thank the artists and lenders to the exhibition, without whom there would be no show. Special thanks go to the *Digital Capture* advisory panel for their ideas and guidance during this multiyear effort: M. Salman Asif, Assistant Professor, Department of Electrical and Computer Engineering, UC Riverside; Anikó Imre, Professor, Cinema & Media Studies, University of Southern California; John Jennings, Professor, Media and Cultural Studies, UC Riverside; Sheila Pinkel, Professor Emerita of Art and Art History, Pomona College, whose work is featured in the exhibition; and James Tobias, Associate Professor, English, UC Riverside. Jussi Parikka joins us for a memorable residency at UC Riverside's Center for Ideas and Society (CIS), with thanks to CIS codirector Jeanette Kohl, Associate Professor, History of Art, as well as Susan Laxton, Associate Professor and Chair, History of Art, and Judith Rodenbeck, Professor, Media and Cultural Studies.

Many others—scholars, artists, technical experts—offered assistance, new perspectives, and suggestions. They include Victor Acevedo, Pennington P. Ahlstrand, Steve Anderson, Elvia Arroyo-Ramirez, Constantin Basica, Sheila Bergman, Lisa Bloomfield, Amy Blumenthal, Chris Chafe, Erik M. Conway, Darryl Curran, Scott S. Fisher, Dan Goods, Farley Gwazda, R. Mac Holbert, Kathy Rae Huffman, Erkki Huhtamo, Robert Kieronski, George Legrady, Julie Martin, Simon Penny, Tony Redhead, Cole Root, Alexander (Sandy) A. Sawchuk, Rebecca Tamblyn, Aurora Tucker, Glen Wexler, Holly Willis, and Audra Eagle Yun. Special thanks to Britt Salvesen, Curator and Head, Wallis Annenberg Photography Department and the Prints and Drawings Department, and Staci Steinberger, Curator, Decorative Arts and Design, at the Los Angeles County Museum of Art, whose enthusiasm for our exhibition and willingness to exchange ideas sustained and energized us.

Finally, I extend my heartfelt gratitude and admiration to curators Nikolay Maslov

and April Baca, who took the prompt and ran with it in directions none of us could have foreseen. And, as every exhibition is a collective endeavor, each member of our staff has contributed to the success of the exhibition, publication, and programming: Rene Balingit, Assistant Scene Technician; Trudy Cohen, Deputy Director; Emily Gray, Senior Museum Preparator; Lindsey Hammel, Associate Director of Education and Public Programs; Amy Metcalf, Senior Public Events Manager; Victoria Naser-Saravia, Museum Preparator; Steffanie A. Padilla, Education Program Coordinator; Allissa Payne, Finance & Visitor Services Assistant; Danielle Peltakian, Museum Registrar; Kathryn Poindexter-Akers, Exhibitions Manager; Grace Saunders, Exhibition & Design Assistant; Joanna Szupinska, Senior Curator; Hannah Waiters, Curatorial Assistant; and Alyse Yeargan, Collections Manager. Rita Sobreiro Souther, former Exhibitions Manager, oversaw the project in its critical moments of formation. Joining our small but mighty team at various stages of this project, January Parkos Arnall served as curatorial advisor when I stepped into the museum's directorship; Henk van Assen and Melissa Leone of HvADesign created sophisticated designs; Lindsey Westbrook executed brilliant editing of our exhibition and publication texts; Sarah Grace Faulk contributed research and fact-checking to this publication and curated a companion film series to the exhibition; Pete Kallinger expertly advised on selecting cameras from our collection to include in the show; and Timothy LeBlanc, Ebin Villarino, and Katie Weidtmann contributed their talents in the final weeks of installation.

Every work in *Digital Capture* represents an experiment at the front edge of technological change. We sense the breathless and the beautiful. We witness artists edging their way into thin air. This is high art. It is also a collection of remarkable precursors—premonitions of a world still mostly unimaginable in 1962, the starting point of the exhibition. Here we see early views and pioneering explorations of what is now woven into the fabric of everyday life—a digital world bewitched and bewildered.

PREFACE

5.25 OBSER-VATIONS ON DIGITAL CAPTURE

DOUGLAS MCCULLOH

I was going to back out of writing this introductory essay. I had the withdrawal email composed. This even though, early in the four-year gestation of this exhibition, I told the team I would certainly write a short preface for an accompanying publication. I enjoy writing and helped shape the early stages of this project before being deflected to other duties. But then I finally faced the page and, in doing so, faced the sweep of the exhibition. The way the digital revolution has utterly transformed our experience of the world. The fact that today, anything you can imagine is real. The flood of increasingly unmoored images. The tentacles of the internet, our omnipresent digital chaperone. Creation, hope, dreams, disruption, destruction. Then, of course, the host of brilliant and important California artists who have responded to every twist and turn, taking advantage of every unexpected trajectory and creating some of their own. And Southern California's central role in these technologies.

Each artist in *Digital Capture: Southern California and the Pixel-Based Image World* picked a specific stretch of the digital sea to explore. They did so with brilliance and economy. In my preface, meanwhile, I faced the entire ocean, every depth and wave and vanished shoreline. (The inescapable metaphor for the outpouring of images is *liquid*, writes historian of photography Clément Chéroux: "a stream, a flood, a sea."[1]) Confronting the torrent, the grim email virtually wrote itself: sorry team, impossible.

But then I decided to adopt an alternate view. *Digital Capture* displays stones artists have skipped across the ocean of digital technology. Each touch tells us something of the stone and something of the ocean. So I shifted my approach: I'd skip some stones. Pebbles, really. Offer glimpses and flashes, some useful illumination. The meaning of

this preface is already fading, a dilute drop in the overwhelming sea of media. I am no longer even sure what meaning is. My goal is modest. I will skip some stones, and I will aim them over 5.25 lucid lagoons of thought.

01 FROM TECHNO-UTOPIANISM TO TARNISH

Early digital art practice was awash in California techno-utopianism: the optimistic belief in the wisdom of crowds, a conviction that connection would foster dialogue and spur social progress. The earliest examples are saturated with joyful explorations of possibility. Within the structures of the military industrial complex and mainframe labs of Southern California were artists driven by radical experimentation. Should we feel nostalgia for nostalgia itself? (The earliest tech-art interactions were not necessarily placid. "In many ways the converging paths of technology and art during the 1960s was as much a clash as it was meeting," write John Beck and Ryan Bishop.[2]) We are all too aware of the coming tarnish: trolls and fakes, insidious algorithms, embedded bias, global digital surveillance, corporate monopolies, imperious tech titans. With the darker turn, the artists deployed other approaches: critique and countersurveillance, scrutiny and subversion.

"Ultimately," writes Roland Barthes, "photography is subversive not when it frightens, repels or even stigmatizes, but when it is pensive, when it thinks."[3]

The closer you look, the more complex things become. Within the networks, the location of seeing, or even of creation, becomes harder and harder to pinpoint. Is it the making, the posting, the actions of unseen algorithms, the profligate creations of AI, a like, a share, a modification? We are all channels now. The digital realm is presently a way *not* to be in the world. People lead lives as vehicles that generate documents, photographs, comments, selfies, captures, posts. All this creates an image landscape that photographic theory, in the traditional sense, seems woefully inadequate to map. In 2014, a digital lifetime ago, Trevor Paglen wrote: "Susan Sontag's seminal work has little to say about the infrared systems on a Reaper drone" while "applying Roland Barthes' ideas to billions of images in London's city-wide surveillance archives would be utterly absurd."[4] The questions are large. What is the relationship between technology, art, and life? Does anyone believe anymore that art can be radically transformative?

02 COULD HAVE BEEN

The world as it once was nips at our heels. When we look back through the prism of art, we see not only where we are, but where we could have gone. This kind of perceptive examination is, of course, the special domain of artists. Digital technologies proved unable to transcend human limitations, unable to deliver on early hopes of collaborative utopianism. This is especially disillusioning here in the falling golden light of California. Art and artists now focus on misalignments, contested purposes, surveilling the surveillers. They clash about the nature of the future and wistfully look backward/forward to what might have been. We have lost not just our vision, but our trust in vision and in photography as evidence. This is unsurprising: photographic creation and distribution systems are currently disconnected from photography's history. Instead, they must be viewed as descended from military intelligence efforts, satellite surveillance systems, Cold War laboratories, electrical engineering, signal processing, and early experiments in video and television. The planet pulses with machine signals, enmeshed networks,

and immense image databases. Humans are outsiders. "Not seeing anything intelligible is the new normal," summarizes Hito Steyerl. "Information is passed on as a set of signals that cannot be picked up by human senses."[5]

03 EQUALIZED MOMENTS

Digital time is strangely timeless—a vast plain of equalized moments. In the digital world, everything—past, present, and future—is *now*, at least in the only place that matters: the screen. Individual moments are inconsequential. The key is circulation, guided by algorithms of loving grace with their attendant surveillance powers and underlying profit motives. And this flow operates outside our traditionally linear conception of time. "It's still one earth," writes Stacey D'Erasmo, "but it is now subtended by a layer of highly elastic non-time, wild time, that is akin to a global collective unconscious wherein past, present and future occupy one unmediated plane."[6] And yet there is a paradoxical current within *Digital Capture*. The exhibition offers many examples of pioneering California artists using early digital technologies, and these works are marked by the possibilities and the limitations of that digital moment. They are of a certain moment, and we sense it viscerally and acutely. They are, in fact, indelibly time stamped.

04 OVERWRITING OUR OWN HISTORY

We live in an era of historical unconsciousness. America pretends to love history but practices amnesia. We like to remember until we need to forget. A headlong rush into the future requires that we jettison the weight of the past. Digital technology is perfect for the moment—technological change moves so quickly that it overwrites its own history. The immediate past fades like the contrail behind a jet. It is replaced by the now, then the future now, then the far future. More fundamentally, as tech theorist and critic Adrian Daub points out, "It's hard to remember the history of something that changes how history works."[7] As technology and the internet consume our history, *become* our history, they distort history itself. (Are you questioning whether we can retreat from the digital world into reality? Then you're among the hapless who haven't realized how fully entangled we are, how much the digital world *is* the world now. The two are no longer separate. Look it up on Wikipedia, or prompt ChatGPT to write a report.) Against this distortion-field backdrop, *Digital Capture* presents a California-focused history of art intersecting with technology. This is assured and confident, predicated on the idea that history is the facts, while art is the story.

05 A TIDAL FLOW OF PHOTOGRAPHS

The numbers are uncertain, and they climb quickly over time. A common citation is this: 3.2 billion images are shared daily, and 720,000 hours of video. Such numbers are splashed across the internet, and they seem plausible. After all, the world contains about 3.8 billion active smartphones. Inarguably, making and sharing photographs is now an immensely productive and overwhelmingly vernacular process. We are all cogs in the machinery of images, and we all carry on worldwide with ravenous enthusiasm. Consequently, the central characteristic of photography is no longer the image, but the volume, no longer a photograph, but a vast tidal flow of photographs. We dive through our screens into a sea of images, an infinity of information. Do we live among riches? Or are we, like the late Roman emperors, debasing the coinage—tossing our own contributions into the flow? Does each new image (or billion images) reduce the value of all?

Within this analytic framework, privileging selected images—as in an exhibition—would seem misleading at best, dangerous at worst. But artists and art can be seen as wresting meaning from the buffeting force of the flood, highlighting singular vision through the sheer persuasive power of resonant art.

An artist dips into the undifferentiated flow and produces a meaningful singular vision. The choral drone becomes a clear voice.

0.25 ARTIFICIAL INTELLIGENCE

The new burst of artificial intelligence image making seems an inevitable post-photographic visual development. The systems make use of the vast pools of images generated by digital photographic processes. AI image generation is an art of extreme abundance, of profligacy, of wanton excess. We might argue that humanity now produces its flood of images just to train machines how to see. Or that machines now produce images to teach *us* to see. In any event, AI images are meta-photography—photographs built by powerful processors and computational algorithms swirling together ripples left by billions of previous photographs. They are the offspring of our culture's photographic promiscuity mated with immense computing power. They pay homage to almost two centuries of photographic practice—the images we use to define and describe our world. AI is a voracious system that devours all previous photographs and shares them back. It is thus utterly photographic. It is also attentive, omnivorous, and inhuman.

Notes

1 Clément Chéroux, ed., with Linde B. Lehtinen and Sally Martin Katz, *Snap + Share: Transmitting Photographs from Mail Art to Social Networks* (Paris: Cernunnos, 2019), 8.

2 John Beck and Ryan Bishop, *Technocrats of the Imagination* (Durham, NC: Duke University Press, 2020), 5.

3 Roland Barthes, *Camera Lucida: Reflections on Photography* (New York: Hill and Wang, 1981), 38.

4 Paglen quoted in Joanna Zylinska, "Undigital Photography: Image-Making Beyond Computation and AI," in *Photography Off the Scale: Technologies and Theories of the Mass Image*, ed. Tomáš Dvořák and Jussi Parikka (Edinburgh: Edinburgh University Press, 2021), 238.

5 Hito Steyerl, *Duty Free Art: Art in the Age of Planetary Civil War* (London: Verso, 2017), 47.

6 D'Erasmo quoted in Jason Farago, "Out of Time," *New York Times Magazine*, October 15, 2023, 39.

7 Adrian Daub, *What Tech Calls Thinking: An Inquiry into the Intellectual Bedrock of Silicon Valley* (New York: Farrar, Straus and Giroux, 2020), 4.

INTRODUCTION

DIGITAL IMAGING AND SOUTHERN CALIFORNIA, A TRANSMUTABLE TERRAIN

APRIL BACA AND NIKOLAY MASLOV

Digital imaging is broadly defined as the capturing of an image using an electronic device—a digital camera, a scanner, a computer, a satellite. And to this day, whether its everyday users realize it or not, the practice retains a distinct historical and political inflection inseparable from its origins in Southern California's Cold War and space race research labs. Spanning more than six decades, from 1962 to the present, *Digital Capture: Southern California and the Pixel-Based Image World* forefronts artistic uses of, appropriations of, and interventions into digital imaging. From the technology's genesis in the military-industrial-scientific complex through its ubiquity in the contemporary present, the exhibition narrates the ideological, rhizomatic, and sometimes contradictory shifts that occurred as it was adopted for artistic ends. The show—and this book that accompanies it—attempt to complicate a deterministic narrative of technological evolution primarily informed by a Western, militaristic, and commercial viewpoint. The featured artists showcase a breadth of novel engagements and critical inquiries, especially by female-identifying, queer, and BIPOC artists.

Geographically anchored by two major industries shaping media and technology—Hollywood and Silicon Valley—California has been a pivotal space for artistic and technological experimentation.[1] And bound as it is to various geopolitical agendas, including the rampant militarization of its border with Mexico, it is also an ideological, political, sociocultural, and historical terrain. Its shifting stakes and broader role in global economies of visual digital culture have informed our understanding of what constitutes it.[2] This flexible understanding pays tribute to its many distinct transformations as a place "open and porous to flows" beyond the shifting national imagination.[3] Southern California especially, given its decades-

long history of scientific-technological industries and now-inseparable relationship with globally dispersed digital media, offers a rich grounding to explore the explosion of digital imaging in the last several decades.[4] That said, the exhibition approaches Southern California against its perceived coherence—against any easy definition as a region—to emphasize how it has served as a locus for cross-cultural, ideological, and global artistic exchanges. *Digital Capture* foregrounds Southern California as both a physical, topographical region and a concept with which myriad artists and artworks have intersected, in dispersed and nuanced ways.

Digital Capture presents works by more than forty artists whose practices have spanned numerous technological, computing, and imaging media. The featured artworks visualize how imaging technologies and computer hardware and software have matured and progressed, along with the different currents and concerns that have guided art making in the period in question. They consider how art is produced and distributed, in the process pointing to how mass communications systems of (first) television and (later) the internet would emerge and displace those that came before—a phenomenon that continues in a seemingly ever-accelerating way.

Most existing scholarship on the rise of imaging technologies has been devoted to their militaristic, scientific, and commercial functions, and so a core premise of the book and the show was to significantly expand critical dialogue on digital imaging via its use in visual art, specifically by detailing how the technology's local origins have shaped its global dispersion and vice versa. There has of course been a breadth of scholarly work devoted to the intersections of art and technology, but the origin story of digital imaging and its application within the arts has not yet been the subject of a significant research effort of this scope.

Mirroring the physical exhibition, this publication is organized around six thematic frameworks that we curators recognized in art that incorporates or comments upon digital imaging. They reflect on—to name but a few through lines—the ecological, domestic, and surveillance state, and issues of agency, representation, culpability, and connection.

"In Space, Time, and War: Digital Cosmologies and Militant Terrains" features artists who contend with the military-industrial complex, immigration, and the mutation of culture and identity across borders [PLATES 01-06]. It highlights what is frequently cited as the inaugural moment of digital imaging: a 1961 concept paper by engineer Eugene Lally at the Pasadena-based Jet Propulsion Laboratory titled "Mosaic Guidance for Interplanetary Travel," describing the possibility of a photo sensor connected to a computer to image stars and planets for navigation.[5] It also features images of deep space from NASA's Hubble missions, and traces the trajectory of digital imaging during the space race (the 1960s) and the budding relationship between space and empire. Artists Sheila Pinkel and Maggie Hazen explore how technological development and the commercial objects that result from it are often inseparable from militarism and its impact on the public cultural sphere. Huntrezz Janos expands on scientific communities' racial and gendered stratifications and claims to objectivity. EPOCH's virtual group exhibition is staged in a digital model of the Chet Holifield Federal Building in Laguna Nigel, California; the title, *Purgatorio*, references both the ziggurat-style edifice and the borderlands' position as a liminal, transitory, geopolitical site of containment in the era of an increasingly technological police state.

The onset of the 2000s saw digital imaging technologies converge with the internet. The artists and works in "The Image Is Infinite:

Archiving, Digital Reproduction, and Material Obsolescence" explore the digital image in the era of vast web-based photo archives and burgeoning AI image-generating systems [PLATES 07–13]. Chronologically, this section ranges from Sheila Pinkel's work engaging pre-digital scanning technologies, which enabled the creation of vast assortments of images, to Refik Anadol's new "AI data painting" created using advanced AI processing of 65,354 images from the California Museum of Photography's Keystone-Mast Collection. Andrew Norman Wilson examines how contract workers, disproportionately women of color, are charged with scanning at companies such as Google; fleeting glimpses of workers' hands and fingers evidence the gendered and racial labor that supports ever-expanding digital archives such as Google Books. Such repositories served as training data for the AI systems that began to gain widespread commercial and public adoption in the present decade, and Natalie Bookchin engages with the digital data bank as a repository for everyday gestures and imagery. Elisa Giardina Papa's *Archive Fever* (2011–ongoing) reconceives the browser as an intimate repository and confessional assemblage.

In the last decades of the twentieth century, advancing technologies became increasingly deployed in surveillance systems, remote-controlled weaponry, facial recognition software, and satellite imaging. "States of Seeing: On the Conditions of Looking" highlights artists who have repurposed these same technologies for more communal and interrogative ends [PLATES 14–21]. Trevor Paglen shines a light on the working apparatus of advanced imaging systems such as facial recognition, and Nonny de la Peña examines how technologies such as virtual reality can be journalistic and investigative tools. Lauren Lee McCarthy, Marton Robinson, and Dean Sameshima explore the relationships among desire, voyeurism, and surveillance in the age of the digital image. Mendi + Keith Obadike's work comments on how the standards and protocols of technology systems such as HTML carry systemized and structural violence over into purportedly "neutral" online spaces. Julia Scher contends with the mobilization of "new old" surveillance practices across early internet spaces. And a gallery dedicated to *Satellite Arts* (1977) by Mobile Image (Kit Galloway and Sherrie Rabinowitz) counterbalances the contemporary stakes and ramifications of "seeing" by emphasizing the early possibilities of satellite communication as a connective public medium.

"Digital Ecologies and Terrestrial Plains" features artists explicitly engaged with the ecological violence, material extraction, and technological detritus caused by the modern technosphere [PLATES 22–30]. This section explores the tenuous, sometimes colonial relationships reflected in the artistic and photographic "capturing" of natural landscapes. Trevor Paglen and Lynne Marsh contend with the aerial visualization, and consequential distortion, of surveilled landscapes. Works by Amir Zaki, Charles O'Rear, Goldin+Senneby, and David Maisel forefront landscapes transformed by digital technologies through environmental devastation or image manipulation. The complication of landscape and its function in California utopianism is visualized by Dynasty Handbag and micha cárdenas, who propose alternative imaginaries and queer futures and ends.

While physical technologies are, of course, bound to certain times and places, they can also open new artistic terrains and planes. "Media Matters: Spatial Antagonisms and Material Inquiries" features artists who began to use digital imaging tools designed with scientific and militaristic aims for creative and sociopolitical purposes [PLATES 31–41]. Artist-engineer A. Michael Noll was among the early pioneers exploring the aesthetic

possibilities of computer-generated images, an impulse Lee Mullican also pursued. Ahree Lee's *Disrupting the Industry* (2019) draws on the histories of gendered labor in computing. Rebecca Allen's recently digitized computer-punch-card animation *Flirt* (1974) explores the interplay between female sensuality, the materiality of desire, and technology. Videos by Steina and Woody Vasulka and Gerardo Velazquez demonstrate how artists pushed the limits of nascent digital technologies to create novel forms. Stan VanDerBeek's and Frank Malina's works emphasize the political atmosphere of their time. Lucia Grossberger Morales's interactive mixed-media installation *Huaca* (1987) transforms rote computational media into a ritual altar with an embedded interactive kaleidoscope; the work is a physical expansion of what constitutes (and is recognizable as) a computer while offering a novel interface through a familiar children's toy. Finally, John Divola's and Brandon Lattu's works examine the past, present, and futures of images and image-making tools.

The final and most capacious thematic section, "Glitch Domestic," expands on the stakes of digital and computer technologies as they entered the domestic and private spheres starting in the late 1970s [PLATES 42–55]. Drawing on the legacies of cyber-feminist and transnational cybernetic discourse, which has reframed the glitch as an interrogation of identity and an evasion of normative, static, or recognizable language, this section traces the conceptual, aesthetic, and ideological parallels between artistic experimentation, digital domestic technologies (such as baby monitors and Ring doorbells), and feminist, queer, and anti-racist artistic interventions into questions of embodiment. Works by Ilene Segalove and Nam June Paik foreground the television as an object, medium, and technology that reorganized domestic and social life, foreshadowing how computers (and later the internet) would do the same. Judy Malloy and Cathy Marshall's *Forward Anywhere* (1993), created while Malloy was an artist in residence at Xerox Palo Alto Research Center (PARC), draws on a series of email exchanges to reveal the hypertextuality of everyday conversations. Christine Tamblyn's work examines the historical omission of women from technology and scientific sectors. Lynn Hershman Leeson's installation comments on how technology both connects and isolates through the imagined world of its titular agoraphobic protagonist, Lorna. Sonya Rapoport highlights the psychological and affective relationship between the personal psyche and computational media to map a conceptual psychoanalytic "body." Sonia Landy Sheridan's and Barbara T. Smith's experiments with scanners were early explorations of how these home and office technologies might express concerns about gender identity and the body's materiality. Penelope Umbrico's rumination on the metaphorical death of CRT TVs thinks through the quiet interiority of the domestic spaces reflected in their screens. Elisa Giardina Papa and Valerie Green consider the often-intimate relationships between users, device screens, and their applications, many of which cater to home services or remote work. Brandon Lattu's work addresses the ubiquity of photo editing tools while also connecting with scanner experiments by artists in past decades. And Liliana Conlisk Gallegos presents a VR retelling of the genealogies of Latinx and Indigenous women in the Americas, particularly the United States and Mexico, to reevaluate their historical and contemporary significance; the work draws on the oral histories, mythologies, and archival remnants of these narratives to extend a cross-disciplinary and multimedia rumination on the possibility of decoloniality in virtual spaces.

The exhibition also features defunct, working, and/or contemporary hardware and cultural imagery created at different points

along the evolution of digital imaging. This includes, but is not limited to, the early digital handheld gaming device Blip, the Digital Game (1977), Charles O'Rear's iconic photograph and default Windows XP desktop wallpaper *Bliss* (1996), and the infamous Versace jungle-print dress worn by Jennifer Lopez to the 2000 Grammys, which by many accounts led to the birth of Google Images [PLATES 55, 27, 10].

BACKWARD AND FORWARD AGAIN

For their part, the essays in this publication offer a guide through significant historical developments in digital imaging in art while simultaneously disrupting and reimagining established narratives. Liliana Conlisk Gallegos—also an artist in the show—frames colonialism as a persistent technology in her essay "From Landscapes to LandTransEscapes: Decolonial Transmutations and Transvergence in Southern California Technological Art." She highlights how artists have used digital imaging technologies to challenge colonial narratives about the West, proposing alternative relationships among the land, its inhabitants, and technology.

April Baca's essay "When I Die, Plz Delete My History??!💀😩: Alternative Archives, Non-Precious Forms, and Collective Assemblages" rethinks historical assumptions about the archive by investigating its contemporary digital forms. It details how alternative archival assemblages, from browser tabs and search histories to personal photo collections, have long served as integral—albeit overlooked—archival forums laden with personal, artistic, and collective meaning. Foregrounding practices engaged with collecting and collating images, the essay argues for the significance of the personal digital repository and the necessity of its inclusion in conversations on the archive.

In "everyone will be taken into the future," Nikolay Maslov expands on the entanglement between Southern California and digital imaging technologies. The essay explores how these technologies have become ever more essentialized and integrated into contemporary life while simultaneously serving as foundations for new technologies, notably AI. The essay situates digital imaging within broader discussions of labor and environmental impact, calling for further critical inquiry that might ensure that our future(s) are actively shaped alongside these technologies rather than being helplessly driven by them.

Finally, a historical timeline covering the years 1906 to 2023 provides a useful chronology of key technological and artistic developments.

This publication, like the exhibition it accompanies, aims to recognize artistic practices that complicate, subvert, and render richer contemporary understandings of digital imaging and its history. The featured artists and essayists offer alternative perspectives and strategies to rethink digital imaging outside of its normative applications and definitions.

Notes

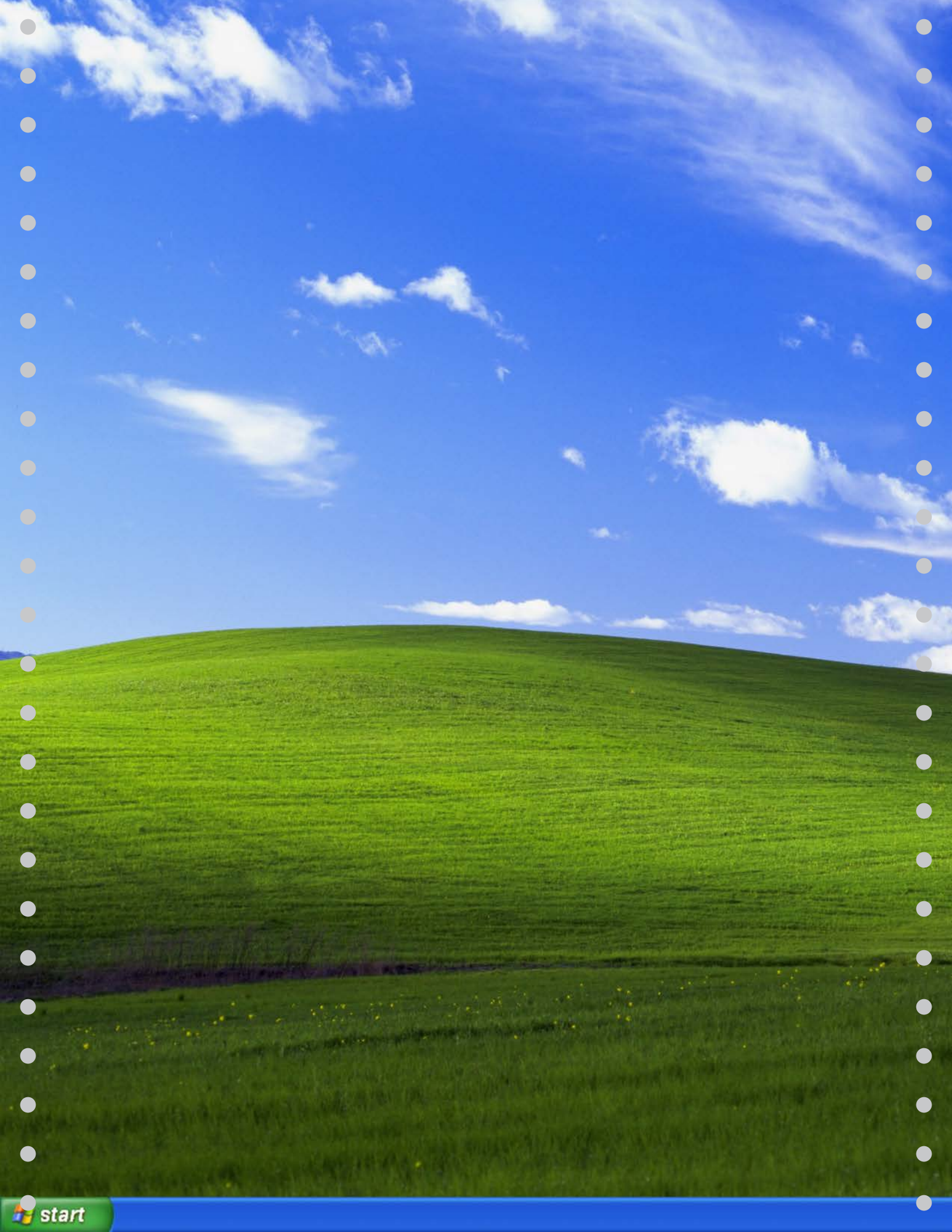
1 Silicon Valley's location in the San Francisco Bay Area and overlap with the countercultural movements of the 1960s facilitated what has become more commonly known as dot-com neoliberalism or hippie capitalism—a particular techno-utopianism specific to California that describes the convergence of big tech, postwar utopianism, and the orthodoxies of neoliberalism.

2 Iconic depictions of the state have long been used for branding and marketing digital technologies. Perhaps the most famous case is Windows XP's use of Charles O'Rear's *Bliss* (1996), depicting the rolling hills of California's wine country, as its default desktop image. Many artists, including those represented in this exhibition, have been quick to contextualize and complicate these oft-romanticized and utopian landscapes.

3 Doreen Massey, *For Space* (Los Angeles: SAGE, 2005), 29.

4 For a discussion of the mass landfill dumping of Hollywood DVDs throughout the Global South see Hito Steyerl, "In Defense of the Poor Image," *e-flux Journal*, no. 10 (2009): https://www.e-flux.com/journal/10/61362/in-defense-of-the-poor-image/.

5 Eugene Lally, "Mosaic Guidance for Interplanetary Travel," in *Space Flight Report to the Nation*, ed. Jerry Grey and Vivian Grey (New York: American Rocket Society, 1961). The term "pixel" (a neologism for "picture element") was first published in 1965 by Lally's JPL colleague Frederic C. Billingsley.


start

FROM LANDSCAPES TO LANDTRANSESCAPES

DECOLONIAL TRANSMUTATIONS AND TRANSVERGENCE IN SOUTHERN CALIFORNIA TECHNOLOGICAL ART

LILIANA CONLISK GALLEGOS

The ancient Greeks viewed natural environments as scenes of divine activity, with Thales, an early Greek physicist, positing that "all things are full of Gods."[1] Their concept of wilderness—ἔρημος (desert) or ερημιά (desertic)—referred to isolated spaces devoid of humans and sparse in flora and fauna. Rather than untamed nature, it was the absence of resources—making it difficult or impossible to sustain human life—that distinguished such regions. Moreover, for the ancient Greeks, natural places abundant in flora and fauna but free from human presence were not seen as wild, but rather as "virgin" nature, reflecting patriarchal fantasies of purity before an imminent penetration by man.

The modern Western understanding of untamable and feared nature as something separate and outside of civilization, with the potential to endanger humans, is a recurring perceptual-logical pattern that traces as far back as 360 BCE in the mythological concepts (sometimes referred to as scientific hypotheses) of the antipodes and the antichthones, referring to an upside-down world located on the other side of the planet, diametrically opposite the city-state of Athens, whose monstrous and backward inhabitants experience life head down and feet up.[2] In his *De situ orbis libri III* (ca. 43 CE), the earliest known Roman geographer, Pomponius Mela, divided the Earth—which he placed at the center of the universe—into five zones, only two of them habitable. Of the two life-holding zones, only the northern temperate zone was known because passage to the other side was believed to be impossible: "The southern was unattainable by people of the north because of the necessity of passing through the unbearable heat of the intervening torrid zone in order to reach it."[3]

These concepts stem from an attempt to draw out a totalizing landscape of the spherical Earth into inhabited, habitable, uninhabited, and uninhabitable climate zones. A supposedly

organic border on the Earth's sphere protected anybody who dared breach it from certain death. This theory or belief accompanied a tangible fear of the unknown wilderness as an enemy, an inherent threat to civilization. The antipodes theory/mythology evolved to denote individuals residing outside the boundaries of the known world as wild Others. The Western human self, empowered with the idea of being outside and separate from that nature, regarded it with either horror or a desire to morph it into something conducive, productive, to its goals and vainest desires.

Aspects of this logic arrived in the Americas with the European explorers and, soon enough, settlers. It was the late fifteenth century, the moment of the birth of European modernity, which distinguished the then-present time as Christian from the pagan Roman and Greek past. As expressed by David R. Klein, the modern Western concept of "wilderness" has its roots in Judeo-Christian fundamentalism, in the formulation of city-states "under God." To them, the separation of the urban dweller from nature was considered a desirable outcome of civilization. Nature was not perceived as a respected ally necessary for the survival of the species, but as an obstacle, something to be tamed and controlled, a threat but also "the raw material out of which man has hammered the artifact called civilization . . . an adversary to be conquered."[4] To the settler, nature was an enigma to force into conformance with a cosmovision of the "abstract single, human, and male all-powerful God of Judaism, Christianity, and Islam."[5]

Finding roots in their own antiquity, namely ancient Greek and Roman wall paintings, modern Western European perceptions of landscape as something ripe for interpretation were cemented in the Renaissance, when artists began to view landscape as subject. The notion of civilizing the natural landscape, akin to the "civilizing" efforts imposed on other cultures to conform to Western European norms, is exemplified in seventeenth-century landscape art. In these works, painters assumed a godlike role, manipulating landscapes to create idealized representations reflecting their subjective cultural ideals of harmony and balance, embedding their vision of "perfection" as ideal in their portrayals of nature. Yet despite its embodiment of civilizing ~~supremacist~~[6] ideology, the landscape genre was initially regarded as lowbrow; depictions of untamed natural scenery were hierarchically understood as inferior to "superior" and more civilized subjects representing European "refinement," for instance mythological, religious, classical, and other allegorical depictions.[7] Then in 1800, Pierre-Henri de Valenciennes published *Éléments de perspective pratique à l'usage des artistes* (Elements of Practical Perspective for the Use of Artists), and that began to change. But still, the subsequent rise in prestige of the landscape genre in art was tied directly to increasing valuation of control, manipulation, and "enhancement" of nature by artists and others.

In retrospect, it is easy to identify parallels between the evolution of landscape painting as a genre and developments in colonial history, one major example being perceptions of the wilderness in the Indigenous lands that are now referred to as the United States. Both align with the tradition of viewing natural spaces as perilous because they have not been intervened in or exploited by humans, indicating their assumed potential malleability and also the imagined necessity of such a transformation for their increased valuation. Colonialism and expansionism found in all this a perfect justification for seizing lands and resources and erasing Indigenous peoples. Landscape painting was also a means to claim ownership of colonial territory, or to reminisce about territories since recovered by the Indigenous peoples from whom they had been stolen.[8]

Colonialism is the practice of gaining complete or partial political dominance over another nation, settling it with colonists, and exploiting its people and resources for economic gain. Coloniality, as described by Aníbal Quijano and Michael Ennis, is the continuation of this logic with the goal of maintaining the matrix of power structures imposed during colonial times.[9] Walter D. Mignolo argues that coloniality is the darker side of Western modernity, once driven by Christian theology and later by the dictates of neoliberalism.[10] In his psychoanalytic studies of colonialism, colonizers, and the colonized, Frantz Fanon elaborates that colonialism not only subjugates native people but also distorts and destroys their past, present, and future.[11]

The "perverted logic" of coloniality, a kind of sociopathic gaslighting, affects both the colonized and the settlers, blinding the latter to their own ~~supremacist~~ ideologies and preventing them from empathizing with or appreciating alternative forms of development and civilization. This blindness also extends to the perception and depiction of inhabited lands as uninhabited—a key tactic of colonialism. This disconnect denies the reality—in other words, makes it unrecognizable to the gaze of the newcomers, limited as they are by the logics of coloniality—that these lands were already occupied and flourishing before colonization.

From the 1600s to 1860, the formation of the United States produced a "collapse of indigenous Indian ecologies and the incorporation of a European ecological complex . . . legitimated by a set of symbols that placed cultured Europeans above wild nature, other animals, and 'beastlike savages' . . . an image of nature as female and subservient to a transcendent male God."[12] The logic of coloniality, which views the individualistic self as separate from nature and others, reinforced preexisting gender hierarchies in newly formulated racial hierarchies. As the United States expanded westward, settlers appropriated lands and resources, some of which had belonged to white Californio settlers, but most of which were owned and/or occupied by Indigenous, mixed-race Indigenous, or Afro-Mexican families who had inhabited those lands for centuries.[13] Anti-Mexican, anti-Indigenous, and anti-Brown and Black sentiment peaked in the mid-1800s, when expansionists wanted the entire area of what is now the western United States to stop being part of Mexico. Eruptions of anti-Mexican Anglo nativist sentiment arose in militia movements such as the Bear Flag Revolt (1846) and the later full-on Mexican-American War (1846–48), and animosity only increased with the start of the Gold Rush in 1848.

The roots of the logic of coloniality extended beyond the local conditions, competition, and conflicts in the gold and silver mines. They were rooted in an attempt to impose a specific version of the American landscape from sea to shining sea. White settlers' and politicians' failure to acknowledge the diverse communities already thriving in the inhabited "wild" Western territories reflected an established racist tradition found in "the migrating Yankee's anti-Mexican cultural predisposition."[14] This bias shaped political ideologies, envisioning the region as a white settler haven that required a disregard of the diverse communities already thriving there. This racist logic entered multiple propaganda efforts across the West and Southwest aiming to manipulate the political "landscape" (as it is often called) and mold the perception of the "nature" of people to align with ~~supremacist~~ perspectives. It was not white Mexicans but Indigenous and mixed-race Mexican peoples who were caricatured as bandits and braves in posters, postcards, dime novels, and, later, Western films like the silent short *Kidnapping by Indians* (1899), which concretized the

(complex) portrayal of the multifaceted, heroic white cowboy and explorer-settler versus the oversimplified, one-dimensional "wild" and "untamable" Indigenous and Mexican people. Never mind that the latter were the actual victims of Anglo ~~supremacist~~ imposition, defending their ancestral lands and heritage. Popular depictions helped justify the theft of property, the raping of women, violent extermination via lynchings and hangings, and the illegal repatriation of Mexican, Indigenous, and other people who just "looked Mexican," and not only during this moment in history. There were also other clear socioeconomic and political agendas fueling popularized negative representations of Indigenous and Mexican people and the continued intervention in and overtaking of already-inhabited lands, theft of existing homes and locales, and exploitation of natural resources.[15]

Westward expansion was declared ended in historian Frederick Jackson Turner's 1920 paper "The Significance of the Frontier in American History," which described the colonial settlement of the frontier as decisive in shaping the American character and culture. Turner's notion of "winning a wilderness" allowed no thought outside a framework of colonial ~~supremacy~~ and individualism. This perspective, operating hand in hand with the earliest depictions of wilderness in Western landscape painting, presupposed the white Western individual as distinct and separate from nature.

In the nineteenth century, landscape art became more interpretive and less concerned with idealization. But at the end of the day, landscape was still understood as an object to be either civilized or completely reimagined in the perception of the artist. Also during this pivotal period, a sudden interest arose among Anglo Americans in preserving and protecting wilderness areas. This may seem contradictory, but as we shall see, domination and conservation, seemingly in tension, were essentially two sides of the same coin. And just as the settler colonial attitude toward Western lands was shifting from conquering the frontier into preservationism, photography came along.

LANDSCAPE AND PHOTOGRAPHY

In the US West in the nineteenth century, landscape photography was largely deployed in the service of preserving the "wild" beauty of the land in the face of industrialization and resultant ecological decline. Landscape photography also perpetuated certain mythological aspects of the US West, previously only depicted in paintings and stories, to Easterners. Photographs served as a lure for tourists and migrants, documenting the terrain, weather, and wildlife as resources for future settlers. They supplemented the US Geological Survey's mapping expeditions. They detailed the landscape for the transcontinental railroads and other construction efforts serving the goals of capitalist coloniality.[16] And they showcased the ways in which the landscape had been "improved" by the hand of Western civilization.

One incredibly impactful purpose of photographs was to support conservationist lobbies seeking to "protect" natural "public" lands. Photographs played a crucial role in campaigns leading up to the inauguration in 1916 of the National Park Service, the bureau responsible for protecting and preserving (at first) thirty-five national parks and monuments. National parks, as institutionalized colonialism, have been instrumental in the perpetuation of colonial power, reinforcing as they do government ownership of what would otherwise be Indigenous lands. Colonialist toponymies and allegorical references in national park place names romantically likened newly

discovered landscapes to European homelands to establish organic ownership.[17] National parks are both symbols of, and direct physical enactments of, imperial power, a continuation of the settler logic of coloniality already present in the Western landscape genre.[18] The national parks system served multiple purposes, but one that stands out in colonial history is the erasure of settler colonial violence—a displacement that had to occur to make most of the parks a possibility.

Another part of the colonial agenda evident in the formation of national parks was the legalization of Indigenous displacement.[19] The US Supreme Court's 1955 ruling in Tee-Hit-Ton Indians v. United States even denied compensation to displaced Indigenous tribes, extinguishing their aboriginal property rights via the colonial-era doctrine of discovery and solidifying Congress's continued authority to dispossess Indigenous peoples of their traditional lands. Justice Stanley Reed justified the decision by writing that according to the doctrine of discovery, "as Indians, they were to be treated just like the other 'savage tribes of this continent' whose rights have been defined by the Supreme Court's Indian law."[20] And despite recent efforts to incorporate the cultural heritage of the original peoples into the parks' narratives, this mostly empty gesture of performative recognition allows settler colonial erasure and dispossession of Indigenous peoples to persist in the name of a Western-centric take on environmentalism.[21]

LANDSCAPE AND COLONIALISM

Tracing the history of the landscape genre and its intertwinement with colonialism and expansionism reveals a dynamic mutual influence between art's assessed value and the incorporation of technology into artistic practices. As we have seen, Western European standards judge the value of art according to hierarchical frameworks rooted in a logic of coloniality whose ~~supremacist~~ premises are invisible to the uncritical mind. Today, the art world is confronting questions far beyond the photographic about what constitutes meaningful or legitimate uses of technology in art, and what forms of technology are considered valid artistically. To broaden our perspectives on the potential intersections of technology, art, nature, and landscape, it becomes imperative to escape current imposed perceptions and explore alternative approaches to the relationships between self, nature, art, land, and others.

The typical Western European perspective that idealizes land as an object and capturable component of nature, prime for cultivation, transformation, interpretation, and/or conservation, contrasts starkly with Indigenous paradigms of land as intertwined with community, self, art, nature, architecture, and science. In the latter worldview, landscape is not a static object to be captured but an active subject enabling possibilities, following the movements of nature and people, evolving, morphing, and interacting in land-specific manifestations of artistic and scientific transvergence. This is why Indigenous artists often depict landscapes symbolically and iconographically, through representations that require cultural context and an understanding of ancient knowledge, stories, and traditions that are shared and passed on within communities. Indigenous landscapes are not about external individual perceptions where interventions are imagined to be required. These landscapes integrate materiality and ritual significance, relying heavily on the interconnectedness between humanity and nature while drawing from communal cultural experience.

Such is the case with the weaving of sacred landscapes in Mixtec codices and the textiles of multiple Indigenous nations of

the Americas. While the Western European interpretation reads weaving as a way to bring landscape into the cultural realm and "claim control over natural forces," textile artists who have kept symbolisms and traditions alive for generations refer to themselves as weaving their cultural values, feelings, and even themselves into the landscape in a way that also includes ancestors' hands.[22] In such weaving traditions, depictions of landscapes present an opportunity to learn from nature and collaborate with it, to document both memory and the inevitable yet welcome processes of movement and change, since stagnation and static-ness are death. The manifested connection between culture, history, the living, and ancestors sustains the transmission of knowledge and traditions in a way that preserves the interconnectedness of nature, land, self, and community and promotes its sacredness and importance.

Profound interrelationships between geographically disparate Indigenous tribes reveal broader communal practices of exchange woven into the creation of artistic and technologically vibrant living landscapes. Such an example is Chaco, a network of archaeological sites in northwestern New Mexico cherished and maintained by the Hopi, where extensive exchanges flourished throughout the Indigenous Americas. Thousands converged here to learn the art of mutually influencing—rather than unilaterally dominating—the elements, fostering harmony with nature. Parallel to a holistic worldview in contrast to Western European individualism is the impossibility of separating art from natural science and cosmic knowledge. Chaco, as a hub for culture, science, and spirituality, was intricately shaped to harmonize with the landscape and celestial rhythms. The walls were meticulously aligned to the sun and the stars, and this architecture served to mark the passage of time, including daily cycles, equinoxes, and optimal periods for agricultural activities like planting and harvesting. Here the landscape was perceived not as something outside, but from within, as an interactive collaborator-designer.

Chaco's architecture, as a living art form akin to an immersive painting, blending seamlessly and inseparably with the ever-changing people and fauna in its natural surroundings, is the paradigmatic example of what I call a landTransEscape, or a form that escapes Westernized perceptions of nature and its representations. This perspective rejects the notion of human individualism, superiority, or dominion over nature. Instead of attempting to subjugate or elevate nature, it adds complexity to understandings of technology by embodying a harmonious coexistence, and it amplifies nature and the landscape through an analogously immersive experience that extends and enhances the interconnectedness. These examples of Indigenous perceptions of landscape, art, and technology escape the colonial desire for changelessness, individualism, and the hetero-masculine bravado of manifest destiny that is so dependent on binary and border thinking as well as its continuously reaffirmed hierarchical logics.

As much as technologies have reified eurocentric hierarchical ideological relationships between gender, race, lands, and space, digital technologies have also served as interventions or hacks to interweave and reconnect BIPOC and other artists to both ancient and contemporary ways of perceiving self, others, land, and space—cultural aspects that have historically been undervalued or ignored by mainstream Anglo society. The language of media arts, with its privileging of immersion, interactivity, and plural dimensionalities, parallels that found in the Indigenous cosmologies, beliefs, and practices, which, it is becoming clear, represent the future into which eurocentric perspectives are only now arriving.

Digital technologies are being harnessed to de-Westernize, counteract, and resist coloniality by facilitating the materialization of decolonial options and enabling a return to modes of thought aligned with legacies of BIPOC cosmovision, perceptions, and transborder logic. For example, in Jakarta, motorcycle taxi drivers are creatively using digital technologies to challenge surveillance systems that threaten their livelihoods, blending traditional methods with modern tools.[23] And in rural New Zealand, Peter-Lucas Jones and Keoni Mahelona are pioneering the development of AI technologies rooted in Indigenous knowledge and values to address community needs and environmental sustainability issues, diverging from mainstream AI narratives that prioritize profit and technological progress.[24]

New media artists are likewise utilizing digital technologies to reimagine landscapes and explore alternative and transvergent worldviews, often specifically challenging the constraints imposed by geographical and ideological boundaries. Innovative works rooted in anti- and decolonial perspectives have been prominently showcased in exhibitions such as *The Future Past v. Coloniality: Decolonial Media Art beyond 530 Years* (online); *Still Present* (Berlin Biennale for Contemporary Art, Berlin, 2022); and *Making Art History: Decolonizing the Canon* (Krannert Art Museum, Champaign, Illinois, 2014).[25] These presentations and more, whether they invoked the term or not, centered the concept of transvergence as detailed by Marcos Novak, referring to the convergence of multiple overlapping and/or conflicting identities, issues, materials, and perspectives, leading to unexpected and alien territories distinct from the limitations imposed by colonial perspectives.[26]

LANDTRANSESCAPES

Several digital and new media artworks showcased in *Digital Capture: Southern California and the Pixel-Based Image World* reaffirm the enduring legacy of "epistemic disobedience," to quote Mignolo, and the pursuit of the decolonial in the realm of media arts:

> Epistemic disobedience leads us to decolonial options as a set of projects that have in common the effects experienced by all the inhabitants of the globe that were at the receiving end of global designs to colonize the economy (appropriation of land and natural resources), authority (management by the Monarch, the State, or the Church), and police and military enforcement (coloniality of power), to colonize knowledges (languages, categories of thoughts, belief systems, etc.) and beings (subjectivity).[27]

Digital technologies are versatile tools that can be wielded for various purposes. They have served as instruments of power, perpetuating colonial ideologies and reinforcing discriminatory practices through the exploitation of personal data. Scholars such as Shoshana Zuboff, Joy Buolamwini and Timnit Gebru, Safiya U. Noble, Antoinette Rouvroy and Bernard Stiegler, Bernard E. Harcourt, and Frank Pasquale have highlighted how technologies have been weaponized to advance coloniality and its ~~supremacist~~ logics.[28] Said weaponization frequently takes the form of data necropolitics, as described by Antonio Pele and Caitlin Mulholland, in which data is used to oppress, discriminate against, and ultimately eradicate certain individuals or groups.[29]

But according to Mignolo, the era of dominance through coloniality is reaching its conclusion. According to him, there are two primary dynamics disrupting Western

hegemony.[30] The first is de-Westernization, or increasing awareness of Western European–dominated perceptions, knowledge, economics, and politics. The second is decoloniality, which is an ongoing delinking from the colonial matrix of power that upholds Western modernity. The general movement, Mignolo asserts, is toward envisioning and creating global futures where people and land are no longer exploited in the reckless pursuit of ~~supremacy~~ and wealth accumulation.

Transvergence blends diverse elements and encourages the exploration of hybridity, complexity, interconnectedness, and transborderism (questioning borders and challenging their boundaries). This leads to unexpected yet already-existing territories and landTransEscapes in art, a positionality in which artists problematize and challenge Western European (colonial, static, preconceived, individualist, ~~supremacist~~) perceptions of land and space while proposing alternative perspectives. LandTransEscapes reflect and record processes, transformations, or transitions thanks to a conscious recognition of human intervention, natural processes, and the many possible combinations of both. This term also suggests that there is a dynamic, ever-changing relationship between land, the surrounding environment, the ecosystem, history (whether known or yet to be defragmented), multiple presents, and possible futures. LandTransEscapes also involve cultural, social, and ecological shifts that contribute to reshaping perceptions and experiences of landscapes beyond coloniality. Characterized by its exponential growth and transgenerational evolution as well as digital technology's parallels with Indigenous technological cosmovision, anti- and decolonial pixel-based new media art offers novel avenues for landTransEscapes. This movement also contributes to a continued legacy of cultural and land reclamation.

David Maisel's *The Mining Project (Butte MT 3)* (1999) explores the intersection of human exploitative activity, environmental transformation, and cultural memory as they manifest in the image of a wounded landscape [PLATE 25].[31] The archival pigment print captures a colorful landscape scarred by industrial mining activity, with traces of violent, prominent, and continuous human intervention evident in the altered terrain. The title hints at a particular location linked to mining, a practice that has profoundly altered landscapes and societies throughout the US West. This process was instrumental in the colonial endeavor of assimilating these areas into the Anglo expansionist empire. The captivating visual allure of the image is a haunting reminder of the mesmerizing effect of human exploitation during the era of booming slavery. This echoes a continuum of classist exploitation that persists in contemporary society.

Depicted in *The Mining Project (Butte MT 3)* is a cross section of coloniality recorded in the earth's flesh, for example in the repetitiveness and homogeneity that the exploitation of mines produces on the topography and on the miners themselves. Gazing at the photograph, we can't help but imagine the numerous other aspects of our natural world that continue to be exploited but remain hidden. This entails recognizing and confronting the exploitation of natural resources—land, water, minerals—and its inevitable effect on environmental degradation and violations of the rights—economic, cultural, and otherwise—of BIPOC communities and other structurally disadvantaged sectors.

Maisel's vivid manifestation of land exploitation transforms the traditional take on landscape into a scene of environmental injustice, where artistic representation no longer suffices. It exemplifies this shift, albeit from an aerial perspective

akin to "the eye of God," which provides a somewhat detached and abstracted view of the landscape, but ultimately serves to emphasize the scale and impact of exploitation on the land. Here, landscape photography serves as historical and forensic documentation, revealing the deep extent of environmental destruction.

Lynne Marsh's short digital video *L.A.* (2003) delves into the convergence of urban landscapes and human mobility [PLATE 26]. It portrays a group of five skydivers, all seemingly identical, underscoring the repetitive and derivative nature of coloniality now exemplified in electronic and technological representations of bodies, space, and terrain. The skydivers glide gracefully over a simulated satellite view depicting cities and coastline, ostensibly greater Los Angeles. Dressed in black, they hover in a repetitive choreography above the urban and natural landscape, presented in a 3D simulation crafted from a moving flat map, creating the illusion of movement. This simulation prompts reflection on the constraints of technology in capturing the essence of land and city, highlighting the inherent limitations in rendering such complex environments. Yet it is also demonstrative of the illusions that landscape can produce.

By centering the motion of individuals suspended above an urban backdrop whose roads, topography, sounds, and colors can only be inferred through projection or a blend of memory and imagination, Marsh underscores the interplay between human movement and the constructed environment, which is deeply influenced by ideological viewpoints. Moreover, Marsh's depiction of Los Angeles, a dynamic and diverse metropolis, as a stagnant 2D map on the brink of infiltration by the identical skydivers subverts conventional portrayals of landscapes as immutable and fixed. This juxtaposition boldly challenges norms by presenting a clear pastiche of the cis-hetero masculine bravado inherent in the westward expansion ideology or the logic of coloniality, entwined with digital and technological methods used to manipulate and stage landscapes. Despite their ambiguous presence, the five flyers remain suspended, never depicted as actually making physical contact with or penetrating the landscape.

L.A. emphasizes the fluidity and adaptability of urban spaces in direct relationship to the imagination of the viewer, suggesting that landscapes are not fixed entities, but dynamic and evolving environments shaped by possible human interaction. In the artist's words, "At the same time as provoking pleasure in the boundless freedom of maneuvering above a populated space, the video projection also hints at a possible menacing presence hovering over the city like a plague or virus."[32] Marsh's work adds to the idea of landTransEscapes by expanding the notion of landscape to include urban environments and emphasizing the ambiguous presence of power as an exploratory yet possibly menacing human activity striving to shape a land that is there somewhere and yet somehow escapes attempts to capture or penetrate it. By portraying landscape in this way, Marsh invites us to reconsider perceptions of urban space and recognize the complex interplay between nature, technology, and human agency in shaping the world around, above, and below.

Trevor Paglen's *KEYHOLE-IMPROVED CRYSTAL from Glacier Point (Optical Reconnaissance Satellite, USA 1860)* (2008) contributes to the proposal of landTransEscapes by challenging conventional perceptions of landscape via elements of surveillance and hidden infrastructure [PLATE 28]. The photographic print features Yosemite's Half Dome, a majestic rock formation famously captured by Carleton Watkins in the 1860s (at the conclusion of the westward expansion),

then by Ansel Adams in the 1920s (against the backdrop of the establishment of the national parks). Upon closer examination, viewers will discern white streaks, signaling the presence of optical reconnaissance satellites. This highlights the intrusion of technology into natural spaces and underscores the mission to perpetuate the exploration sequence of coloniality by intersecting star trails in outer space. Apparently, nothing escapes settler colonial expansionism.

The juxtaposition of natural landscapes with visible technological interventions challenges us to reassess our perception of scenery and acknowledge the pervasive impact of surveillance technologies on our environment. This influence echoes the historical legacy of westward expansion in the Americas, where Indigenous lands were altered and surveilled. Paglen's work offers a fresh perspective, seamlessly blending modern technology into landscapes while subverting that technology's intended use. To monitor the spacecraft, the artist tapped into a database created by amateur astronomers initially trained by the US government to track Soviet satellites. Upon retirement, these individuals redirected their expertise to tracking US satellites as a hobby.[33]

Paglen's artwork embodies the concept of transvergence by presenting layered interpretations of natural landscapes through technological means historically associated with colonial dominance, now repurposed to expose them. It contributes to the notion of landTransEscapes by portraying spaces shaped by both natural and technological forces and drawing parallels between the grandiose aspirations of geographical and celestial ~~supremacy~~ inherent in colonial endeavors that remain and continue to expand.

Dynasty Handbag's digital video *Oh, Hummingbird* (2017) explores themes of truncated natural migration, displacement, labor injustice, the failed male gaze, and the destruction of nature and humanity due to human interventions through a musical performance set against psychedelic imagery [PLATE 23]. Wearing a skin-colored bodysuit with marker-drawn dangling breasts and a curly pubic bush, matching crocs, and a blonde wig with fake hot-pink flowers, the protagonist (the artist herself) presents an exaggerated take on the male gaze and its stereotypical object of desire, a grotesquely sexually enhanced Barbie type in full makeup. She sings a cautionary tale while playing the lute, that iconic Western European instrument from the medieval, late Baroque, and Renaissance eras, which appears and disappears, as it is both imagined and as actual as the artist herself and the landscapes, flowers, and hummingbird with flickering wings that comes and goes with the rhythm of the music:

> Oh, hummingbird just a word, do be careful when munching that flower because it may have been rained on by toxic clouds of polluted gas . . . in a cycle of life that is more like a straight line to death.[34]

The piece incorporates elements of performance, video, and multimedia to convey its message and the experience of movement across landscapes both physical and metaphorical, making us feel as if we have arrived too late to a party that promised to be great, but ended up a fluke. The idea that the land is poisoned, and that somehow, as an extension of the chauvinist perception, the feminized body is also poisoned, is a wink at the inevitable collapse of the cis-hetero ideals of ~~supremacy~~ and coloniality. It is an ode to the failure of coloniality and its mirages. The hummingbird, as fragile as it is strong and resilient, represents the warrior's journey of individuals or communities navigating unfamiliar territories, continually forced to adapt to

new and ever more dangerous environments. By superimposing the hummingbird against various landscape settings and through song, Dynasty Handbag highlights the cost of intervening in landscapes, migration as a natural phenomenon that carries inherent dangers, and the ways in which nature, animals, and humans have paid—indeed, have been "treated like poop"—by exploitative expansionist manipulations.

Oh, Hummingbird engages in the formulation of landTransEscapes by challenging conventional notions of feminine bodies, reality, imagination, psychedelic projections, nature, and the artificial, which leads to a questioning of the trans-dimensional borders and boundaries of coloniality. The piece suggests that landscapes may become unconfined by geopolitical and ideological divisions, and proposes an alternative, obviously intervened-in, "truth-telling" landTransEscape that openly decides and provides movement to formerly fixed depictions, highlighting an interconnectedness and fluidity that remains when such interventions are owned, where the free movement of people, ideas, and cultures finds its power in new media artistic performance, painting a fluid form of pixelated landTransEscape. Dynasty Handbag's use of multimedia techniques and humor further emphasizes the dynamic and ever-changing nature of landscapes, encouraging us to consider the failed legacies of coloniality depicted in the degradation of the ultra-feminine blonde body, hacked lute song, dead tree stumps, and queered dichotomous depiction of a feminized and impenetrable, yet surely someday penetrable, nature. The artist invites us to reconsider the complexities of power dynamics and the legacy of landscapes in the modern world.

micha cárdenas's *Sin Sol / No Sun* (2020) is a projected virtual environment installation and augmented reality game that offers an interactive landTransEscape by exploring the impact of environmental degradation and climate change on marginalized communities, particularly those in the Global South [PLATE 22]. The piece incorporates elements of digital media, performance, storytelling, and poetry, all presented by a trans Latinx AI hologram named Aura. The work addresses the interconnectedness of land, culture, identity, technology, and social justice.[35] The title already suggests a world without sunlight, evoking environmental catastrophe and ecological imbalance. By highlighting the consequences of climate change, cárdenas draws attention to the ways in which nature is transformed by human activity and industrial development.

The artwork foregrounds the experiences of communities that are disproportionately affected by environmental harm, using multimedia techniques to elicit empathy and amplify the perspectives of marginalized groups that challenge dominant narratives about climate change and sustainability. Centering the perspectives of Indigenous peoples, migrants, trans people, and other marginalized communities, *Sin Sol / No Sun* invites us to imagine alternative futures and possibilities for collective action. Through its immersive and interactive elements, the artwork places us back into the landscape, where we can superimpose a digital landscape over our analog one, producing awareness of the interconnectedness of humans, animals, and land, and encouraging us to reflect on our own relationship to the environment and the role of technology in shaping our understanding of land and landscape.

By fostering dialogue and awareness around issues of environmental justice, *Sin Sol / No Sun* contributes to ongoing discussions about the intersection of art, activism, and ecological resilience. Through its innovative use of multimedia and emphasis on marginalized voices, this AR experience

challenges viewers to reimagine the relationship between humanity and the natural world and to envision a more just and sustainable future.

I was honored to be included in the *Digital Capture* exhibition with my work *The Coyolxauhqui Imperative 2020* (2020), a digital video depicting a virtual-reality world that exemplifies landTransEscapes by reimagining traditional landscapes and narratives through what I call a *transfronteriza* lens [PLATE 42]. The work remixes a simultaneous past, present, and future through 2D and 3D art, photography, and spoken words in Nahuatl, English, and Spanish as well as sound effects and historically accurate reproductions of ancient Mexica music.[36] Drawing inspiration from the Nahua story of Coyolxauhqui[37] and Gloria Anzaldúa's concept of the Coyolxauhqui imperative,[38] the piece challenges conventional understandings of time, gender, identity, and power dynamics by emphasizing interconnectedness in shared experiences of coloniality among the colonized, the settlers, and their descendants.

Through vibrant imagery, symbolism, and animated simulation, the piece creates a space where boundaries blur and new possibilities emerge in reference to the impact of colonization and coloniality in the Indigenous feminine of the Americas, including Mother Earth. The use of mixed media and references to culturally specific feminine archetypes such as La Malinche (The Traitor), La Llorona (The Weeper), and La Chingada (The Fucked-Over One) disrupt linear cis-hetero masculine narratives, inviting viewers to explore intersectional identities and histories. By embracing fluidity and transformation, *The Coyolxauhqui Imperative 2020* transcends traditional notions of landscape, offering a dynamic and inclusive vision of the world from the perspective of a *transfronteriza* consciousness.

This example of a landTransEscape is immersive and collaborative, transcending the traditional role of the artist as the sole producer or even as an individualistic element in binary opposition to nature and others. It embodies the collective consciousness, echoing shared experiences and perspectives. Through expanded animation techniques, viewers experiencing this world delve into intricate interrelations of the landscape that would likely otherwise remain invisible to the untrained colonial or colonized eye. Finally, the piece is an example of artisanal, handmade VR production or *no-muralismo*, a VR art genre I created that eradicates the borders between science, technology, art, artisanship, landscape, and the self so that more stories can flourish. It employs *rasquachismo*, the Chicano/a/x sensibility of making do with what is available, in new media arts praxis.[39]

DECOLONIAL TRANSMUTATIONS AND TRANSVERGENCE

The exploration of landscapes and the proposal of landTransEscapes through various artistic mediums reveals a complex interplay between human activity, environmental transformation, and cultural memory. Artists like David Maisel, Lynne Marsh, Trevor Paglen, Dynasty Handbag, micha cárdenas, and myself offer diverse perspectives on the ways in which land and interconnectedness are shaped, exploited, and reclaimed in the contemporary world. Through our artworks incorporating the digital, we aspire to provoke critical reflection on land use, environmental degradation, cultural heritage, gender and sexuality, and the intersections of power and memory. By reconceptualizing landscapes through landTransEscapes, we challenge conventional narratives of landscape representation and offer new possibilities for understanding and appreciating the dynamic relationship between humanity and the

natural world. The works underscore the vital role of artistic expression in challenging coloniality, emphasizing the pressing need for social and political justice as integral to addressing the deeply interconnected ecological and social challenges of our era. In doing so, they inspire hope for a future characterized by sustainability and equity through digital art.

The evolution of landscape art reflects the intertwined histories of colonialism, expansionism, and the imposition of Western ideologies on land perception. This tradition, rooted in the viewing of natural spaces as untamed, impenetrable, and/or in need of transformation, has served to justify the seizure of lands and erasure of Indigenous peoples. Via myriad mechanisms, coloniality—the shadow of Western modernity—perpetuated ~~supremacist~~ ideologies and distorted the perceptions of both colonizers and colonized regarding nature and inhabited lands, consequently shaping their understanding of their identities, their very selves. Narratives of conquest and domination manipulated sociopolitical landscapes, painting settlers as victims and (in the context of California) BIPOC Indigenous and Mexican people as dangerous and threatening antagonists. This led to violent acts, land theft, and the systematic erasure of diverse BIPOC communities thriving and continuously working toward thriving in the western territories, a reality that persists today across various dimensions. These include disproportionate rates of incarceration, death at the hands of police, inadequate representation in media, and exclusion from critical sectors of society such as education, health care, applied sciences, politics, and the judicial system.

A legacy of Indigenous perspectives offers a stark contrast, viewing landscapes beyond the two-dimensional and indeed interconnected with community, culture, spirituality, time, and space. Through practices like weaving and architectural design, Indigenous peoples integrate natural landscapes into their art and daily lives and vice versa, fostering harmony with the environment and promoting cultural continuity. The concept of landTransEscapes challenges static colonial perceptions of land, proposing dynamic and interconnected relationships between humans, nature, and space in the digital realm. It also links current and future media art to a legacy beyond the Western European, as in uses of technology that are leading to the demise of coloniality. By engaging in revamped conceptualizations through landTransEscapes, artists take on Mignolo's "decolonial option" by offering different and new perspectives on landscape representation and inspiring hope for a more sustainable and equitable future. Through their diverse artistic expressions, they contribute to ongoing dialogues about humanity's relationship with the natural world and the urgent need for environmental and social justice. The digital artworks discussed here extend Indigenous, Black, queer, and other organically decolonial perspectives and epistemologies whose futuristic, cutting-edge ways of knowing, producing, and disseminating knowledge and art are actually located in the non-colonial past.

Notes

1 G. S. Kirk and J. E. Raven, "Chapter II: Thales of Miletus," in *The Presocratic Philosophers* (Cambridge, UK: Cambridge University Press, 1957), 74–98.

2 Plato, *The Timaeus of Plato* (London and New York: Macmillan, 1888).

3 "Pomponius Mela," *Encyclopedia Britannica*, http://www.britannica.com/biography/Pomponius-Mela.

4 Aldo Leopold, *A Sand County Almanac* (New York: Oxford University Press, 1949), 18.

5 David R. Klein, "Wilderness: A Western Concept Alien to Arctic Cultures," *Information North*, September 1994, 418.

6 ~~Supremacy~~ denotes the conviction of inherent superiority or the centralization of oneself over others, often resulting in the imposition of dominance, power, authority, or influence. ~~Supremacy~~ is a stupid and disgusting belief that will be erased but for now continues to stick around, as it hides behind accepted quotidian acts of silencing and violence. See Liliana Conlisk Gallegos, "The Coloniality of the Quotidian: A Transborder Perspective on the Matrix of Colonial Power and the Agents of Supremacy (The Everyone That Is No One)," in *Re-Activating Critical Thinking in the Midst of Necropolitical Realities*, ed. Marina Gržinić and Jovita Pristovšek (Newcastle upon Tyne, UK: Cambridge Scholars Publishing, 2022), 8–37.

7 On the hierarchy of artistic genres at this time see Getty Conservation Research Foundation, https://www.getty.edu/education/teachers/classroom_resources/curricula/landscapes/background1.html.

8 A European example would certainly be the early nineteenth-century Dutch depictions of the landscapes in the Indies, which reaffirmed a persistent historical ownership of the territory by evoking a longed-for lineage tracing back to a revered era of Dutch colonization. See Susie Protschky, *Images of the Tropics: Environmental and Visual Culture in Colonial Indonesia* (Leiden, the Netherlands: KITLV Press, 2011).

9 Aníbal Quijano and Michael Ennis, "Coloniality of Power, Eurocentrism, and Latin America," *Nepantla: Views from the South* 1, no. 3 (2000): 533–80.

10 Walter. D. Mignolo, "Epistemic Disobedience and the Decolonial Option: A Manifesto," *Transmodernity: Journal of Peripheral Cultural Production of the Luso-Hispanic World* 1, no. 2 (2011): 44–66.

11 Frantz Fanon, *The Wretched of the Earth* (New York: Grove Press, 2007).

12 Carolyn Merchant, "The Theoretical Structure of Ecological Revolutions," in *Out of the Woods: Essays in Environmental History*, ed. Char Miller and Hal Rothman (Pittsburgh: University of Pittsburgh Press, 1997), 18–19.

13 Leonard Pitt, *The Decline of the Californios: A Social History of the Spanish-Speaking Californians, 1846–1890* (Berkeley: University of California Press, 1998).

14 Richard H. Peterson, "Anti-Mexican Nativism in California, 1848–1853: A Study of Cultural Conflict," *Southern California Quarterly* 62, no. 4 (1980): 309.

15 See Nicholas Villanueva Jr., *The Lynching of Mexicans in the Texas Borderlands* (Albuquerque: University of New Mexico Press, 2018); Francisco E. Balderrama and Raymond Rodríguez, *Decade of Betrayal: Mexican Repatriation in the 1930s* (Albuquerque: University of New Mexico Press, 2006); David J. Weber, *Foreigners in Their Native Land: Historical Roots of the Mexican Americans* (Albuquerque: University of New Mexico Press, 2004).

16 Stephen Longmire, "Back West: Reviewing American Landscape Photography," *Afterimage* 25, no. 2 (September–October 1997): 21–24.

17 Angela Melville, "Mapping the Wilderness: Toponymic Constructions of Cradle Mountain / Lake St. Clair National Park, Tasmania, Australia," *Cartographica* 41, no. 3 (2006): 229–45.

18 Maano Ramutsindela, "National Parks and (Neo)Colonialisms," in *The Cambridge Handbook of Environmental Sociology*, ed. Katharine Legun, Julie C. Keller, Michael Carolan, and Michael M. Bell (Cambridge, UK: Cambridge University Press, 2020), 1:206–22; Gareth E. John, "Cultural Nationalism, Westward Expansion, and the Protection of Imperial Landscape: George Catlin's Native American West," *Ecumene* 8 (2001): 177–201.

19 Daniel Brockington and James Igoe, "Eviction for Conservation: A Global Overview," *Conservation and Society* 4, no. 3 (2006): 424–70.

20 Robert Williams Jr., *Like a Loaded Weapon: The Rehnquist Court, Indian Rights, and the Legal History of Racism in America* (Minneapolis: University of Minnesota Press, 2005), 90.

21 Glen Sean Coulthard, *Red Skin, White Masks: Rejecting the Colonial Politics of Recognition* (Minneapolis: University of Minnesota Press, 2014); Richard H. Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens, and the Origins of Environmentalism, 1600–1860* (Cambridge, UK: Cambridge University Press, 1995); Brockington and Igoe, "Eviction for Conservation: A Global Overview," 424–70.

22 Sharisse D. McCafferty and Geoffrey G. McCafferty, "Weaving Space: Textile Imagery and Landscape in the Mixtec Codices," in *Space and Spatial Analysis in Archaeology*, ed. E. C. Robertson, J. D. Seibert, D. C. Fernandez, and M. U. Zender (Calgary: University of Calgary Press, 2006); Agencia EFE, "Tejidos indígenas narran saberes ancestrales," *Expreso*, August 14, 2023, https://www.expreso.ec/actualidad/mundo/tejidos-indigenas-narran-saberes-ancestrales-169938.html.

23 Karen Hao and Nadine Freischlad, "The Gig Workers Fighting Back against the Algorithms," *MIT Technology Review*, April 21, 2022, https://www.technologyreview.com/2022/04/21/1050381/the-gig-workers-fighting-back-against-the-algorithms/.

24 Karen Hao, "A New Vision of Artificial Intelligence for the People," *MIT Technology Review*, April 22, 2022, https://www.technologyreview.com/2022/04/22/1050394/artificial-intelligence-for-the-people/.

25 Liliana Conlisk Gallegos, *The Future Past v. Coloniality: Decolonial Media Art beyond 530 Years* website, ACM SIGGRAPH Digital Community Arts, 2023, https://decolonial-media-art.siggraph.org/exhibition/; Kader Attia, *Still Present* (Berlin: Berlin Biennale for Contemporary Art, 2022); Tumelo Mosaka, *Making Art History: Decolonizing the Canon* (Champaign, IL: Krannert Art Museum, 2014).

26 Marcos Novak, "Speciation, Transvergence, Allogenesis: Notes on the Production of the Alien," *AD Architectural Design* 72, no. 3 (2002): 64–71.

27 Walter D. Mignolo, *The Darker Side of Western Modernity: Global Futures, Decolonial Options* (Durham, NC: Duke University Press, 2011), 45. Decoloniality encompasses a multifaceted effort that addresses various forms of ~~supremacy~~, spanning race, gender, culture, language, religion, class, abilities, epistemology, and more.

28 Shoshana Zuboff, *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power* (New York: PublicAffairs, 2019); Joy Buolamwini and Timnit Gebru, "Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification," *Proceedings of Machine Learning Research* 81 (2018): 1–15; Safiya U. Noble, *Algorithms of Oppression: How Search Engines Reinforce Racism* (New York: NYU Press, 2018); Antoinette Rouvroy and Bernard Stiegler,

"The Digital Regime of Truth: From Algorithmic Governmentality to a New Rule of Law," *La Deleuziana Online Journal of Philosophy* 3 (2016): 6–27; Bernard E. Harcourt, *Exposed: Desire and Disobedience in the Digital Age* (Cambridge, MA: Harvard University Press, 2015); Frank Pasquale, *The Black Box Society: The Secret Algorithms That Control Money and Information* (Cambridge, MA: Harvard University Press, 2015).

29 Antonio Pele and Caitlin Mulholland, "On Facial Recognition, Regulation, and 'Data Necropolitics,'" *Indiana Journal of Global Legal Studies* 30, no. 1 (2023): 173–94.

30 Mignolo, *The Darker Side of Western Modernity*.

31 Find other works from this series at https://davidmaisel.com/works/the-mining-project/.

32 Lynne Marsh, *L.A.*, 2003, https://www.lynnemarsh.net/la-2/.

33 Trevor Paglen, *KEYHOLE IMPROVED CRYSTAL from Glacier Point (Optical Reconnaissance Satellite, USA 186)*, 2008, Met Museum website, https://www.metmuseum.org/art/collection/search/296323.

34 Dynasty Handbag, *Oh, Hummingbird*, 2017, available at https://vimeo.com/224076667.

35 micha cárdenas, *Sin Sol / No Sun*, 2018, https://michacardenas.sites.ucsc.edu/sin-sol-no-sun/.

36 Liliana Conlisk Gallegos, *The Coyolxauhqui Imperative 2020*, 2020, available at https://www.youtube.com/watch?v=JodHvHzC0Yc.

37 Mark Cartwright, "Coyolxauhqui," *World History Encyclopedia*, February 11, 2016, https://www.worldhistory.org/Coyolxauhqui/.

38 Gloria Anzaldúa, *The Gloria Anzaldúa Reader*, ed. Ana Louise Keating (Durham, NC: Duke University Press, 2009), 303–14.

39 See Liliana Conlisk Gallegos, "Monuments to the Pluriverse: A *Transfronteriza Nepantlera*'s Approach to *Rasquache* Anticolonial Artisanal or Utilitarian New Media Art Production," *Everywhen*, 2024 ISEA Conference Scholarly Papers, available at https://bit.ly/monumentstothepluriverse.

WHEN I DIE, PLZ DELÉTE MY HIS-TORY??!

ALTERNATIVE ARCHIVES, NON-PRECIOUS FORMS, AND COLLECTIVE ASSEMBLAGES

APRIL BACA

The archive is a monument. Akin to a traditional monument, it creates distinct discursive formations by preserving and memorializing the past. As repositories for knowledge production, archival collections become coherent through their historical, political, institutional, cultural, and personal frameworks; rather than a random assortment of "things," archives have chronological and scholarly organization. This legibility has reified the purpose of the archive as a distinct restitution of historical discourse that clarifies, periodizes, and generates meaning.

As a project broadly defined through its accumulation and attribution of meaning, the archive and its usual materials and functions have arguably become diffused in the contemporary digital landscape. Examples of alternative collecting practices (and their storehouses) are exemplary not only in the accumulation of browser data, imagery, and files shared and downloaded online (cohered through distinct user profiles and IP addresses), but also through myriad digital art practices that have engaged with questions of the archive and its relationship to reproduction, memory, and knowing.[1]

Although downloads, search histories, browser tabs, digital photo albums, and other such immaterial forums aren't traditionally regarded as archival repositories, the archive as an entity devoted to "silent monuments, inert traces, objects without context, and things left by the past" suggests that perhaps they should be [FIG. 1].[2] This essay engages with the distinct but interconnected practices of Elisa Giardina Papa, Natalie Bookchin, Sheila Pinkel, Dean Sameshima, Liliana Conlisk Gallegos, and Christine Tamblyn, all artists in the exhibition *Digital Capture: Southern California and the Pixel-Based Image World*. Their featured works disrupt the material, ideological, and subjective coherence typically afforded

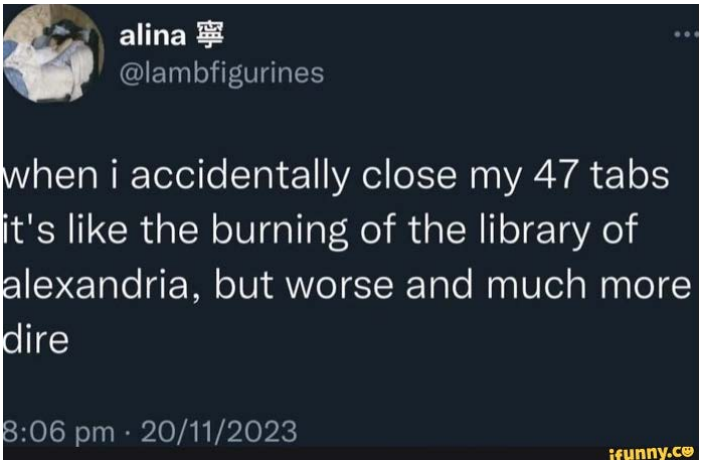


FIGURE 1. Tweet by user @lambfigurines, 2023

to the archive through the use of fringe knowledge, quotidian materials, personal artifacts, rote duplication, and more. The artistic turn toward the personal digital archive as an alternative archival assemblage is historically and politically significant against the context of typical archival collecting practices (namely during the age of imperialism) while offering an opportunity to transform meaning making outside of its traditional (and monumental) raison d'être. The following text engages with how these artists visualize a decentralized artistic archive.

Akin to the traditional functions and biases of the archive and its practices, the digital archive is equally indebted to the terms and pitfalls of media software and digital forums. Feminist media scholars Safiya Noble, Lisa Nakamura, Wendy Hui Kyong Chun, and others have written extensively about the material and ideological violence of digital spaces, and on that front, I defer to their estimable work.[3] I am interested here in how each of these artists rearranges the visual archive and its information in a way that disrupts coherent and/or hierarchical meaning.

Admittedly, approaching these practices as distinct nods toward an alternative archival practice may potentially displace the artists' original intent. While Giardina Papa, Pinkel, and Bookchin have been explicit in their engagement with collecting habits, forms, and governance, the motivations of other featured artists lean closer to the sociopolitical, historical, and cultural contexts informing their subjects. This is not to say that there is no crossover between the two focuses—and I will enumerate the connections I perceive—but instead that each artist's engagement with representation, reproduction, and memory is specific to their practice, medium, and moment. Still, I consider the nuances of these artistic practices within the broader conceptual "work" of alternative archival assemblages, collective memory, and fringe knowledge production. Contrary to functioning in service to institutional memory or homogenous meaning, each of the following artworks is committed to the everyday.

THE IMAGE IS INFINITE: ARCHIVAL REPOSITORIES AND MUTABLE SITES

The personal desktop as a critical forum for rethinking the possibilities of the archive is explicitly undertaken in Elisa Giardina Papa's aptly titled *Archive Fever* (2011–ongoing), which visualizes the image and its repository as an infinite and mutable site [PLATE 09]. This ongoing browser-based performance depicts Giardina Papa's internet history through bookmarked tabs, personal emails, YouTube segues, screenshots, and more. The artist's frenetic browsing is shown in real time as she rapidly adds and alters various tabs and search suggestions. At the same time, feedback from previously opened tabs continues to run in the background, creating an amalgamation of auditory, visual, and executional data. Giardina Papa's formal use of various media platforms in *Archive Fever* creates a structural framework and repository where the subjects of the archive

reside, an *archeon* that houses an array of digital information. In approaching personal web browsing histories as an alternative archival forum, the work demonstrates the pertinence of personal archival practices as a critical (if still mostly ignored) forum for collective memory, knowledge production, and authorship in online contexts.

Jacques Derrida's 1995 book *Archive Fever* provides a theoretical lens through which to consider how the personal digital archive functions as a profoundly temporal, intimate, gendered, and compulsive space for remembrance.[4] Derrida's "hauntology"—a neologism referring to the specters of ontology (and their unspeakability)—specifically serves as a lens to better understand the remnants of personal search histories, their traces, and affective relationalities. In Giardina Papa's work, the digital artifacts of personal search histories function as ghosts whose phantasmal traces haunt search bar suggestions and auto-loaded tabs after a browser crash. In this vein, *Archive Fever* demonstrates how fringe forms of memory making through the personal archive are exemplary of the exclusionary histories, communal edifices, and participatory structures that continue to fall outside the realm of traditional collecting practices and institutional archival forums. In these conditions, the work exemplifies an artistic intervention into the contemporary digital archival moment and its indeterminate positionality.

At the time of this writing, *Archive Fever* occupies a somewhat ambiguous position. As a work that exists in any number of ongoing and yet-to-be-realized iterations on the artist's personal computer, it is a composite whose participatory framework is determined not by active museumgoers but through the personal and secondary effects of previous online users (such as YouTube commenters), ripples of algorithmic data, and of course Giardina Papa herself. While the various subscriptions, chat messages, and comment bars that Giardina Papa clicked through in the original iteration of *Archive Fever* served as the archival ephemera of her seemingly erratic search habits and browser history, these (past) activities are organized into a single site and a distinct iteration of the work. Giardina Papa's website has become an archive for the archive, an apparatus that unfolds lost time, both personal and as related to the moving image.

Time and questions of spatiality are theoretical concerns similarly expounded upon in Derrida's *Archive Fever*. Here, the archive is a liminal spatiotemporal composite that serves as a "question of the future, the question of the future itself, the question of a response, of a promise and of a responsibility for tomorrow." It represents the power exercised in the present, which congeals an "order of commencement as well in the order of commandment." The remnants and digital detritus that comprise and accompany *Archive Fever* can be understood as a spectral amalgam whose effects are always troubled by a feverish yearning for the past (archive fever) or an "irrepressible desire to return to the origin, a homesickness, a nostalgia for the return to the most archaic place of absolute commencement."[5] It is the desire to amass, contain, and possess moments and subjects. But the original iteration of Giardina Papa's *Archive Fever* has arguably never existed in any singular sense. As an explicitly plural and open-ended web work, it relies on the spectrality of user presence and traces of previous events in its ever-changing constitution. True to Derrida's assertion, archives (both *Archive Fever* and archives more generally) cannot serve as beginnings, but act instead as placeholders for and mediations of various starting points. This archival abandonment of the subject or "thing itself" is expanded upon in Derrida's postscript annotations,

which denote that the archive can only contain the lost.

Apart from the explicitly defined participants of *Archive Fever* in the context of a physical gallery space (that is, Giardina Papa herself and viewers), the accidental collaborators of Giardina Papa's past, present, and future online engagements are arguably phantasmal—occupied by the ghosts of previous and yet-to-be-active users (including the artist herself). Here, the traces of subjective affect and the ephemera that litter personal user desktops and browsing software are most apparent when engaging with the work. Though additive, the mass accumulation of visual information in *Archive Fever* retains a narrative function hinged entirely on the work's discontinuity. This discontinuity is personified through the wavering availability of the work, including the days, weeks, and months when the HTML script was (and will be) no longer available online.

I understand Giardina Papa's refusal to adhere to a static or immediately recognizable impulse in *Archive Fever* as antagonizing traditional archival and collecting practices. Where the archive has historically served as an edifice of collected materials, documents, and ephemera, Giardina Papa's digital archive hinges entirely on the instability of information and its destabilizing affects/effects. Contrary to the historical precedence of the physical collecting institution initiated in an era of slavery by "colonial administrators, planters, white men and women, and governing bodies in the metropole," *Archive Fever* serves as a "cosmology not of being but of contingency."[6] Yet unlike some speculative models of user resistance that have proliferated across media scholarship and digital artistic practices, it is cushioned comfortably within the corporatized edifice of the various web browsers that comprise its media and dictate its decentralized forms.

The taxonomic organization of the archive as a stable, coherent structure is similarly questioned by Natalie Bookchin in *Databank of the Everyday* (1996) [PLATE 08]. The piece explicitly questions information transmission, dissemination, and organization, in this case by considering the ubiquity of computer and digital databanks. Bookchin is a contemporary media artist associated with the Net Art movement of the early 1990s whose practice is invested in the intersections between visual media culture, habitual performativity, gendered labor, and public and private spheres of engagement. Bookchin's interactive CD-ROM uses the commercial image bank as a model for thinking through the mass typological organization of everyday habits, movements, and compulsions. The work is formally composed of a clickable sequence of quotidian gestures and actions, such as opening and closing a door or typing on a computer, resulting in a repetitive, never-ending, circular narrative. Its systematic organization of mundane events is visually accompanied by a corresponding set of instructions that allow engagers to click and choreograph various actions appearing in small windows on the screen.

User interactivity is a defining feature of the work, as the graphical interface of the ripped CD-ROM on view in the exhibition is navigated through user-determined sequences on a generative, albeit fixed, loop. The loop, for Bookchin, is a disposition shared between electronic media and the body itself—that is, the regular needs and fodder that dictate the functionality of both physical bodies and media. This connection between the loop and the body is represented in *Databank of the Everyday* through simple bodily movements and actions such as shaving or flushing a toilet. The body's speculative, material, and historical mechanization remains (and continues to be bound by) racialized, classed, gendered, and geopolitical contexts. The efficiency of the body in the development

of the Global North (as in the transatlantic slave trade) and under modernity at large (for instance, in Taylorism and Fordism) would spur early twentieth-century avant-garde art movements, activists, and theories engaged with the technological state. The self-fulfilling and self-justifying rhetoric of modernity promised a universalism that aspired to a globally interconnected homogeneity. The internet and mass media realize this model of connectivity while concurrently altering and transforming everyday discourse. This cyclical (largely experimental) relationship creates, in the words of Arjun Appadurai, "specific irregularities because both viewers and images are in simultaneous circulation." At the same time, it is not "bound within local, national, or regional spaces." In this vein, *Databank of the Everyday* explicitly critiques the body under modernity and a "monocausal fetishization of the electronic."[7]

Bookchin's work likewise offers insight into how time-based organizational structures, in their broadest sense, have continued to dictate and determine tasks and activities under capitalist modernity. In her critique of modernity, time, and the archive, Mary Anne Doane argues that visual media technologies (namely photography and film) contain an inherent archival impulse. For Doane, the archival materiality of media is paradoxical to its function as a temporal technology hinged on what she calls the contingent: "The archive is a protection against time and its inevitable entropy and corruption, but with the introduction of film as an archival process, the task becomes that of preserving time, of preserving an experience of temporality, one that was never necessarily 'lived' but emerges as the counter-dream of rationalization, its agonistic underside-full presence."[8] In this sense, the cyclical "looping" of *Databank of the Everyday* evidences the mechanization of time, the body, and activity in a postindustrial Western landscape. The images and data in its compilation of narrative loops may or may not bear any interconnection beyond their visual proximity. Akin to Bookchin herself, the user creates and establishes meaning through the formal implication that there must be a relationship between the two. The viewer's connection with the events, corresponding information, and page sequences, then, entirely hinges on temporality, uncertainty, and artificiality. This "unknowing" haunts each viewing interaction while alluding to the indistinguishability of (circular) content in an age of informational chaos and entropy.

Alongside the purported objectivity of electronic media databanks, this concern extends to other digital storehouse apparatuses, namely the camera. Released at the dawn of the commercial internet age, *Databank of the Everyday* also engages with the speculative death of analog photography in a soon-to-be-digital-dominant landscape where "photography finds itself as just more data in a database."[9] Bookchin's stock photography catalogs present a contemporary databank of the human body and its motions as captured in (in)definable time. Each subject represented becomes separated from its subjective "uniqueness" and transformed into archival fodder—a visual record of specific, categorizable actions. The digital photograph as an archival record thus becomes a "shared hallucination." On the one hand, "it is not there," "but it has indeed been": "a mad image, chafed by reality."[10]

The collation and serialization of the everyday and its quotidian effects are similarly expanded upon in Sheila Pinkel's multidimensional photographic study *Manifestations of a Cube* (1974–82) [PLATE 11]. Pinkel's expansive series used then-novel photographic media to examine the dynamic between art, abstraction, and technology. *Manifestations of a Cube* includes

color Xeroxes, cyanotypes, a digital print, xeroradiographs, and a set of photograms. The primary subject is a square glass dish the artist lifted from a Japanese restaurant. While appropriate to the late-modernist sensibilities prevalent at the time of the work's making, the dish's cube-like appearance is less a formalist fetish object than a conceptual anchor for exploring the possibilities of early digital imaging technologies. In this sense, *Manifestations of a Cube* can be understood as appropriating the customary signifier of mid-twentieth-century Modernism (the cube) to examine its cross-cultural and technological implications.

While this would initially appear to follow much of the ideological basis of US mid-century Modernism, Pinkel's technological reincarnations enact an ironic reversal of the cube through its non-precious (and accumulative) applications. The cube's sometimes-spectral appearance attests to this, while the shape remains haunted by the "life or life-death of modernity."[11] The initiation and culmination of the series in the mid- to late 1970s follows then-contemporary artistic forays engaging questions of materialism (à la Lucy Lippard) and the shifting role of photography as a conceptually and historically laden medium (in the vein of Roland Barthes and Susan Sontag). *Manifestations of a Cube* straddles these lines of inquiry while concurrently looking both back and forward. It attends to the historical precedent of Modernism, the age-old question of "seeing" (famously expounded upon by John Berger), and photography as "experience captured," while undermining the very passivity—and ubiquity—of photography's "message" during a period of rapid technological change.[12]

The formal distortions that appear through the photographic exposures of the dish also stage the series as an examination of light and cubic typologies. Pinkel's engagement with light-based geometry appears through the various media used, including photograms and xeroradiography, each yielding soft yet vibrant and sometimes multicolored representations of the cube with variations in its dimensional depth. Pinkel's process-oriented photo series led to the experimental short film *Intuition* (1977), which features various color permutations on a black-and-white photogram. The addition of color was made possible by the computing system at the USC School of Engineering's Image Processing Laboratory, and indeed, this was the first digital film created in that lab.[13]

While Pinkel's photo-technical experimentations demonstrate an exhaustive artistic rigor engaged with the politics (and possibilities) of form and imaging itself, *Manifestations of a Cube* similarly serves as an expansive visual archive of an artist's object study. The symbolic quality of the cube is less pertinent than what the technologies themselves afford to (re)consider processes of accumulation, abstraction, and documentation. Pinkel's cube exists in myriad visual permutations (or manifestations, to invoke Pinkel directly) and unexpected irregularities that seem to parody the formalist rigidity of its Modern-art precursors. Rather than framing the artist as a conduit for the unexpected, digital imaging technologies would become the interlocutors for Pinkel's photogram series. This collaborative staging between artist and technology demonstrates a sustained fascination with scale, light, and form while situating the cube as, to invoke Lev Manovich, "a subject of ironic and melancholic simulation."[14] The square dish is not only formally displaced and elevated beyond a mass-produced restaurant item into an object of sustained artistic inquiry, but further displaced through its visual repetition and technological amalgamations—an object-turned-subject-turned-data(bank). The cube signifies only one of many different

time- and media-specific variations in the more extensive visual archive that comprises its varying forms.

THE PERSONAL ARCHIVE: PARTICIPATORY INTERVENTIONS AND MEANING MAKING

The criteria and the function of the archive as a distinct system of power relations have been argued extensively by scholars engaged with its motivations and complexities. Michel Foucault's well-established critique of the archival repository as an exercise in power-knowledge details how "materiality . . . necessarily obey[s] . . . the order of the institution rather than of the spatio-temporal localization" while concurrently retaining "possibilities of reinscription and transcription (but also thresholds and limits)."[15] Meanwhile, more contemporary scholars such as Saidiya Hartman have approached the gaps and violence in archival records as opportunities to imagine alternative possibilities. Hartman's "critical fabulation" attends to how power is exercised in the archive through absence while drawing on its elasticity to create new narratives.[16] The artworks by Dean Sameshima, Liliana Conlisk Gallegos, and Christine Tamblyn featured in *Digital Capture* visualize personal archival assemblages, participatory interventions, and alternative forms of meaning and its making: Sameshima excavates the personal visual archives of gay male dating sites in the early 2000s, Conlisk Gallegos forefronts decolonial visual narratives of Latinx and Indigenous women in the context of European colonialism and US imperialism, and Tamblyn considers the hetero-patriarchal insularity of technology and the continued obfuscation of women from its records. Though the artists' practices and concerns are formally, conceptually, technologically, and chronologically distinct, I place their works in conversation here to consider broader questions of the personal and the communal, and their respective roles in the archive and its making.

The significance of communal photo repositories and online forums, though long overlooked in conversations surrounding the archive, has occupied an integral position for many communities. Beyond significant efforts to document and preserve historically marginalized movements, persons, and contributions (particularly by LGBTQIA+, minoritarian, and feminist activists), artists in particular have expanded the scope of what, who, how, and when certain artifacts, spaces, and persons are documented. In this vein, I look to Dean Sameshima's *Figures of Lust Furtively Encountered in the Night* (2001–4), a collection of photographs printed directly from low-resolution images culled from gay male dating-site profiles [PLATE 20]. The photos were taken when digital cameras were becoming more commercially available, thus prompting more widespread use in documenting quotidian gestures of intimacy. While the work explicitly reflects on queer male desire and visibility, an impetus that continues to drive much of Sameshima's broader practice, the indeterminacy of the figures (they are named only by their formal aspects and accompanying image URLs) is of less importance than their formal position and aesthetic connections with one another across the series (*Digital Capture* features eight of the series' twenty-five digital prints).

The images formally cohere through a few shared characteristics: a blinding white circular flash, (partial) nudity, staged poses, and domestic settings. The grainy resolution heightens the men's already largely indiscernible facial characteristics while highlighting their muscular, often hairless bodies. Many of the self-portraits were taken in front of mirrors in semi-darkened rooms (primarily bedrooms and bathrooms) that

reveal and conceal the intimate and familiar facets of each "selfie." Their intimacy is less about visible flesh and more pointedly in the encounter that Sameshima stages between subject and viewer; in other words, the series presents desire in a way that relies less on what is seen and more on the affective connections, desirous ambiguity, and erotic repositories that often accompany, or are affiliated with, lustfulness. In this vein, it quietly relishes and spills outside the photographs' original context, attributing a kind of nondescript seriality to each figure of lust.

The refusal of total visibility reflected in the series' low-res imagery can also be read as a tactic against particular forms of recognition. The politics of visibility for queer people and communities (especially queer minorities, working-class, and non-citizen demographics) has been especially fraught in the post-2000s techno-political landscape. The biopolitical regulation (and continued violation) of bodily and sexual autonomy in the United States has been immeasurably amplified through geolocation, facial recognition, and other surveillance technologies. These mechanisms insulate "national subjects who align themselves with US imperial interests" from the "forms of illegitimate queerness that ultimately propel populations into extinction."[17]

The intentional obfuscation of a totalizing visibility foregrounds the myriad (and personal) queer tactics that have increased in the continued wake of death, terror, heteronormative nationalisms, and "liberal discourses of multicultural tolerance and diversity." Given that the queer community has been historically and "endlessly cathected to death," queer livelihoods, connections, and self-representations that exist outside the violence of heteronormative productivity remain more pertinent than ever.[18] In this sense, *Figures of Lust Furtively Encountered in the Night* eschews the politics of recognition that continue to assimilate and manage queer bodies and subjecthood into normative national subjects. The full-frontal posturing of each partially obscured male subject instead redefines the terms by which viewers might engage.

This indeterminacy is not, in the words of Rich Cante and Angelo Restivo, "simply a question of 'reality' versus 'fantasy' that is mobilized."[19] But their representative transformation is undoubtedly a facet. It is a distinct type of visual, conceptual, and formal mapping that takes up the conventional aesthetic relationship and figurative grounding routinely depicted in gay male pornography. The aesthetic routine exercised by each figure exemplifies the practices, forms, and spaces that remain locatable in broader communal erotic online repositories. These digital archives for and of personal pleasure tend to be participatory assemblages whose features and popularity ebb and flow with the various digital, sociocultural, and aesthetic trends that continue to shape their appearance and use function. The role of spatiality is significant in these dynamics due to the imaginative interplay between illusion and facticity and the scenes where said relations might unfurl.

The bathrooms, dirty mirrors, and bedrooms in disarray reveal the centrality of domestic spaces as a private yet shared forum for erotic encounters. While the mirrors used by each self-photographing subject reveal various body parts, the long dry watermarks, dim lighting, and blinding camera flashes conceal, enacting a kind of Barthes-ian striptease that "makes voyeurs of the public" where the "décor, the props, and the stereotypes intervene to contradict the initially provocative intention." The domestic space itself in turn becomes another "series of coverings placed upon the body," staging the self-presentation of nakedness

as a predetermined and "superfluous yet essential gesture."[20] In the context of the personal archive (saved computer files, digital camera memory, et cetera), each photograph exists as an object study and visual archive of sensuous desire for its spectral participants and figures.

The urgent recuperation of heterogeneous communal memories and artifacts—particularly across Black, Latin/x, Asian, and Indigenous communities, whose stories, artifacts, likenesses, documents, and ephemera have long been stolen, sequestered, and commercialized by white supremacist archival institutions in the Global North—has similarly come to the fore in the digital era. Creative reimaginings of what the forums for such remains might and can look like have been undertaken by artists working to seed new futurities. To this end, I turn to Liliana Conlisk Gallegos's VR artwork *The Coyolxauhqui Imperative 2020* (2020), which presents a visual, narrative, genre, and technical amalgamation of Latinx and Indigenous practices and mythologies [PLATE 42]. It is conceptually and aesthetically organized using three distinct Mexican and Xicanx feminine archetypical frameworks: La Malinche (The Traitor), La Llorona (The Weeper), and La Chingada (The Fucked-Over One).[21] Conlisk Gallegos considers how each has served (and resisted) gendered reconstitution in the face of European colonial expansion.

The work's title derives from the mythopoetic theory of the Aztec moon goddess Coyolxauhqui and the imperative of recognition and re-creation. The myth follows Coyolxauhqui's failed attempt to murder her mother, Coatlicue, and eventual beheading by her brother, Huitzilopochtli. Coyolxauhqui's body falls, dismembered, "breaking to pieces, in various places her arms, her legs, her body," as it plummets down the mountain where she is killed.[22] Huitzilopochtli then tosses the head into the sky so Coatlicue can gaze upon her daughter every night. The myth exemplifies ongoing healing processes and subjective fragmentation; Gloria Anzaldúa notably theorized it as an attempt to heal through (re)completion, wherein Coyolxauhqui becomes a "symbol for the necessary process of dismemberment and fragmentation, of seeing that self or the situations you're embroiled in differently,"[23] and considered the story a "symbol for reconstruction and reframing, one that allows for putting the pieces together in a new way. The Coyolxauhqui imperative is an ongoing process of making and unmaking."[24] Conlisk Gallegos's contemporary redress visualizes and expands upon Anzaldúa's concept through globalization and Western neoliberalism.

The video opens with a narration by the artist as the camera pans through a digital collage of 2D Mexican murals and figures, each loosely organized through its respective backdrops, archetypical similarities, and expansive yet flattened sky. *The Coyolxauhqui Imperative 2020* is an unabashedly gendered intervention into contemporary world making, a "decolonial retelling of the mythopoetic experience of womanhood within the context of the American continent."[25] The artist emphasizes decolonization as a linguistic and indeterminate place-making strategy, a gesture most notably employed by theorists such as Édouard Glissant. Glissant's poetics of relation theorizes the right to "opacity" and the de-nationalization of identity as a gesture of resistance. This decolonial model relies on indeterminacy and a refusal to articulate potential futures, spaces, and subjects. Here, "poetics open[s] onto unpredictable and unheard of thing" and "aims for the space of difference—not exclusion but, rather, where difference is realized in going beyond."[26]

Glissant's point is especially pertinent in the context of the digital spaces that Conlisk Gallegos appropriates for *The*

Coyolxauhqui Imperative 2020. As a space predicated on the logic of a purportedly infallible binary, the screen has continued to function as (and enforce) a particular type of border logic. The border between self (the engager) and other (the digital) split by the physical (and ideological) screen similarly follows Cartesian rhetoric historically in service of Western hegemony. I invoke these legacies not to claim the impossibility of representational (embodied) digital art operating outside this paradigm, but rather to suggest that its emergence is contingent on a shift away from (and within) neoliberal individualism. Decolonial and artistic uses of the medium similarly require a reexamination of its various borders of separation, whether geopolitical, computational, or otherwise. In this vein, *The Coyolxauhqui Imperative 2020* visualizes a trans-temporal shift away from linear, hegemonic narratives and subjects. Its explicitly overlapping mythopoetic narrative attests to this, as does its formal combination and reconfiguration of recognizable imagery. Representations of pre-Hispanic Mexico are placed into visual dialogue with contemporary retellings, creating cross-generational exchange among makers, stories, and ideations. The alternative archival and future-looking assemblage offered in *The Coyolxauhqui Imperative 2020* presses against boundary making (who is included and how? what is told and when?) and lingers in indeterminate visibility.

The trap of visibility (to invoke Foucault), while both obvious and material when considered against the dispersed and nuanced histories of surveillance and control, does not, however, concurrently account for its contrasting option—that is, a totalizing opacity. Obfuscation is, of course, equally detrimental and contours how, as Sara Ahmed has argued, "some bodies become understood as the rightful occupants of certain spaces."[27] Christine Tamblyn's feminist revisionist work *She Loves It, She Loves It Not: Women and Technology* (1993), containing texts, sounds, movie clips, and images about women's use of technology in the past, present, and future, engages these questions explicitly via an interactive timeline that outlines historically pertinent female-identifying technologists and creators [PLATE 53]. The piece was created with assistance from the artist Marjorie Franklin and programmer Paul Tompkins, then Tamblyn's students at San Francisco State University. Tamblyn's primary focus on women and technology would continue to undergird the broader trajectory of her artistic, pedagogical, and scholarly career. Originally a CD-ROM work, and presented in *Digital Capture* as a video of its emulation, the piece offers a multi-narrative argument against the masculinism of technology both historically and in the contemporary moment. Several distinct perspectives, characters, and voice-overs narrate the legacies of gendered exclusion and obfuscation that have dominated various technological spheres. Tamblyn demonstrates the gendered inaccessibility of novel technologies and their spaces as systematized patriarchy.[28] For Tamblyn, women's access to and role in creating novel technologies is determined through and against hetero-masculinist power and Western (fascistic) exceptionalism.

In the work, Tamblyn evidences this through selected historical and archival ephemera, oral narratives, and artistic examples organized into twelve distinct paths: memory, control, power, communication, credits, violence, homunculus, labyrinth, interactivity, representation, ideology, and the other. The video opens with Tamblyn's virtual video-recorded avatar appearing in the center of the frame as the makeshift bud of an interactive flower. The viewer can "pluck" one of the twelve petals, mirroring the same affective ambivalence the work's title evokes. Each narrative transition is preceded by a virtual introduction by

Tamblyn, who opens with the statement: "My name is Christine; welcome to my mind. I want to interact with you. I am a woman who is now appearing to you as a virtual subject." Tamblyn instructs the viewer to proceed to the next phase of the work by clicking "on her mouth."

Tamblyn faces the viewer with a disaffected countenance, mouth agape and adorned with bright red lipstick, vaguely reminiscent of an inflatable sex doll. Her satirical play on the virtual (female) avatar formalizes its kinship with these mass-produced plastic avatars that similarly (albeit distinctly) serve as inanimate re/displacements for living, physically present women. The viewer's "click" leads them into a home-screen guide with an array of explanatory text and navigation buttons. Tamblyn breathes heavily while the engager decides which petal-path to follow, a gesture that seems to endow the computer with embodied liveliness.

Tamblyn would explicitly address her ongoing interest in the virtual and material body as a mediated site—be it in virtual forums or material ones—in the March 1994 ICA London conference "Seduced and Abandoned: The Body in the Virtual World."[29] The conference was notable for its then-novel feminist interventions into the intersections of gender, sexuality, digital technologies, and artistic practice. Tamblyn specifically argued against the historical exclusion of women and culture from conversations on technology, which arguably still remains an insularly hetero-masculinist, Western, militarized front.

Beyond Tamblyn's archival intervention into women's continued exclusion from the technological realm, *She Loves It, She Loves It Not* similarly presents a feminist revisionist history. The work collates women's technological feats, achievements, and interventions in the technosphere as a gendered reclamation and critique of the dominant patriarchal rhetoric of science and technology. Akin to theorist Isabelle Stengers's examination of the political ecologies of incorporation, "objectivity," and "rationality," Tamblyn reveals the historical-material terrain of digital art making and the stakes specific to female artistic practitioners. The relation between the two (that is, women and technology) remains one of "reciprocal capture," where makers are concurrently beholden to (or held captive by) the power, histories, and rationales that continue to saturate digital forums and vice versa.[30]

The historical context for the work's creation in the early 1990s also places it in dialogue with emergent and parallel feminist, queer, and critical race interventions into technologically deterministic spaces. For example, the rise of post-humanism in the late twentieth century would prove paramount in examining the cultural and political parameters of technology apart from its previous insulation in scientific discourse. Cyber-feminisms of the late 1980s and 1990s would inevitably collide with the culture wars, third-wave feminism, and the politics of multiculturalism. These fields remain(ed) divided between notions of an indexical (essential) identity and identity-based coalitions (for instance Black feminism, queer theory, or Chicana feminism).[31] Tamblyn's work pays tribute to these distinct movements and interventions through the historical and chronological annotations and digitized ephemera accompanying each case study. In this vein, *She Loves It, She Loves It Not* can be understood as visualizing the effects of boundaries—of history and knowledge, art and criticism, body and machine.

COLLECTING, SAVING, DELETING: OLD HABITS AND NEW FORMS

Each of the artworks explored above provides a conceptual model for the contemporary digital moment—a time when forms of digital memory, collectivity, and data have become increasingly determined by the overwhelmingness of self-produced media, uncertainty, and acts of reconstitution toward digital democratization. The archive occupies an increasingly tenuous position in these conditions, with its etymological conditions, even in a Derridean sense, becoming ever more opaque. In this vein, artistic gestures of uncertainty and collated digital materials have attempted to treat "the real [not] as an effect to be produced" but as a manifold inhabiting a flux of shared and collectively organized information.[32]

I say this while thinking about Hannah Arendt's assertion that "moments of truth" can be captured and lend integral stability to facets of human life grounded in a teleological order. Truth, for Arendt, is inextricably bound to a firmness or essential ontological position that resists control or manipulation: "Conceptually, we may call truth what we cannot change; metaphorically, it is the ground on which we stand and the sky that stretches above us."[33] The constitution of this truth is contingent on the manifold interpretations and experiences that have determined its order. In the context of an alternative archival assemblage, this is primarily what makes each of these works so compelling. Within this framework, the immediate interests, forgotten tabs, and desirous pop-ups begetting clicks have supplanted the normative material logics that continue to inform the physical archive, its fetish objects, and its often-immutable collecting practices. These artists have replaced the entombed material object and its sensuous dust with the readily accessible, immaterial, detrital, non-precious, and infinite. This deviation radically contrasts with institutional archival practices that continue to privilege specific artifacts from a secular, institutional, and disembodied engagement.

The personal and/or largely mutable materials featured within each artist's "archive" are porous and indistinct and serve myriad functions, ranging from the quotidian (bookmarking, erotic pleasure, downloading) and the partial (censored and/or blocked) to the scholarly, for an array of public-engaging audiences. This is similarly complicated, however, by the fact that internet surfing histories and other personal archiving and image-based practices remain mediated by the internet's increasing territorialization. As a practice, the personal archive and "poor image" repository (as famously argued by Hito Steyerl) is still considered a form of fringe knowledge operating outside traditional archival scholarship.[34]

Contrary to the status of traditional archival forms sedimented through carefully organized objects and ephemera, the artistic archives enumerated here are spectral, contrarian, and "hauntological," possessing a kind of "virtuality that already impinges on the present, conditioning expectations, and motivating cultural production."[35] Each work's objects and activities visualize the pertinence of marginal knowledge and intimate connectivity through the mass proliferation of novel memory-making practices. The repositories and forms comprising the works expand the breadth of normative archival forms and institutional forums through a largely collaborative framework. The artistic archival forms and collecting practices, though distinct chronologically, formally, and conceptually, provide an alternate lens through which to understand the possibilities of the archive beyond its traditional functions and modes.

The tomb Douglas Crimp infamously decried, which insists "upon which different kinds of data can be accumulated and organized," is here disrupted through a tabulated incompatibility or artistic deviation from normative models.[36] These artistic gestures arguably spark new ways of thinking about the constitution of the archive and its practices, not just as supplementary to preexisting institutional practices, but as a renewed forum for meaning and knowing. Contrary to the traditional archive and its disembodied entombment, each artist's inadvertent (or specifically intended) archival impetus to collect, collate, or reconstruct has yielded the opportunity to create novel through lines for understanding individual and collective experiences via alternative assemblages, temporal media, and compulsory knowing.

Notes

1 Other such "nontraditional" archives include the home archive—that is, the creation, collection, and organization of personal effects and documents laden with sentimental value and significance. VHS tapes, family albums, knickknacks, and hobbyist artifacts are included in this and have been regarded by some scholars as among the first archives.

2 Michel Foucault, *The Archaeology of Knowledge and the Discourse on Language*, trans. A. M. Sheridan Smith (New York: Pantheon Books, 1972), 7.

3 Interested readers might turn first to Safiya Noble, *Algorithms of Oppression: How Search Engines Reinforce Racism* (New York: NYU Press, 2018); Wendy Hui Kyong Chun, *Updating to Remain the Same: Habitual New Media* (Cambridge, MA: MIT Press, 2017); and Lisa Nakamura, *Cybertypes: Race, Ethnicity, and Identity on the Internet* (New York: Routledge, 2002).

4 Jacques Derrida, *Archive Fever: A Freudian Impression* (Chicago: University of Chicago Press, 1995).

5 Derrida, *Archive Fever*, 2, 36, 14, 91.

6 Marisa J. Fuentes, *Dispossessed Lives: Enslaved Women, Violence, and the Archive* (Philadelphia: University of Pennsylvania Press, 2016), 13.

7 Arjun Appadurai, "Here and Now," in *Modernity at Large: Cultural Dimensions of Globalization* (Minneapolis: University of Minnesota Press, 1996), 4, 3.

8 Mary Anne Doane, *The Emergence of Cinematic Time: Modernity, Contingency, the Archive* (Cambridge, MA: Harvard University Press, 2002), 223.

9 Natalie Bookchin, *Databank of the Everyday* description, 1999, http://www.espacemultimediagantner.cg90.net/wp-content/uploads/2015/08/collec08.pdf.

10 Roland Barthes, *Camera Lucida: Reflections on Photography*, trans. Richard Howard (New York: Hill & Wang, 1981), 115.

11 Jean-Michel Rabaté, *The Ghosts of Modernity* (Gainesville: University Press of Florida, 1996), xi.

12 See Susan Sontag, "In Plato's Cave," in *On Photography* (New York: Rosetta Books, 1973), 4.

13 See Sheila Pinkel, "Manifestations of a Cube," *Leonardo* 15, no. 3 (1982): 228.

14 Lev Manovich, "What Is Digital Cinema?," in *The Digital Dialectic*, ed. Peter Lunenfeld (Cambridge, MA: MIT Press, 1998), 189.

15 Foucault, *The Archaeology of Knowledge and the Discourse on Language*, 103. See also Michel Foucault, *Power/Knowledge: Selected Interviews and Other Writings*, 1972–77 (New York: Pantheon Books, 1972/1980).

16 See Saidiya Hartman; "Venus in Two Acts," *Small Axe* 12, no. 2 (2008): 1–14; Saidiya Hartman, *Wayward Lives, Beautiful Experiments: Intimate Histories of Social Upheaval* (New York: W. W. Norton, 2019).

17 Jasbir Puar, "Preface," in *Terrorist Assemblages: Homonationalism in Queer Times* (Durham, NC: Duke University Press, 2017), xx.

18 Puar, "Preface," xx. See also "queer negativism" texts by Leo Bersani, Lee Edelman, and Lauren Berlant.

19 Rich Cante and Angelo Restivo, "The Cultural Aesthetic Specificities of All-Male Moving-Image Photography," in *Porn Studies*, ed. Linda Williams (Durham, NC: Duke University Press, 2004), 144.

20 Roland Barthes, "Striptease," in *Mythologies*, trans. Annette Lavers (New York: Noonday Press, 1972), 84, 86. See also Anne Cheng, *Second Skin: Josephine Baker and the Modern Surface* (New York: Oxford University Press, 2013), which examines the racialized and gendered contradictions of Barthes's striptease.

21 Liliana Conlisk Gallegos, "Artist Statement," 2020, https://digitalartarchive.siggraph.org/artwork/liliana-conlisk-gallegos-the-coyolxauhqui-imperative/.

22 Bernardino de Sahagún, trans., *Florentine Codex: Book 3, The Origin of the Gods* (1569/1981).

23 Gloria Anzaldúa, "Let Us Be the Healing of the Wound: The Coyolxauhqui Imperative—La Sombra y el Sueno," in *One Wound for Another / Una herida por otra: Testimonios de latin@s in the U.S. through Cyberspace*, ed. Clara Lomas and Claire Joysmith (Mexico City: Centro de Investigaciones Sobre America del Norte, 2003), 120–22.

24 Gloria Anzaldúa, "Bearing Witness: Their Eyes Anticipate the Healing," in *The Gloria Anzaldúa Reader*, ed. AnaLouise Keating (Durham, NC: Duke University Press, 2009), 279.

25 Liliana Conlisk Gallegos, artist statement for *The Coyolxauhqui Imperative 2020* (2020), in the SIGGRAPH DAC online exhibition *Digital Power: Activism, Advocacy and the Influence of Women Online*, https://digital-power.siggraph.org/piece/the-coyolxauhqui-imperative/.

26 Édouard Glissant, *Poetics of Relation*, trans. Betsy Wing (Ann Arbor: University of Michigan Press, 1997), 82.

27 Sara Ahmed, *On Being Included: Racism and Diversity in Institutional Life* (Durham, NC: Duke University Press, 2013), 2.

28 Christine Tamblyn, *"She Loves It, She Loves It Not: Women and Technology*, an Interactive CD-ROM," Leonardo 28, no. 2 (1995): 102. See also Christine Tamblyn, *She Loves It, She Loves It Not: Women and Technology*, 1993, UC Irvine Libraries Special Collections, Tamblyn (Christine) Papers.

29 See Sadie Plant, Bruce Sterling, Helen Cadwallader, Christine Tamblyn, Pat Cadigan, and Rosi Braidotti, *Seduced and Abandoned: The Body in the Virtual World* (London: Crises Editions, 1994).

30 Isabelle Stengers, *Cosmopolitics 1*, trans. Robert Bononno (Minneapolis: University of Minnesota Press, 2010), 38.

31 See for instance the work of Judith Butler, Stuart Hall, and Kobena Mercer.

32 Jacques Rancière, *Film Fables* (New York: Berg Press, 2006), 159.

33 Hannah Arendt, "Truth and Politics," in *Between Past and Future: Eight Exercises in Political Thought* (New York: Viking Press, 1968), 264.

34 Hito Steyerl, "In Defense of the Poor Image," *e-flux Journal*, no. 10 (November 2009): https://www.e-flux.com/journal/10/61362/in-defense-of-the-poor-image/.

35 Mark Fisher, "What Is Hauntology?," *Film Quarterly* 66, no. 1 (Fall 2012): 16.

36 Douglas Crimp, "On the Museum's Ruins," *October* 13 (Summer 1980): 44.

EVERYONE WILL BE TAKEN INTO THE FUTURE

NIKOLAY MASLOV

Our curatorial team has quipped since the very onset of this project (in early 2020) that *Digital Capture: Southern California and the Pixel-Based Image World* will be out of date the moment it opens. That has held true, perhaps to an extent none of us imagined. What has been reaffirmed over the past four years, however, is the interwovenness between California and digital imaging.

During the COVID-19 pandemic, hardware and software conceived, designed, and/or developed in California became massively more relied upon for communication, entertainment, and political engagement. Lockdowns and quarantines pushed about half of the global population to rely on digital solutions like telemedicine, virtual learning, and remote work. A Pew Research Center study found that 90 percent of Americans considered the internet essential during this time.[1] But a digital divide grew as well, as the pandemic highlighted and intensified existing inequalities in digital access, particularly affecting students from disadvantaged backgrounds[2] and amplifying challenges for older populations in accessing health care and staying connected in general. The compulsory digitalization that occurred during the pandemic also escalated surveillance and data collection, making opting out of the technology-laden world more difficult than ever before.[3]

Each stage of technological integration into a population, workforce, et cetera reflects not just a step forward, but also a moment to reflect on the variety of pathways technology can take. The trajectories of a technology such as digital imaging can develop in ways that are as unpredictable as they are transformative. This invites us to take a closer look at not only the technology and its users, but also at the socio-cultural-political milieu surrounding it. Wolfgang Ernst helps us articulate a line of inquiry known as media archaeology

that is "an epistemologically alternative approach to the supremacy of media-historical narratives. . . . This means that when media archaeology deals with prehistories of mass media, this 'pre-' is less about temporal antecedence than about the techno-epistemological configurations underlying the discursive surfaces (literally, the monitors and interfaces) of mass media."[4] Media archaeology is not only the exploration of the material and historical conditions of the creation of software and hardware, but also, as Jussi Parikka states, "a conceptual and practical exercise in carving out the aesthetic, cultural, and political singularities of media. And it's much more than paying theoretical attention to the intensive relations between new and old media mediated through concrete and conceptual archives."[5] Media archaeology explores the ideas and imaginaries behind the development of new media and technologies while also noting the various false starts of technological progress.

Following media archaeology more broadly, *Digital Capture* resists reducing the seemingly inevitable emergence of the "pixel-based image world" into a technologically deterministic narrative. Jussi Parikka and Erkki Huhtamo also remind us that "dead ends, losers, and inventions that never made it into a material product have important stories to tell."[6] And Noah Wardrip-Fruin adds that "the media archaeology approach has often unearthed forgotten moments from pre-digital media and, bringing them into the present media context, has both seen them anew and used them to illuminate the media culture of today."[7] The investigative approach and framework of media archaeology has been a guide for *Digital Capture* in its efforts to elucidate manifold digitally induced seismic disruptions in the personal, political, and ecological spheres.

My intent in this essay is to expand on a few of the themes, individuals, and technologies that served to ground and develop *Digital Capture*. The following pages also highlight one particular trajectory of digital images over the past few decades, beyond their ubiquity: they have been a substrate for new technological developments. Digital imaging untethered animation, graphic design, photography, the cinematic arts, and essentially every other visual form from its physical constraints, ultimately remaking them as virtual data points as opposed to fixed photochemical artifacts. The end point of this transmutation was the flattening of visual material into "content"—the reframing of media into components to be distributed, reinterpreted, and reimagined for a multitude of aims. One particular aim has been the training and development of artificial intelligence (AI) systems that themselves have begun creating images. As Joanna Zylinska poignantly writes, "The distinction between image capture and image creation is now increasingly blurred."[8] Likewise the distinctions between devices that create, capture, or manipulate images. Phones double as personal computers, automobiles can accept incoming calls and texts, and everything seems to be laden with cameras and other image-capturing devices. The pixel, as the single unit of visual digital data, becomes the intermediary between all of these, bridging disparate devices and applications into a seamless continuum of digital interaction.

UNTETHERING

Curator and writer Sandra S. Phillips reminds us: "Photography was invented during a period of enormous technological advancement that marked the real beginning of the modern world. The Industrial Revolution brought about fundamental and radical changes in society; suddenly machines were able to do things

that human beings could not, or machines could do the work of many more quickly."[9] Similarly, the geopolitical ruptures of the late twentieth century brought out fundamental changes to the sociopolitical fabric of our world. The end of the Cold War saw neoliberalism seemingly prevail as the global political ethos. As Francis Fukuyama (in)famously wrote in his article "The End of History?" (1989), "The triumph of the West, of the Western *idea*, is evident first of all in the total exhaustion of viable systemic alternatives to Western liberalism."[10] The redistribution of geopolitical hegemony in the late 1980s and early 1990s also saw a concurrent ascendancy of digital technologies over their analog antecedents. Bookending the conceptualization of digital imaging technology in the early 1960s, researchers in Southern and Northern California connected through a proto-internet framework in 1969, and the foundation of our contemporary digital world was set.[11] The 1990s and early 2000s saw the convergence of digital images and the internet, as graphical user interfaces, broadband connections, and ever more affordable personal computers flooded the consumer sphere.

Digital technology was, on the surface, perfectly suited to accentuate the value systems, or at least the superficial signifiers (for instance "fast," "new"), of Western life. A rapid series of firsts emerged during this period. One of the first exhibitions on digital photography, *Digital Photography: Captured Images, Volatile Memory, New Montage*, opened at SF Camerawork in San Francisco in 1988.[12] Photoshop was released for the Apple Macintosh in 1990 and for the Windows PC in 1993. The first lay user of a commercially made digital camera is reputed to have been Lucien Samaha, who in the late 1980s and early 1990s was a student at Rochester Institute of Technology's School of Photographic Arts and Sciences. He won a scholarship that included a position in Eastman Kodak Company's Professional Photography Division. In 1990, by his own account, he was one of the first "to use Kodak's DCS 100 Professional Digital Camera System outside the factory floor."[13] He recalls, "The camera, a Nikon F3 with a Kodak digital back, was tethered to a DSU (digital storage unit) with (by 1990 standards), an astounding 200 Mb Winchester drive, a keyboard and a small monochrome monitor."[14] Professional- and consumer-grade digital cameras continued to be released throughout the 1990s, and the first camera-equipped phones became available toward the end of the decade.[15]

The mid- to late 2000s untethered access to the internet from domestic and commercial/institutional spaces (internet cafés, libraries, universities) through the widespread adoption of modern smartphones. Coupled with advances in cellular telecommunication, users of mobile devices became able to transmit content at ever-increasing speeds and feed an ever-greater amount of data back into the cybersphere. As the *New York Times* reported in 2015, the number of photos uploaded to the internet "has nearly tripled since 2010 and is projected to grow to 1.3 trillion by 2017. The rapid proliferation of smart phones is mostly to blame. Seventy-five percent of all photos are now taken with some kind of phone, up from 40 percent in 2010."[16] Those images quickly became incorporated into large-scale image databases that would become training fodder for machine learning and artificial intelligence research.[17] Scholar Ruha Benjamin writes, "Photography was developed as a tool to capture visually and classify human difference; it helped to construct and solidify existing technologies, namely the ideas of race and assertions of empire, which required visual evidence of stratified difference."[18] What then happens when those technologies are enhanced through classification algorithms and deployed as autonomous systems?[19]

The sophistication of modern machine learning and AI algorithms allows for the reconfiguration of imagery and its associated metadata not only into aesthetic, marketing, or consumer products, but also as tools of the military-industrial complex.[20] In addition, they serve to reinforce or perpetuate the biases of the creators of those systems. Safiya Noble, writing in *Algorithms of Oppression: How Search Engines Reinforce Racism* (2018), expands: "Part of the challenge of understanding algorithmic oppression is to understand that mathematical formulations to drive automated decisions are made by human beings. While we often think of terms such as 'big data' and 'algorithms' as being benign, neutral, or objective, they are anything but. The people who make these decisions hold all types of values, many of which openly promote racism, sexism, and false notions of meritocracy, which is well documented in studies of Silicon Valley and other tech corridors."[21] Satellites are now able to capture and deploy location data for the purposes of spycraft and turn-by-turn navigation. Facial recognition software, whose algorithms depend heavily on multitudes and magnitudes of images, are deployed by security agencies of global nations but also commodified into face filters on social media. The personalization of media content is ultimately driven by the variance and quantity of data points users provide either actively (through intentional connections to websites, apps, and servers) or passively (through cookies, malware, open networks, and so on). This digital oversharing allows for easily curated retail or media experiences, but also for the hyper-targeting of individuals (notably swing voters) by political campaigns.

AI-generated images are also introducing new challenges in the realms of content moderation and image verification. As these images blur the lines between the real and the artificial, determining their authenticity becomes increasingly complex. Previously, content moderation was about filtering through content to determine its appropriateness or source. Now, with the rise of advanced AI imagery, moderators face the added task of distinguishing between human-created and machine-generated content. Image verification, which already faced challenges due to tools like Photoshop and the emergence of deepfakes,[22] is further complicated by AI-generated images. These images can replicate reality with high precision but do not have a clear origin, making the process of verification even more daunting. The realms of copyright and plagiarism have entered uncharted territory as well. Images produced by AI models, driven by vast training datasets, raise questions about originality and ownership. If an AI uses copyrighted images in its training set and then generates a "new" image, who holds the rights? Moreover, if these datasets contain uncredited works, the risk of institutionalizing plagiarism becomes real.

Digital technology makes its own internal labor largely invisible and inaudible. There is no whirring of tapes, nor (more recently) spinning of data drives. Conversely, the hyper-visibility of the conditions of labor necessary to manufacture electronic devices (mining of raw materials, supply chains and their requisite labor of factories, retail outlets, delivery services) has ironically been made possible through the instantaneous nature of digital communication. In addition to the complications of the sociopolitical sphere, increasingly power-hungry technological systems demand more raw materials and energy. Jussi Parikka writes: "The iDevice is enabled by dubious labor practices, including child labor in the mines of Congo; the appalling working conditions, which lead to a number of suicides, in the Foxconn factories in China; and the planned obsolescence designed into the product, which also contributes to its weighty share of

electronic waste problems."[23] In navigating the interplay of labor and resources within the digital realm, it becomes clear that beneath the exteriors of our devices lies a tangled web of human and environmental consequences.

Artists and activists have been deploying strategies to subvert and repurpose mass communications (and their tools of creation) since the beginnings of those practices and mediums. Culture jamming—the intrusion of pirate signals into mass-media broadcasts—occurred in a few notable cases in the 1980s and 1990s (as when a faux Max Headroom hijacked two Chicago television stations for a brief moment in 1987)[24] and has found a new dimension in the digital age. So-called subvertising,[25] the disruption of marketing and advertising materials for the aims of subverting their consumeristic and/or political impulses, has thrived in the digital realm as well, expressing itself through meme hacks and other forms. In recent decades, performance and social-practice artists have updated the analog methods of the likes of the Merry Pranksters and Guerrilla Girls, playing with various notions of the viral moment, the meme, and other internet semiotic expressions to articulate their projects.

The precarious nature of instant connection and mediation (and then subsequent remediation, reinterpretation, and remixing) has played out to various extents in the last few decades. The Iraq War of the early 1990s was the first war broadcast in real time over television, and subsequent conflicts have been transmitted over the medium to ever greater degrees. The entry of the internet into the media landscape during the 1990s and the internet's suffocation of traditional news and media outlets has lent new urgency to discussions of truth, fact, veracity, and access. Intrusions into the military-industrial-media triangulation by hacktivists and groups such as WikiLeaks have challenged conventions of jurisprudence and journalistic intent. The presidential campaigns of the past two decades were all reliant on internet-based outreach and organization, as well as on electioneering opportunities afforded by social media. Additional recent reference points that illustrate the potency of digital (imaging) technology in moments of protest and political upheaval include the role of social media and file-sharing software in Occupy Wall Street, the Arab Spring, and Black Lives Matter.

As with digital technology, AI systems and the infrastructure/labor networks that support them also take a toll on ecologies and economies. Kate Crawford writes: "The lifecycle of an AI system from birth to death has many fractal supply chains: forms of exploitation of human labor and natural resources and massive concentrations of corporate and geopolitical power. And all along the chain, a continual, large-scale consumption of energy keeps the cycle going."[26] Artists have begun, with ever more intensity, exploring the complications and possibilities of AI and digital images. Crawford and Trevor Paglen's *ImageNet Roulette* (2019) made the ImageNet[27] database the subject of an installation, highlighting the problematic and stereotypical classifications imposed by AI classifiers. Artists such as Hito Steyerl and Zach Blas have also delved into these themes, using digital media to critique surveillance, data privacy, and the sociopolitical implications of AI. Steyerl's work often reflects on the role of images in the age of digital reproduction and artificial intelligence, while Blas confronts issues of biometrics and identity in the digital realm.[28]

AFTERIMAGE

The past few years have seen a proliferation of AI imaging tools, with AI features infusing seemingly every aspect of image production. One of particular note, and perhaps epitomizing widespread adoption of AI image systems, was the "generative fill" tool's introduction in early 2023 into beta versions of Photoshop. Generative fill allows users to add, extend, or replace elements in an existing image by simply entering text into a prompt window.[29] The tool is powered by Firefly, a generative AI system proprietary to Adobe that also extends to other applications in Adobe's Creative Cloud suite of applications used for graphic design, video editing, and more. Integration of generative fill into Photoshop extends and complicates the possibilities of the "digital darkroom" while also potentially undercutting the business models of similar applications such as Midjourney. With Photoshop a staple of image editing workflows, and Photoshop (as a verb) a synonym for image editing, generative fill could potentially break generative AI into the mainstream of image editing—signifying not necessarily the end of photo editing, but rather a paradigm shift within the digital darkroom. Photo editing tools are no longer passive instruments; they now have the capability to suggest and create.

Refik Anadol, an artist working at the forefront of this intersection, embodies an essence of the modern photographic and image-making landscape. As Joanna Zylinska puts it, Anadol's work foregrounds "the impossibility of the human *seeing it all*[;] it points to the fact that images now come to us principally in flows to be experienced, rather than as single-frame pictures to be decoded."[30] These flows of images not only come at us in algorithmically curated feeds on social media, but also serve as training corpuses for yet more new images. Anadol's work *Machine Hallucination: Keystone-Mast Collection* (2024) utilizes artificial intelligence to transmute images from part of the California Museum of Photography's collection [PLATE 07]. The museum's Keystone-Mast Collection, consisting of approximately 250,000 stereoscopic glass-plate negatives and 100,000 prints, is a vast archive of global history from the late nineteenth to the mid-twentieth century.[31] Anadol and his team used proprietary AI algorithms to transform these historic images into a digitally projected flow of new images, some abstract and some representational. Figures, forms, and landscapes emerge, then are once again subsumed. This flow brackets the history of photo technology, from the earliest glass plates to images generated by artificial intelligence and machine learning. It is also a Rorschach for the promises, pitfalls, and perils of AI and image making. Artworks utilizing AI (and the related discipline of machine learning) are arguably permeated by the broad constellation of military-industrial development, much of which has deep ties to California.[32]

Digital Capture walks up to the doorstep of AI, but does not cross that threshold. That subject matter is deserving of another project entirely.[33] Much in the way that *Digital Capture* serves as an exploration of the image-based pixel world that emerged out of California's Cold War-era space-race labs, it also serves as a prologue for what is to come. It's easy, at least for this author, to imagine us at an inflection point in the history of technology that is at least as significant as the one we encountered at the dawn of the digital age and the internet. Critical inquiry, artistic intervention, and social activism will play vital roles shaping and negotiating how emergent AI systems are deployed in daily life. They will be necessary to counteract impulses that would otherwise make market forces the sole prime movers of the technology's future development

and integration. There is no doubt that the future will be here before we realize it. What remains to be seen is how much of this future we will ourselves create, as opposed to be swept along into.

Notes

1 https://www.pewresearch.org/internet/2021/09/01/the-internet-and-the-pandemic/.

2 Netta Iivari, Sumita Sharma, and Leena Ventä-Olkkonen, "Digital Transformation of Everyday Life: How COVID-19 Pandemic Transformed the Basic Education of the Young Generation and Why Information Management Research Should Care," *International Journal of Information Management* 55 (December 2020): https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7320701/.

3 The title of this essay nods to and inverts artist and author Ilya Kabakov's essay "Not Everyone Will Be Taken Into the Future" (1983), which likens painter Kazimir Malevich to a headmaster choosing students for summer camp to illustrate the selective nature of which artists' works endure into the future. For more see Margarita Tupitsyn, *Malevich and Film* (New Haven, CT: Yale University Press, 2002), 3–7.

4 Wolfgang Ernst, "Method and Machine versus History and Narrative of Media," in *Media Archaeology: Approaches, Applications, and Implications*, ed. Erkki Huhtamo and Jussi Parikka (Berkeley: University of California Press, 2011), 239.

5 Jussi Parikka and Garnet Hertz, "Archaeologies of Media Art," *CTheory*, April 1, 2010, reprinted at http://mediacartographies.blogspot.com/2010/04/ctheory-interview-archaeologies-of.html.

6 Jussi Parikka and Erkki Huhtamo, "An Archaeology of Media Archaeology," in *Media Archaeology*, 3.

7 Noah Wardrip-Fruin, "Digital Media Archeology: Interpreting Computational Processes," in *Media Archaeology*, 302.

8 Joanna Zylinska, *The Perception Machine: Our Photographic Future between the Eye and AI* (Cambridge, MA: MIT Press, 2023), 2.

9 Sandra S. Phillips, "Exposing Ourselves: Photography and the Covert," in *Covert Operations: Investigating the Known Unknowns*, ed. Claire C. Carter (Santa Fe: Radius Books; Scottsdale, AZ: Scottsdale Museum of Contemporary Art, 2014), 27.

10 Francis Fukuyama, "The End of History?," *National Interest*, no. 16 (Summer 1989): 3.

11 The Advanced Research Projects Agency Network (ARPANET), established in 1969, laid the technical foundation for the modern internet. The Advanced Research Projects Agency became the Defense Advanced Research Projects Agency (DARPA), and is the research and development wing of the US Department of Defense. Its primary responsibility is the development of emerging technologies for the military.

12 The accompanying catalogue was Marnie Gillett and Jim Pomeroy, *Digital Photography: Captured Images, Volatile Memory, New Montage* (San Francisco: SF Camerawork, 1988).

13 See https://lucien-samaha.squarespace.com/projects-1.

14 Heavy Collective, "Lucien Samaha: Kodak and the Birth of the Digital Camera," November 5, 2013, no longer available online.

15 The first commercial camera phone, released in Japan in 1999, was the Kyocera VP-210. See https://collection.sciencemuseumgroup.org.uk/objects/co523555/kyocera-visualphone-vp210-mobile-video-phone-1999-mobile-telephone.

16 Stephen Heyman, "Photos, Photos Everywhere," *New York Times*, July 23, 2015, https://www.nytimes.com/2015/07/23/arts/international/photos-photos-everywhere.html.

17 Such databases include ImageNet (2009), Microsoft's COCO (Common Objects in Context) Dataset (2014), and Google's Open Images Dataset (2016), among many others.

18 Ruha Benjamin, *Race after Technology: Abolitionist Tools for the New Jim Code* (Cambridge, UK: Polity, 2019), 68.

19 See Cathy O'Neil, *Weapons of Math Destruction* (New York: Broadway Books, 2016), 15–31.

20 Anduril Industries, Inc., based in Costa Mesa, California, is an example of a recent AI-forward defense contractor. Anduril was founded in 2017 by Palmer Luckey, perhaps best known as the creator of the Oculus Rift VR gaming headset.

21 Safiya Umoja Noble, *Algorithms of Oppression: How Search Engines Reinforce Racism* (New York: New York University Press, 2018), 1–2.

22 Deepfakes are photorealistic video manipulations of people made possible through machine learning and AI.

23 Jussi Parikka, *A Geology of Media* (Minneapolis: University of Minnesota Press, 2015), 89.

24 John Carpenter, "The Max Headroom Incident," *Chicago Tribune*, November 23, 1987, https://www.chicagotribune.com/1987/11/23/the-max-headroom-incident/.

25 See Naomi Klein, "Subvertising: Culture Jamming Reemerges on the Media Landscape," *Village Voice*, May 8, 1997, 40.

26 Kate Crawford, *Atlas of AI* (New Haven, CT: Yale University Press, 2021), 32.

27 ImageNet, created by Dr. Fei-Fei Li in 2006 at Stanford University, is a database of more than fourteen million images (as of 2024) whose aim is to develop the ability of computer systems to develop recognition of objects within images. The project has faced criticism for issues related to dataset bias and image sourcing.

28 See for instance the 2023 exhibition *Hito Steyerl: This Is the Future* at the Portland Art Museum, https://portlandartmuseum.org/event/hito-

steyerl-this-is-the-future/, and Blas's *Facial Weaponization Suite* (2012–14), https://zachblas.info/works/facial-weaponization-suite/.

29 For more see https://www.adobe.com/products/photoshop/generative-fill.html.

30 Zylinska, *The Perception Machine*, 53.

31 For a web-browsable version of Keystone-Mast see https://calisphere.org/collections/11747/.

32 Santa Clara, California-based chipmaker Nvidia is perhaps at the forefront of developing cutting-edge hardware that powers much of AI development, and thus development of art and AI. For more on its connections to government and military funding see https://www.nvidia.com/en-us/research/government/.

33 Some threads of AI and photography were explored in the 2023 exhibition at UCR ARTS *Every Day We Have to Invent the Reality of This World: AI Post Photography*, https://ucrarts.ucr.edu/exhibitions/ai-post-photography/.

Les Horribles Cernettes

WORKS IN THE EXHI-BI-TION

IN SPACE, TIME, AND WAR

DIGITAL COSMOLOGIES AND MILITANT TERRAINS

Digital imaging is inseparable from its origin in Southern California's Cold War research labs. Jet Propulsion Laboratory (JPL) engineer Eugene Lally's 1961 concept paper titled "Mosaic Guidance for Interplanetary Travel," describing the possibility of a sensor connected to a computer to image stars and planets for space navigation, is generally regarded as the first description of digital imaging. It exemplifies the interwoven-ness of digital photography and the military-industrial-scientific complex that served as its incubator.

The term "military-industrial-scientific complex" refers to the network of personnel and institutions that collaborate to produce military weaponry and its technologies. President Dwight Eisenhower coined the phrase "military-industrial complex" in 1961—the same year as Lally's paper—in an address warning against a vague but ominous danger to the nation. The literal and ideological violence of the Cold War thereafter existed in tension with the optimism attached to digital imaging and its novel possibilities. Still today, digital imagery remains ethically and politically fraught given its use in projects of geopolitical expansion, military surveillance, global warfare, and ecological devastation.

E P O C H

Purgatorio, 2024

Virtual exhibition, 8K stand-alone app with high-res audio
Courtesy of EPOCH and the artists

Purgatorio is an online group exhibition created by Peter Wu+ as part of his online gallery project EPOCH. The exhibition features artists from various generations and geographies—including Lucia Grossberger Morales and Marton Robinson, also featured elsewhere in *Digital Capture*—with the artworks displayed in a virtual model of the Chet Holifield Federal Building in Laguna Niguel, California. Designed by modernist architect William Pereira in 1968–71, the building has supported several government entities: an aerospace agency, the Treasury Department, US Immigration and Customs Enforcement (ICE), Citizenship and Immigration Services, and others. These uses are somewhat ironic, given that in ancient times, the ziggurat was a sacred form intended to serve as a medium between the cosmos and Earth. *Purgatorio* visualizes this particular building's role in political violence, policing, and communal displacement, particularly along the US–Mexico border. The title is taken from an unfinished poem by US poet Hart Crane, who imagined Mexico as a place of exile from rampant technological imperialism in the United States. It underscores the ziggurat's and the borderlands' shared status as both transitory spaces and spaces of containment in the face of an increasingly technological police state. The featured works contend with the military-industrial complex, immigration, transnational identity, and the mutation of culture across borders.

Visit the exhibition online at epoch.gallery/purgatorio.

Maggie Hazen

Call of the Lily, 2019

Three-channel HD video (7:40 min., sound) and custom gaming armature; single-channel video (1:45 min.) on custom armature
Courtesy of the artist

Maggie Hazen's video installation considers the commercial, personal, and visual relationship between the actual US military-industrial complex and simulations of military warfare in interactive digital media. The work comprises an overhanging three-monitor station and a rocking chair, and it borrows much of its imagery and narrative from the first-person-shooter game *Call of Duty*. Hazen's appropriation, renamed *Call of the Lily*, replaces the user's wielded weapon with a virtual bouquet of tiger lilies, recalling the 1967 March on the Pentagon by the National Mobilization Committee to End the War in Vietnam. Alternating as it does between actual and virtual scenes of military violence, the work prompts consideration of how the spectacle of war is deployed across media forms.

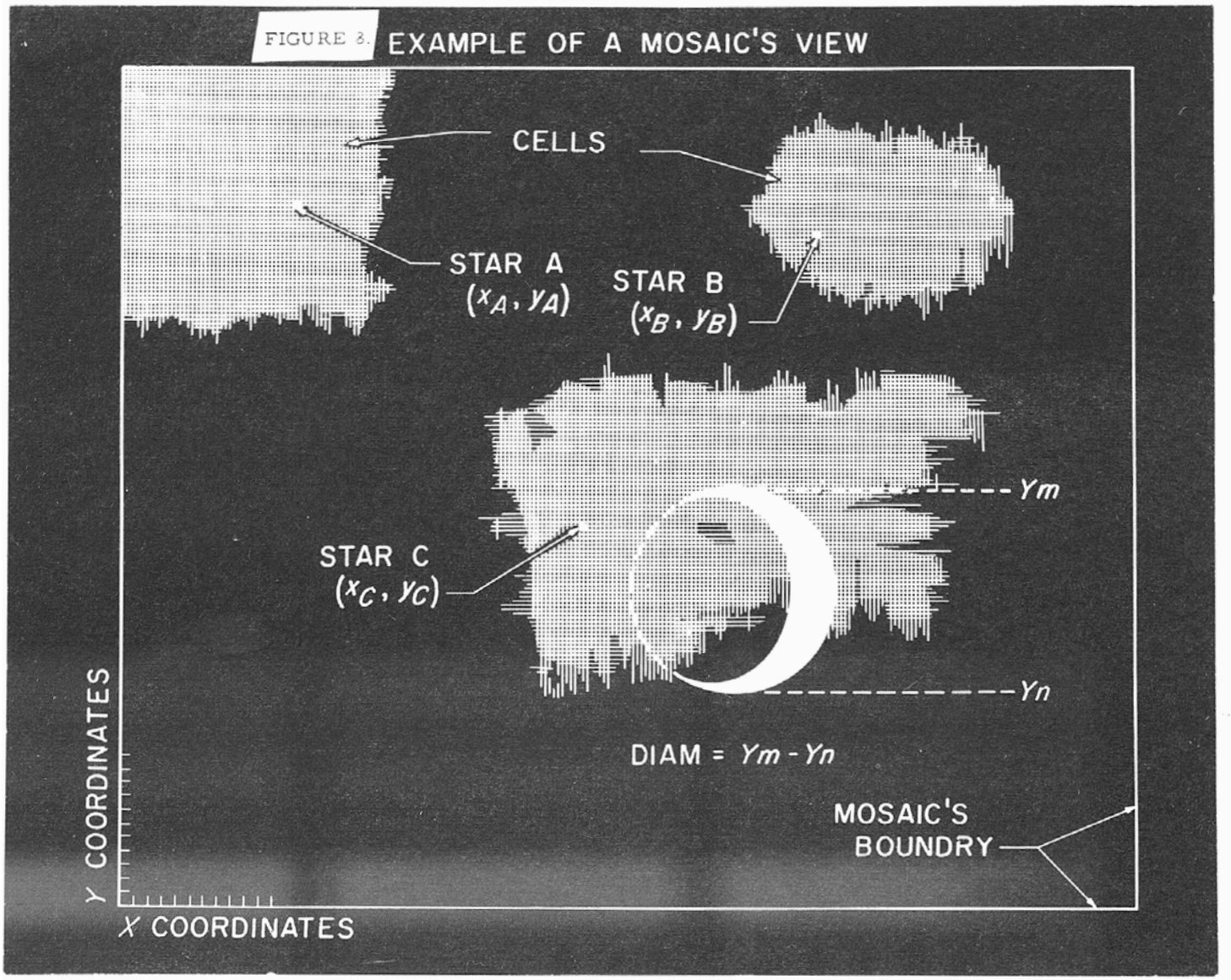
Huntrezz

Janos

Azon Machine (“The Wonders of Today,” season 2, episode 4), 2016

HD video (10:15 min., sound)
Courtesy of the artist

Azon Machine **is a mockumentary series that plays on the profoundly patriarchal and white history of science and technology, satirizing the myths of neutrality, factuality, and reputability commonly associated with scientific breakthroughs. It pairs segments of seemingly factual information with a hypothetical Azon Machine prototype. The name “Azon” is an acronym for “alternate zero observance and navigation,” which theorizes zero not as an absence, but as containing numerous possibilities.**

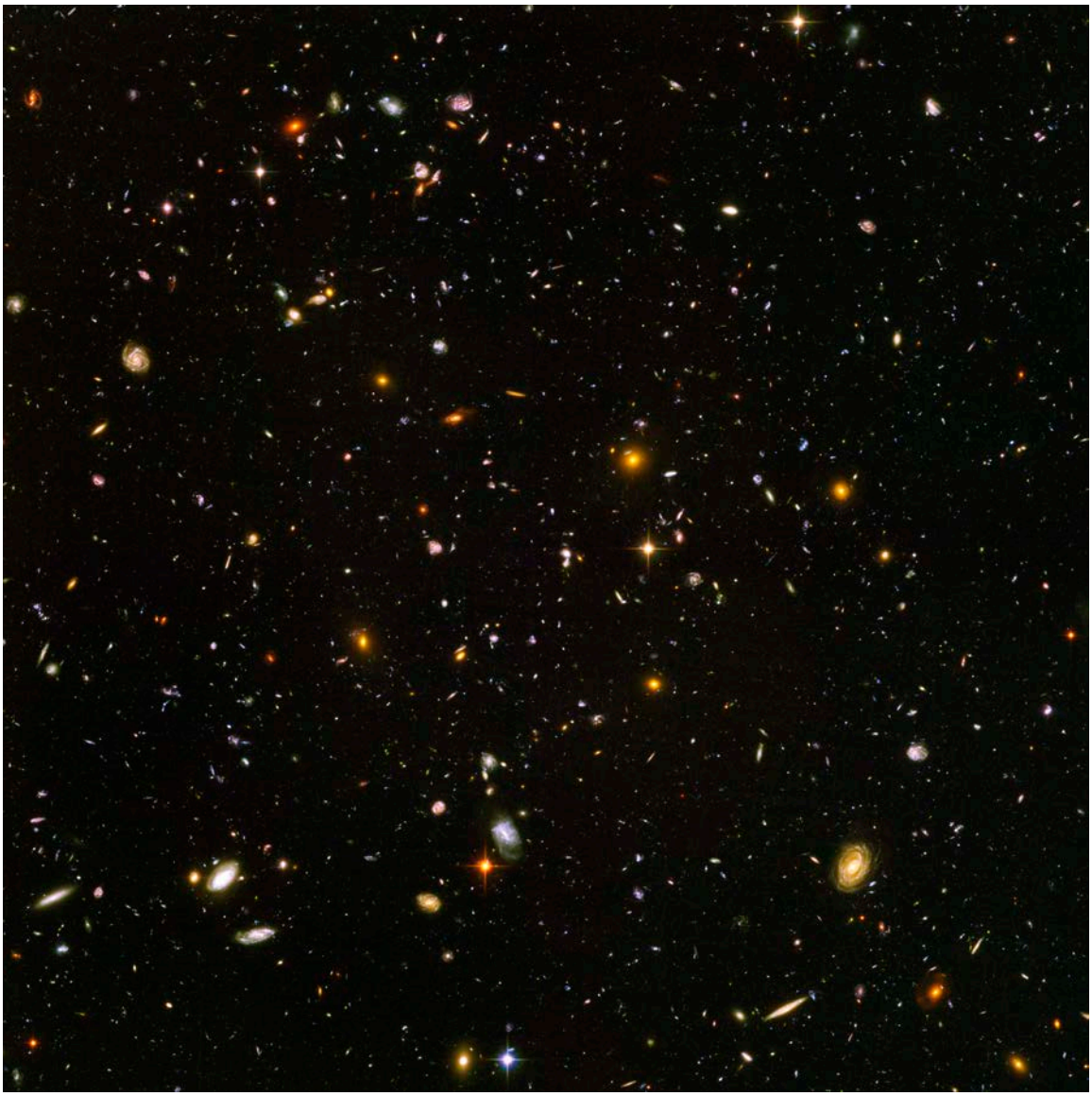


Eugene Lally

"Mosaic Guidance for Interplanetary Travel," first presented at Space Flight Report to the Nation, New York Coliseum, October 9–15, 1961

Archival reproduction
Courtesy of the American Institute of Aeronautics and Astronautics (formerly the American Rocket Society)

US aerospace engineer Eugene Lally presented and published a concept paper in 1961 that would later come to be regarded as the birth of digital imaging. Lally theorized the possibility of a spacecraft guidance system that relied on capturing image grids via photoconductive sensors. The purpose of this early digital picture taking was stated as "gathering scientific information, choosing missions, and providing strategic surveillance." History would show how the technologies developed to realize Lally's concept would also serve as a foundation for digital photography—a medium that transforms light into digital picture elements, or pixels, by way of sensors.

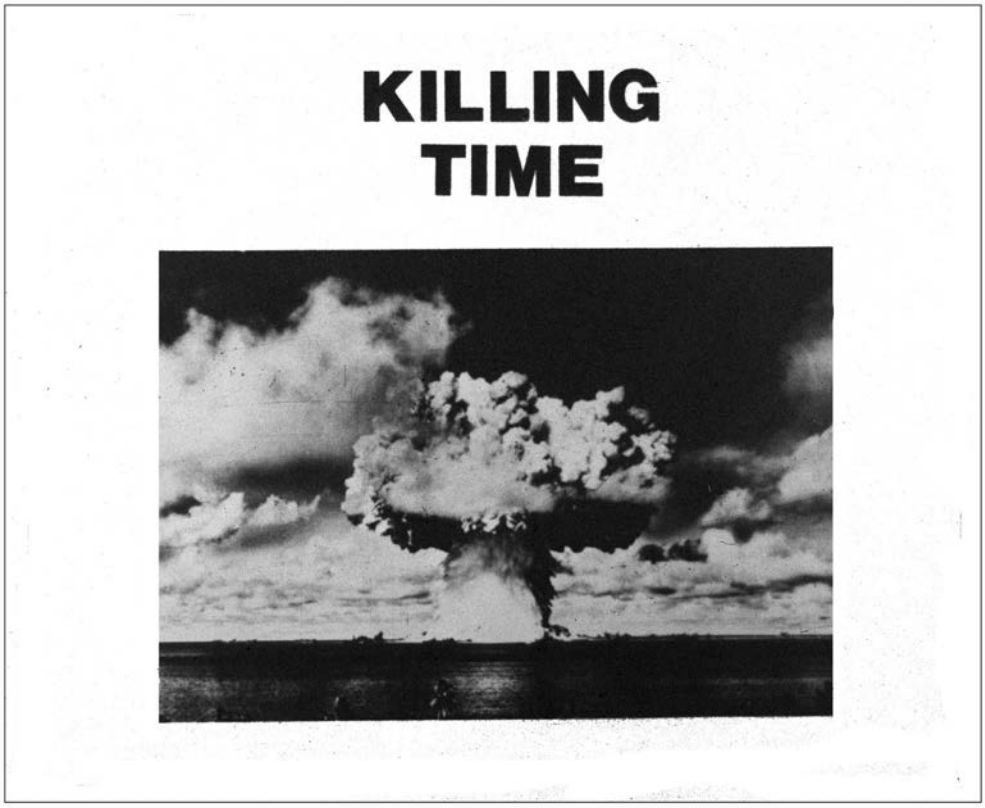


N A S A

Hubble Ultra Deep Field, 2006

Hubble Space Telescope digital image composite
Courtesy of NASA, ESA, and S. Beckwith (STScI) and the HUDF Team

This image depicts a small region of space containing an estimated ten thousand galaxies. It looks back approximately thirteen billion years and captures a moment in celestial history between four and eight hundred million years after the Big Bang. It required eight hundred exposures taken over four hundred Hubble orbits around Earth, with a total exposure time of 11.3 days over several months in 2003–4, and was released to the public in 2006. Named after Edwin Hubble, who used the hundred-inch Hooker Telescope on California's Mount Wilson to capture distant galaxies, *Hubble Ultra Deep Field* represents, among many things, a certain fulfillment of the earliest aspirations of digital imaging. It was presented in *Digital Capture* as an expansive wallpaper to convey the grandeur of space—and the scientific tendency to eclipse human struggles as minor in comparison.



Sheila Pinkel

Thermonuclear Gardens, 1984–85

Photographic installation, including black-and-white gelatin silver print of Xerox with text mounted on fabric, Xeroxed modular works, a digital print of an offset print, a Xeroxed modular work mounted on Sintra, and a black-and-white Xeroxed advertisement on paper
Courtesy of the artist

Thermonuclear Gardens is an expansive multimedia installation and information mapping project that traces the US military-industrial complex in the 1980s and early 1990s through visual and data-based models. One goal is to empower viewers with information regarding nuclear industries and their corporate collaborators. In addition to maps, graphs, and statistics, *Thermonuclear Gardens* features works that represent the material effects of nuclear fallout on the human body. Close-up Xerox scans of artist Sheila Pinkel's distorted form appear alongside semi-abstract figures—crouching bodies distorted and bleached white by the scanner. Pinkel's research for this project confirmed that, during this era, California received more research and development funding from the US Department of Defense than any other state.

THE IMAGE IS INFINITE

ARCHIVING, DIGITAL RE-PRODUCTION, AND MATERIAL OBSOLESCENCE

The late 1990s and early 2000s witnessed the convergence of digital images and the internet as broadband connections proliferated and personal computers became increasingly affordable. As digital cameras gradually became integrated into everything "smart," from handheld gaming devices to cell phones to cars, the result was an explosion of image making, image collecting, and image archiving. While images were collected and sorted into archives long before the digital age, contemporary image archives are home to billions of pictures and their corresponding metadata. These repositories have become training grounds for emerging artificial intelligence. Much like the early digital-imagery practitioners who laid the groundwork for the conventions, techniques, and complications of today's media arts, artists working at the cusp of imaging technologies today are becoming conversant with the promises and perils of AI.

Refik Anadol

Machine Hallucination: Keystone-Mast Collection, 2024

AI data painting (23:10 min., silent)
Courtesy of the artist

Refik Anadol Studio's public artwork transforms the Keystone-Mast Collection at the California Museum of Photography—a vast archive of global history from the late nineteenth to the mid-twentieth century—into an AI data painting. Through Anadol's innovative use of artificial intelligence, the collection is reimagined and brought to life, highlighting how technology can help build unique bridges between past and future, memory and imagination. Anadol used advanced AI to process and interpret 65,354 images from the Keystone-Mast Collection into a mesmerizing visualization that merges historical documentation and contemporary digital art. In converting the data into an AI data painting, Anadol demonstrates the transformative power of technology to recontextualize historical archives, offering viewers a unique opportunity to engage with the past through the lens of cutting-edge digital artistry.

ALSO INCLUDED:

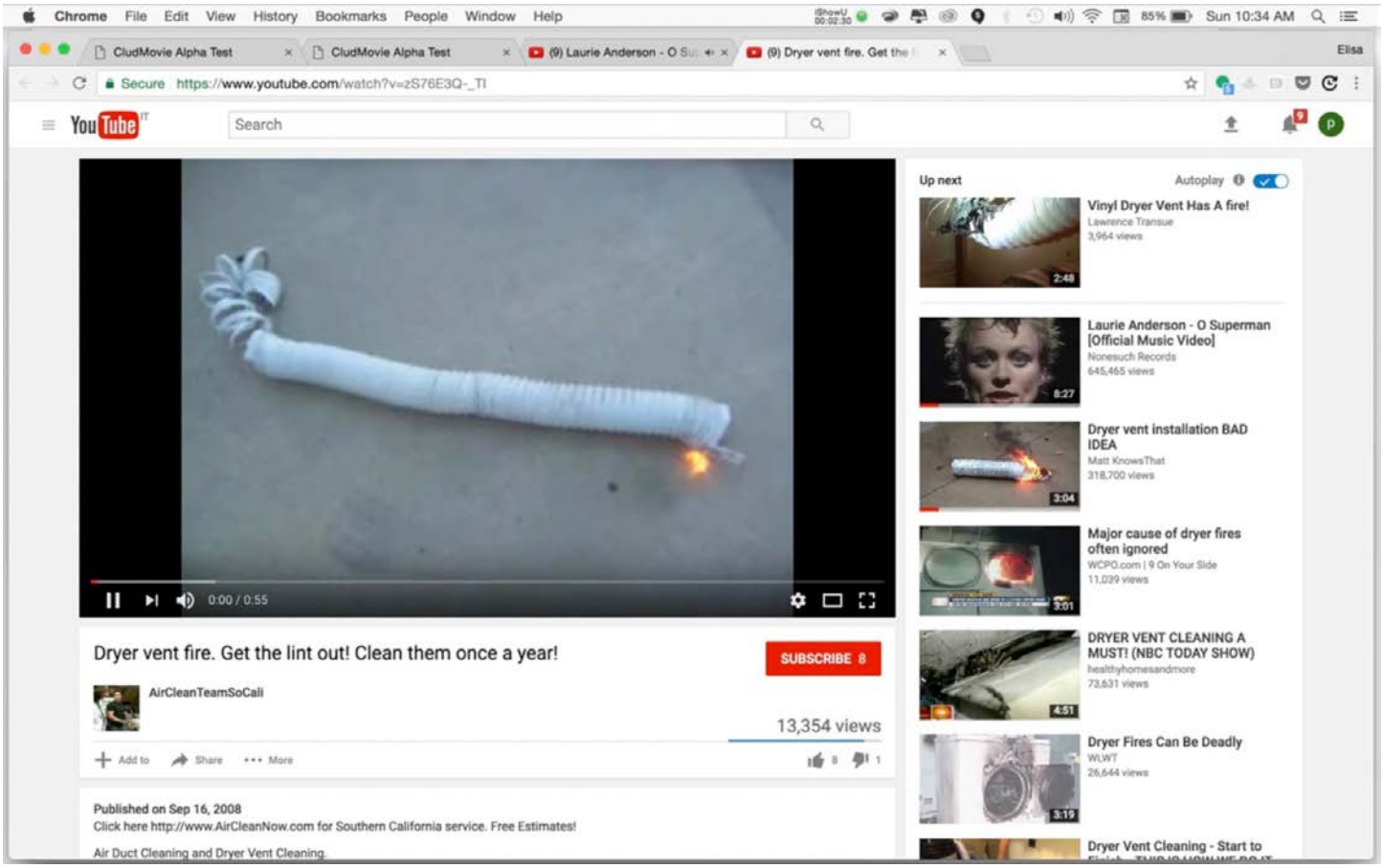
Machine Hallucination: Keystone-Mast Collection process video, 2024
Digital video (1:28 min., silent)
Courtesy of the artist

Natalie Bookchin

Databank of the Everyday, 1996

Digital video emulation of interactive CD-ROM with sound (loop)
Courtesy of Conseil général du Territoire de Belfort / Espace multimédia Gantner

Databank of the Everyday is a CD-ROM work that uses the stock photo library as a mode for thinking through typologies and hierarchies of everyday habits, movements, and compulsions. The version presented in the exhibition was a ripped version of the original interactive CD-ROM, presented on a 2004 Apple eMac running OS9. Natalie Bookchin's taxonomic organization of seemingly mundane events is visually accompanied by a corresponding set of instructions that allow participants to click and choreograph various actions appearing in small windows on the screen. The looping sequences of actions, such as opening and closing a door or typing on a computer, produce a repetitive, never-ending, circular narrative. Released at the birth of the commercial internet age, *Databank of the Everyday* considered the then-speculative death of analog photography in an increasingly digital-dominant landscape.



Elisa Giardina Papa

Archive Fever, 2011–ongoing

Real-time web video with sound (duration variable)
Courtesy of the artist and Galerie Tanja Wagner

Archive Fever is an ongoing browser-based performance that depicts Elisa Giardina Papa's personal internet browsing history through bookmarked tabs, emails, YouTube segues, and screenshots. It borrows its title from philosopher Jacques Derrida's text *Archive Fever: A Freudian Impression* (1995), which conceives of the archive as a liminal, and therefore unstable, site. Giardina Papa's frenetic internet browsing is shown in real time as the artist quickly adds and alters multiple tabs and search suggestions. At the same time, feedback from previously opened browsers continues to run in the background, creating a cacophonous montage of auditory, visual, and executional data. In its scope and efforts, the work demonstrates personal archival practice as a critical (while still largely ignored) forum for collective memory, knowledge production, and authorship.

Jennifer Lopez backstage at the 42nd Annual Grammy Awards, 2000

Courtesy of Getty Images, photo by Bob Riha Jr.

On February 23, 2000, pop singer Jennifer Lopez wore a green silk chiffon Versace "jungle dress" to the Grammy Awards. The neckline, which plunged below her navel, spurred a sensationalized media frenzy, and Google's search engine was overwhelmed with queries about the dress. Google search results at that time were limited to pages of simple text with links, but users were after images. The dress—and the record level of queries it generated—were instrumental in spurring the development of Google's image search capability. Google Images launched on July 12, 2001, and by the end of that year, 250 million images had been indexed. A decade later, that number was over ten billion. In 2011, Google introduced reverse image searches, whereby one can search for images using an image, rather than text, as the query. The Lopez dress phenomenon highlights California's unique amalgam of leading-edge digital pioneering with image, celebrity, and the entertainment industry. It also highlights the sustained scrutiny and objectification of the bodies of women of color, which is hardly limited to California's borders.

Sheila Pinkel

Manifestations of a Cube, 1974–82

60 photograms, 9 color Xeroxes, 3 color Xeroxes, 4 cyanotypes, 1 digital print, 3 xeroradiographs, 1 cyan xeroradiograph
Courtesy of the artist

Manifestations of a Cube is a photographic study that bridges art, abstraction, and technology. Sheila Pinkel's expansive multimedia series used then-groundbreaking imaging methods such as photograms, xeroradiography (a type of X-ray imaging), and color Xerox. The primary subject is a square glass dish the artist stole from a Japanese restaurant. The cubic form is both formally in keeping with the late-modernist sensibilities prevailing at the time, and a conceptual anchor for exploring the possibilities of digital imaging technologies.

ALSO INCLUDED:

Red, Green, Blue Corner Cube, 1972
Silver / Black Corner Cube, 1972
Silkscreens on paper in acrylic artist's frames
Courtesy of the artist

Intuition, 1977
Digital video (5 min., sound)
Courtesy of the artist

Andrew Norman Wilson

***The Anatomy of the Human Body – 93*, 2018**

From the series *ScanOps*, 2012–ongoing
Archival pigment print in aluminum artist's frame
Courtesy of the artist and DOCUMENT, Chicago

Andrew Norman Wilson's ongoing project *ScanOps* examines the hidden nature of much digital labor, particularly at technology companies like Google. Named after the team that manually digitizes books for Google Books, it highlights visible errors in the scanning process, whether distortions, glimpses of the scanning site, or inadvertent appearances of Google workers' hands. These anomalies, typically hidden from the public eye, reveal the human element in seemingly automated digitization processes.

ALSO INCLUDED:

***Hypermia as Therapeutic agent – 251*, 2013**
***The ABC of Photography – 2*, 2014**
***An Exact Narrative of Many Surprizing Matters of Fact Uncontestably Wrought By an Evil Spirit or Spirits, In the House of Master Jan Smagge – 8*, 2014**
***Index of Colours and Mixed Tints – 16*, 2018**
***A Sermon Preached before the Right Honourable the Lord Mayor, the Aldermen, and Governors of the Several Hospitals of the City of London, at the Parish Church of St. Bridget, on Wednesday in Easter Week, April 14, 1762 – 6*, 2019**
From the series *ScanOps*, 2012–ongoing
Archival pigment prints in aluminum artist's frames
Courtesy of the artist and DOCUMENT, Chicago

***Workers Leaving the Googleplex*, 2011**
Digital video (11:03 min., sound)
Courtesy of the artist

Selections from the Keystone-Mast Collection

Selected from the California Museum of Photography's Keystone-Mast Collection, these photographs were part of the training data for the video installation Refik Anadol made for *Digital Capture*. They are representative of the scope and breadth of the collection, which consists of approximately 350,000 stereoscopic prints and negatives made between the late nineteenth and the mid-twentieth century. Such views are created using stereo cameras, which consist of a camera body with two lenses, thus producing negatives with two side-by-side images that are nearly identical except for a slight shift in lateral perspective. When viewed through a special viewer, they produce a three-dimensional effect.

INCLUDED:

George Lewis, Keystone View Company
The Arch of Triumph [Arc de Triomphe] and the Place de L'etoile, Paris, France, not dated
Archival pigment print
Keystone-Mast Collection, California Museum of Photography at UCR ARTS, 1996.0009.29617.SS

Oudine, Keystone View Company
Signs of the Ancient Mayan Civilization, Tegucalpa [Tegucigalpa], Honduras, with Maya Replica in Park, 1938-39
Archival pigment print
Keystone-Mast Collection, California Museum of Photography at UCR ARTS, 1996.0009.37233

Unknown photographer, H.C. White Company
The Sphinx and Second Pyramid, Gizeh [Giza], Egypt, not dated
Archival pigment print
Keystone-Mast Collection, California Museum of Photography at UCR ARTS, 1996.0009.WX25168

Unknown photographer, Keystone View Company
Statue of Liberty in N.Y. Harbor, N.Y. City, 1928
Archival pigment print
Keystone-Mast Collection, California Museum of Photography at UCR ARTS, 1996.0009.KU89571

Unknown photographer, Keystone View Company
Yeni-Valide Djami Mosque, Constantinople [Istanbul], Turkey, not dated
Archival pigment print
Keystone-Mast Collection, California Museum of Photography at UCR ARTS, 1996.0009.KU73981

Unknown photographer, Underwood & Underwood
Magnolia Avenue—tropical beauties of Riverside, California, not dated
Archival pigment print
Keystone-Mast Collection, California Museum of Photography at UCR ARTS, 1996.0009.X42240

Unknown photographer, Underwood & Underwood
The Taj Mahal, Agra, India, not dated
Archival pigment print
Keystone-Mast Collection, California Museum of Photography at UCR ARTS, 1996.0009.X59459

TwinScope Viewer by artist Colleen Woolpert

STATES OF SEEING

ON THE CONDITIONS OF LOOKING

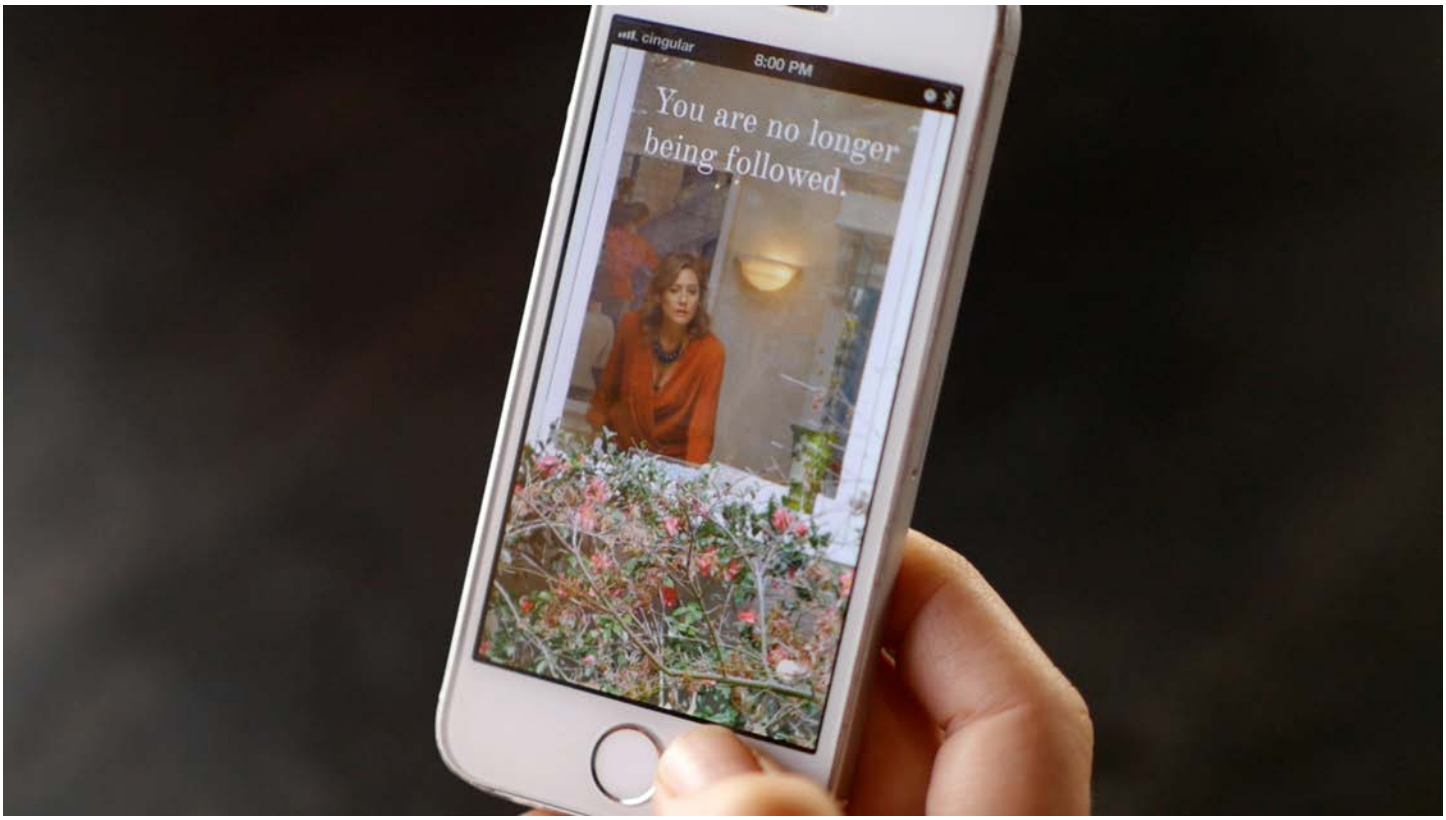
The utopianism associated with digital imaging in the 1960s and 1970s diminished as countercultural energies became increasingly co-opted by the corporate interests that fueled the dot-com revolution of the late 1990s and early 2000s. Novel imaging technologies were increasingly enlisted as tools for surveillance, remote vehicle weaponry, facial recognition, and satellite imaging (to name just a few potentially nefarious ends). Conversely, many artists appropriated these same technologies for positive communal and sociopolitical purposes. Many artists featured in this section scrutinize digital imaging as a tool for surveillance, both historic and current. Some reveal how digital surveillance is weaponized against minority communities, while others find the field a fruitful opportunity for subversion.

Nonny de la Peña

Hunger in Los Angeles, 2012

Virtual reality video (3:38 min., sound)
Courtesy of the artist

Hunger in Los Angeles depicts a diabetic man falling into a coma on a Los Angeles street while waiting in line at a food bank. The user is situated among a crowd that helplessly watches the man cling to life, waiting for first responders. ***Hunger in Los Angeles*** was the first VR experience featured at the Sundance Film Festival. It interrogates the capacity of immersive technology to combine the impulses of photojournalism and documentary filmmaking into empathy-generating experiences. Nonny de la Peña's groundbreaking work set the vocabulary for "immersive journalism" while exploring how emerging technologies can be deployed for aims beyond commercial or entertainment purposes.



Lauren Lee McCarthy

Follower, 2016

Installation of 15 JPGs on iPhone 7s
Courtesy of the artist

Follower is a "service" created by Lauren Lee McCarthy that provides a "real-life follower" for a day. Prospective "followees" can sign up, download the Follower iOS app, which collects data from its willing participants, and wait for a confirmation—which will never come. The follower will also never disclose the duration or parameters of what the following will entail. The findings from each encounter are depicted in this installation of four Apple iPhone 7s. The image file names are taken from followees' answers to McCarthy's application questions, which include "Why do you want to be followed?" and "Why should someone follow you?" *Follower* directly points to how government and corporate entities collect (legally and otherwise) enormous swaths of information on citizens and consumers from social networks, e-commerce platforms, apps, and innumerable other touch points. Privacy and data collection regulations are highly litigated and contested, but users continue to contribute personal data to these systems, knowingly or not.

Sign up today at follower.today/fotomuseum/.

Mobile Image (Kit Galloway and Sherrie Rabinowitz)

Satellite Arts, 1977

Digital video (20:44 min., sound)
Courtesy of Kit Galloway

Kit Galloway and Sherrie Rabinowitz began collaborating in 1977 as Mobile Image, staging experiments in long-distance interactive "telecollaborative" art. *Satellite Arts*, a composite performance video of the artists at three different locations thousands of miles apart, was created using equipment at NASA's Goddard Space Flight Center in Maryland and the Educational Television Center in Menlo Park, California. Their dances are marred by time-delayed satellite feedback, and the distortions make their bodies appear to "fan out" through time and space.

ALSO INCLUDED:

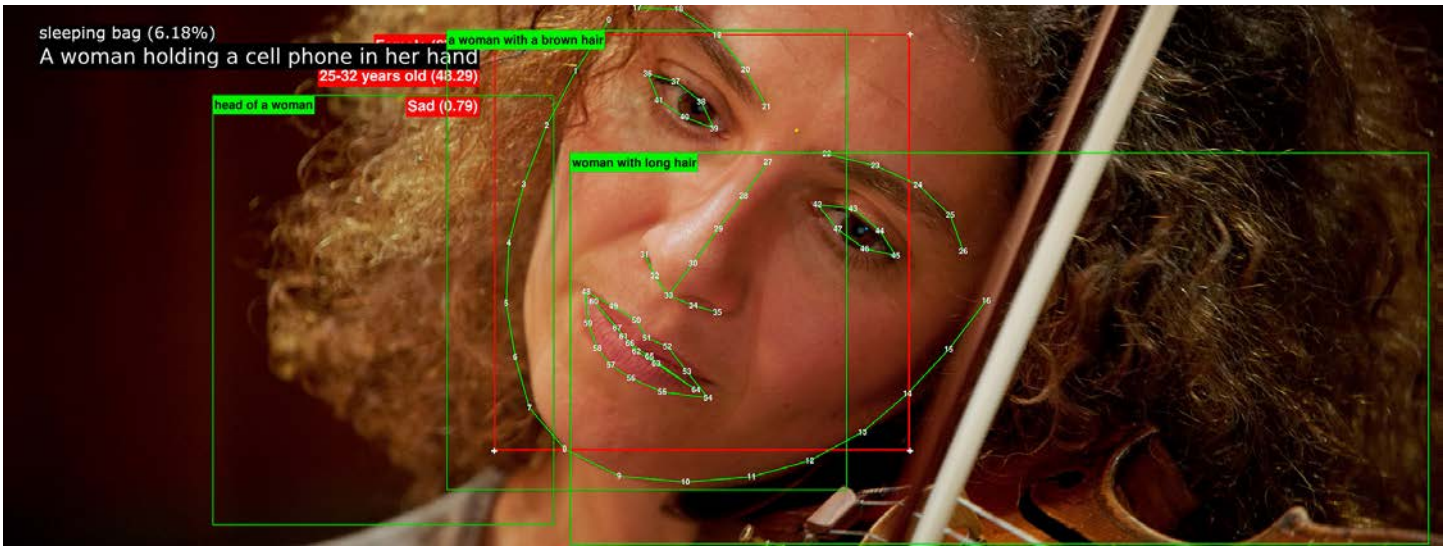
Satellite Arts party announcement, 1978 (reprinted 2024)
Courtesy of Kit Galloway

Mendi + Keith Obadike

The Interaction of Coloreds, 2002/2018

Interactive video installation, sound
Courtesy of the artists

The Interaction of Coloreds examines race and the perception of color in the digital age and within digital spaces. The work references the infamous "brown paper bag test" historically used to assess skin color. As the Obadikes elaborate, "Brown paper bag tests originated during the centuries of African enslavement in the Americas and were used as a way of separating the light from the dark. At first, the tests were used to determine which Africans would work in the fields and which would work in the masters' houses. Those whose skin was lighter than the brown paper bag were placed indoors. Those whose skin was darker than the brown paper bag were placed outdoors. After slavery this practice was administered by Blacks and Whites during the process of seeking employment, admission to Black colleges, and social clubs. In some form, it is still practiced today." The interactive on-screen grid presents a layered audio narrative on race, color theory, and digital imaging protocols and standards. This work urges viewers to reconsider assumed divisions between virtual and material worlds and the complex histories that continue to shape them. By assigning a digital color value to human skin, the work exposes how seemingly neutral protocols like HTML can carry socially constructed bias.



Trevor Paglen

Image Operations, Op. 10, 2018

Digital video (23 min., 5.1 surround sound)
Courtesy of the artist; Altman Siegel, San Francisco; and Pace Gallery

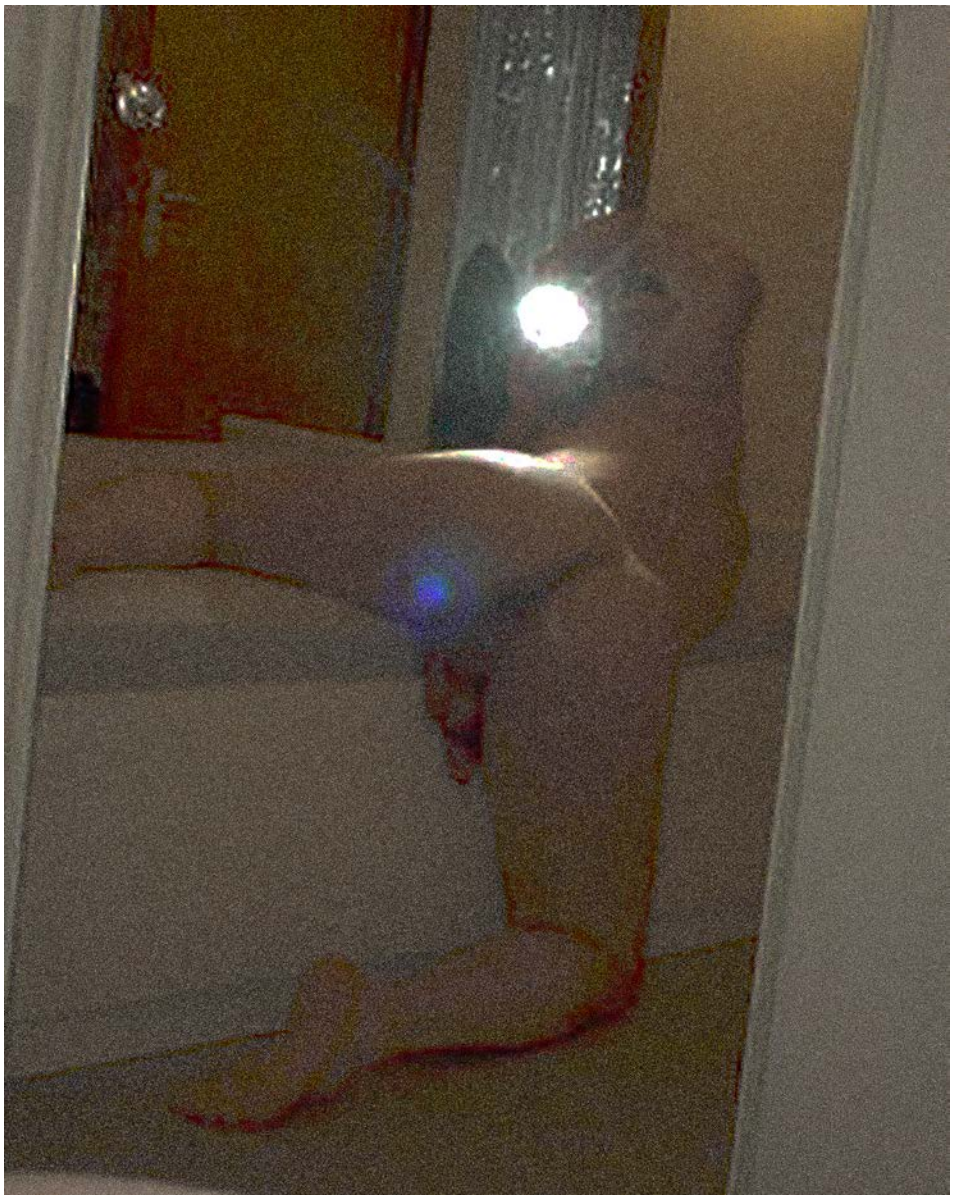
Trevor Paglen's video installation shows machine-learning facial recognition systems at work. As four musicians perform Claude Debussy's *String Quartet in G Minor, Op. 10*, simple face detection progresses to more complex algorithms used in technologies such as self-driving cars, guided missiles, drones, and AI systems designed to estimate age, gender, and emotional state. The installation considers the biases inherent in these technologies and the underlying ethical and political impulses that influence their ways of seeing.

Marton Robinson

***Mirror Mirror, No hay más que un nombre*, 2019**

Digital video (1:47 min., sound)
Courtesy of the artist

This work by Marton Robinson, whose title loosely translates as “there is only one name,” offers an intervention into the politics of the gaze, and specifically how digital visual media mediate between viewer and subject. The video loop of Robinson’s eye, which meets ours unflinchingly, is reminiscent of both very early “peephole” cinema (Kinetoscope) and medical devices used to survey a subject in close proximity. Given the title, Robinson’s flickering eye could be understood as referencing how imaging devices have historically been used to surveil Black and brown bodies, treating racial and ethnic minorities as spectacles for an ethno-pornographic gaze.



Dean Sameshima

***Figures of Lust Furtively Encountered in the Night*, 2001–4**

Chromogenic prints made from digital images
Courtesy of the artist and Kristina Kite Gallery, Los Angeles

Dean Sameshima's photographic series collects images printed directly from low-resolution self-portraits culled from gay male dating-site profiles. The photos chronicle a period when digital cameras were becoming more available and affordable, prompting more widespread use in documenting ordinary gestures of intimacy. The work explicitly ruminates on queer male desire and visibility, a motivation that continues to drive much of Sameshima's broader practice. The series considers this desire in a way that relies less on what is seen and more on the affective connections, desirous ambiguity, and erotic repositories that accompany lustfulness.

Julia Scher

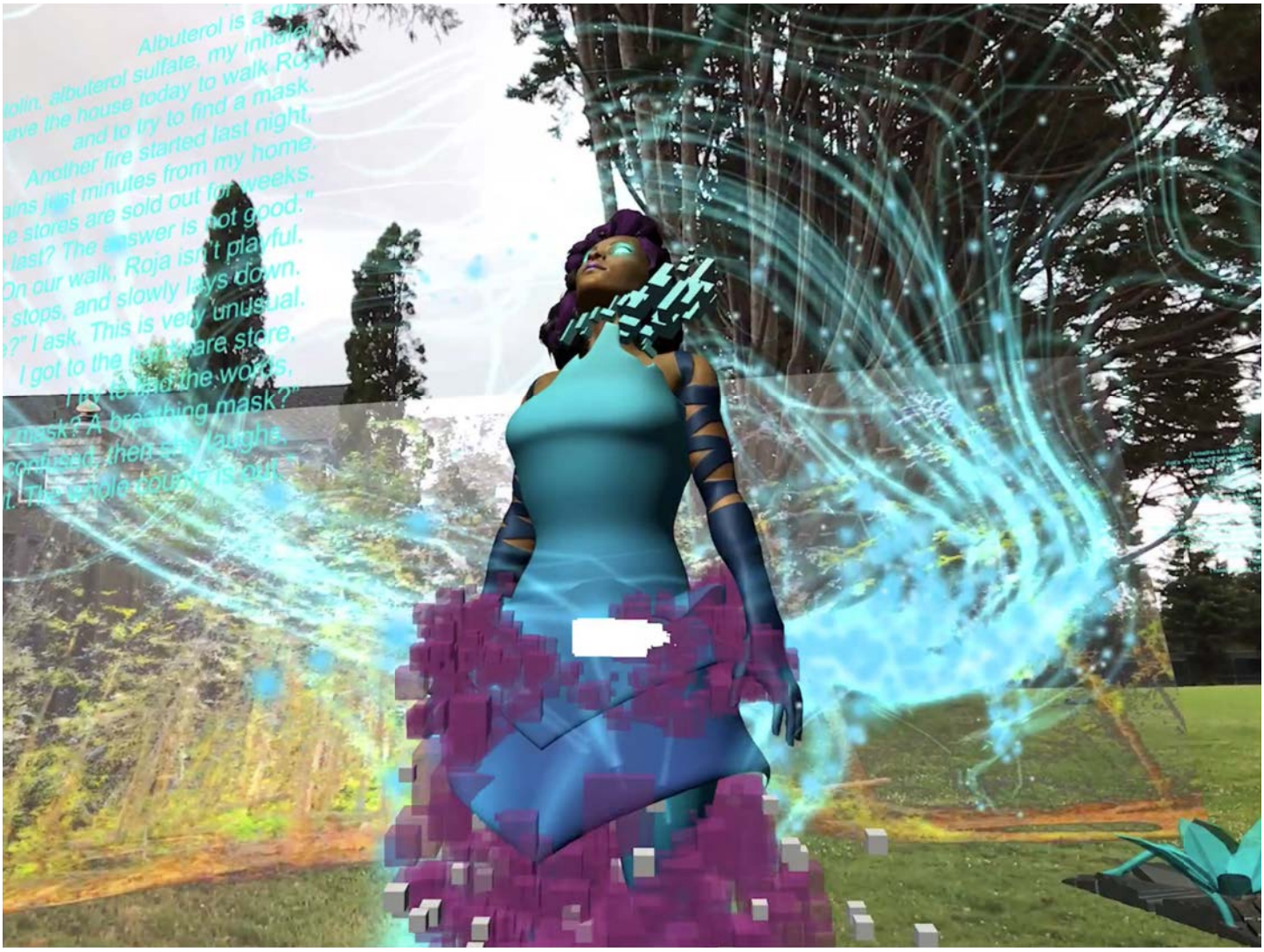
Securityland, 1995

Interactive web work
Courtesy of the Digital Art Study Collection / Gallery 9, Walker Art Center

Julia Scher's point-and-click browser work *Securityland* offers a feminist intervention into online surveillance and security. Scher created the work with äda 'web, a digital web forum dedicated to experimental artist projects that launched in 1995. *Securityland* features six distinct virtual spaces, including a site map, a glossary, and the more ambiguously labeled "wonderland," "konsent klinik," "one house," and "predictive engineering." Upon entry, each room presents a distinct architectural environment and text that calls attention to the alternately seductive and alienating ways surveillance is wielded. Scher's playful collapse of public and private space likewise gestures to prison control practices that involve mass monitoring. With an image of Scher in a security cap featured prominently on the home page, *Securityland* visualizes the potential intimacy between the carceral state and personal (online) spaces.

DIGITAL ECOLOGIES AND TERRESTRIAL PLAINS

California is one of the world's most photographed and digitally rendered spaces, such that the boundaries between the physical world and the imaginary one are perpetually blurred. One consequence of this is an obscuring of the material, ecological, and symbolic violence that has accompanied technological and cultural developments. This interplay between California (and the US West more broadly) as a blissful nowhere and a site of real, often devastating transformations reflects the complex dynamics that continue to shape perceptions of place and space in the digital age. Artists featured in this section complicate the representation of seemingly natural ecologies by highlighting the ecological violence, utopian promise, and imminent dangers proliferated by digital technologies.

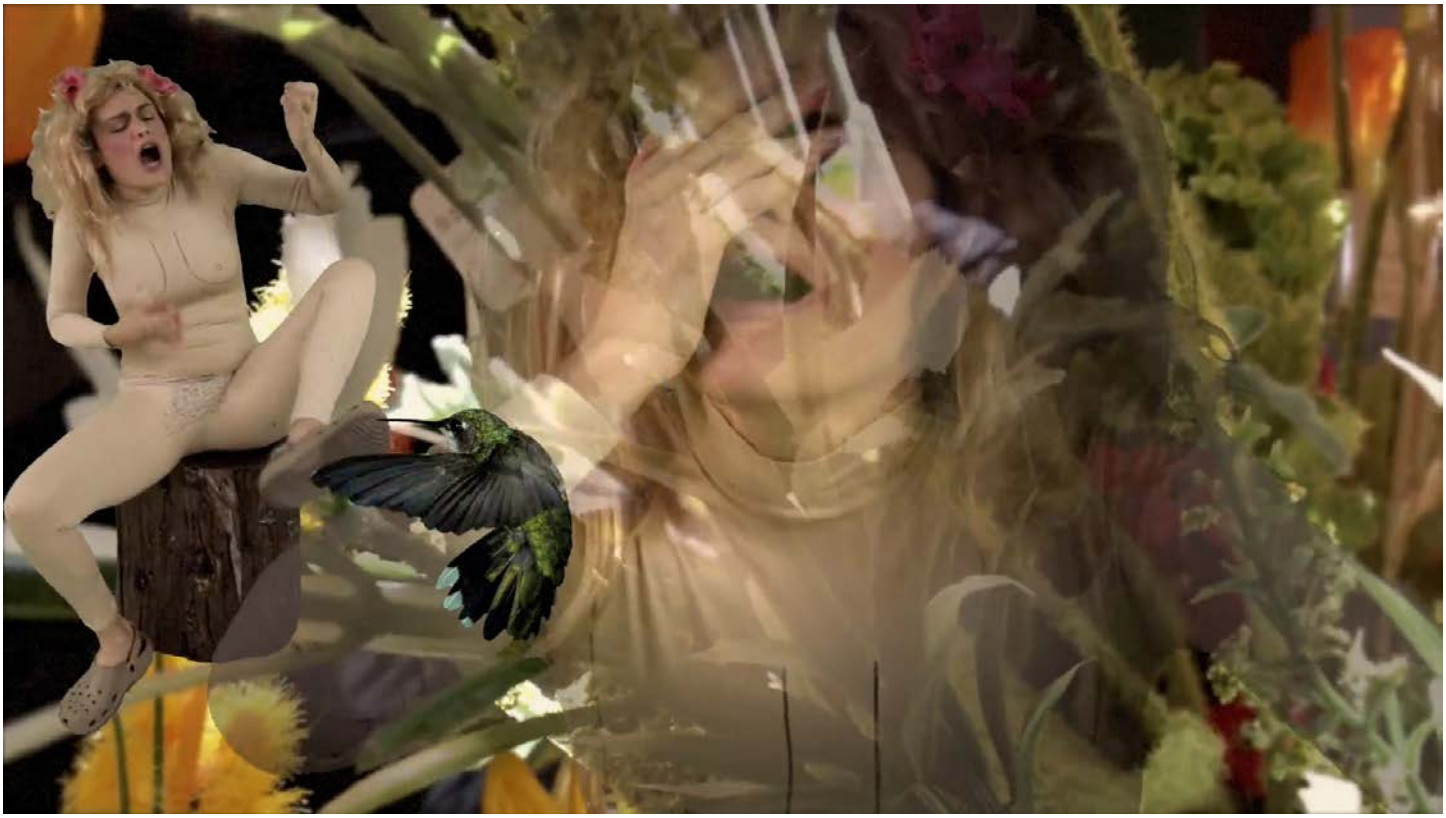


micha cárdenas

***Sin Sol / No Sun*, 2020**

Projected virtual environment installation, application, tablet, and video with sound (duration variable)
Courtesy of the artist and the UCSC Critical Realities Studio

Sin Sol / No Sun is an augmented-reality game designed by scholar and artist micha cárdenas and developed by the Critical Realities Studio at UC Santa Cruz. It aims to educate players about the disproportionate impacts of climate change on immigrants, trans people, women, and disabled people. The game is set fifty years in the future and follows a story of environmental collapse narrated by an AI hologram named Aura. It includes 3D scans of forests from the Pacific Northwest and tasks players with finding and collecting oxygen capsules containing poetry as they attempt to survive and escape climate-change-induced wildfires with the help of Aura's dog, Roja. The game visualizes possibilities for multispecies survival and solidarity.



Dynasty Handbag

***Oh, Hummingbird*, 2017**

Digital video (2:47 min., sound)
Courtesy of the artist

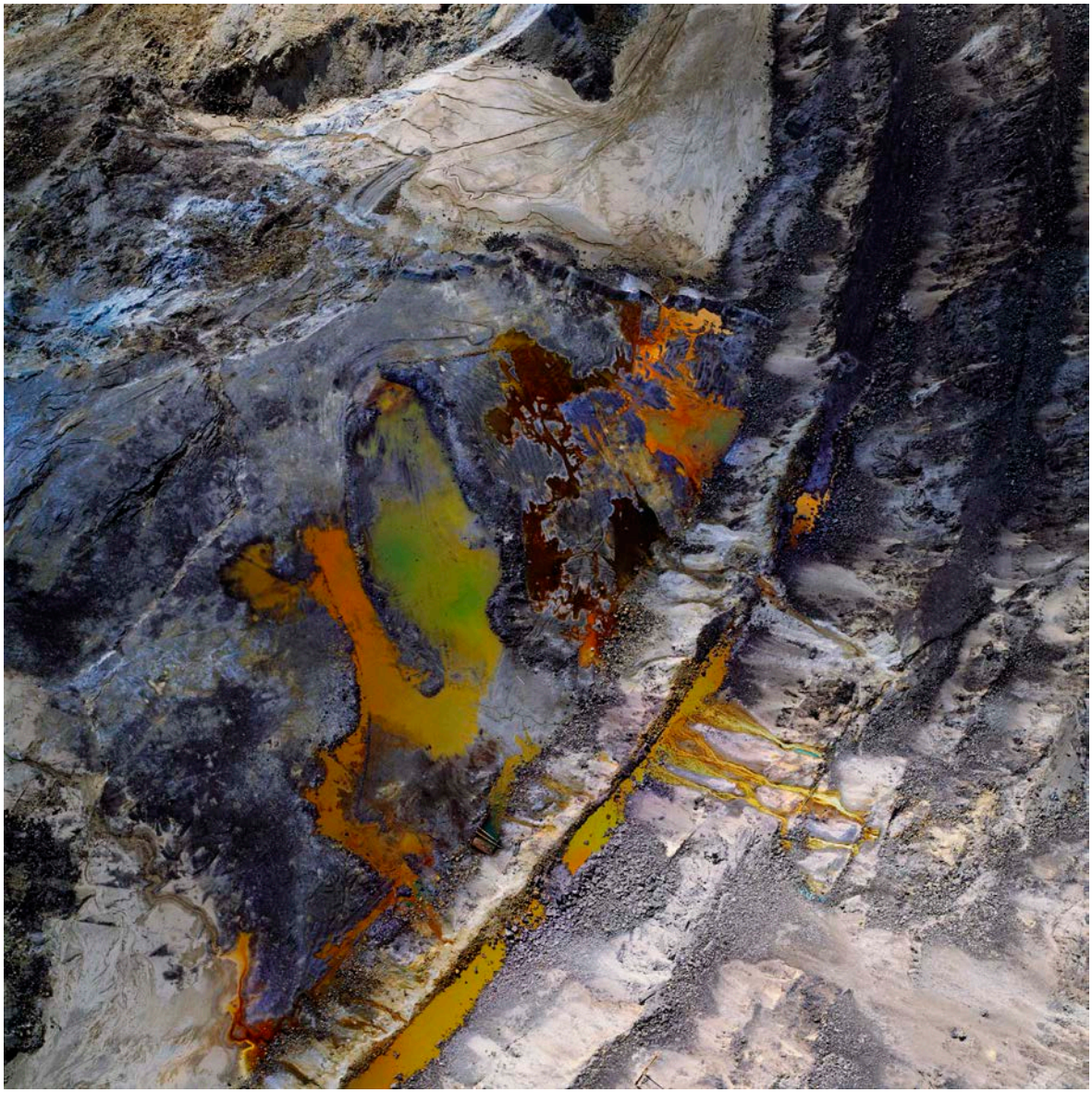
Seated on a tree stump and playing an imaginary lute, Dynasty Handbag appears in a nude suit that features drawn-on breasts and comically exaggerated pubic hair. Surrounding the artist is a fragmented psychedelic blend of flora and a fluttering hummingbird. The upbeat song warns of impending catastrophic climate collapse, for instance urging caution “when munching that flower, because toxic clouds of polluted gas may have rained on it.” The work points merrily yet forebodingly to the ongoing planetary emergency inflicted by the global terror of (techno) capitalism.

Goldin+Senneby

After Microsoft, 2007

Still image with sound, audio loop
Courtesy of the artists

After Microsoft revisits and recontextualizes a globally recognizable image—the default wallpaper of Windows XP, titled *Bliss* and captured by Charles O'Rear in 1996. In November 2006, Goldin+Senneby returned to the same site in Sonoma Valley famously depicted in *Bliss* and rephotographed it, capturing a landscape now transformed and covered in grapevines. This act of revisiting created a dialogue with the earlier image while exploring the evolving relationship between technology and nature. *After Microsoft* includes a three-minute voice-over that describes how the original *Bliss* hillside coincided with a global corporate branding strategy in the late 1990s. The narrative invites viewers to contemplate the interplay of corporate branding, technological idealism, and the manipulation of natural imagery.

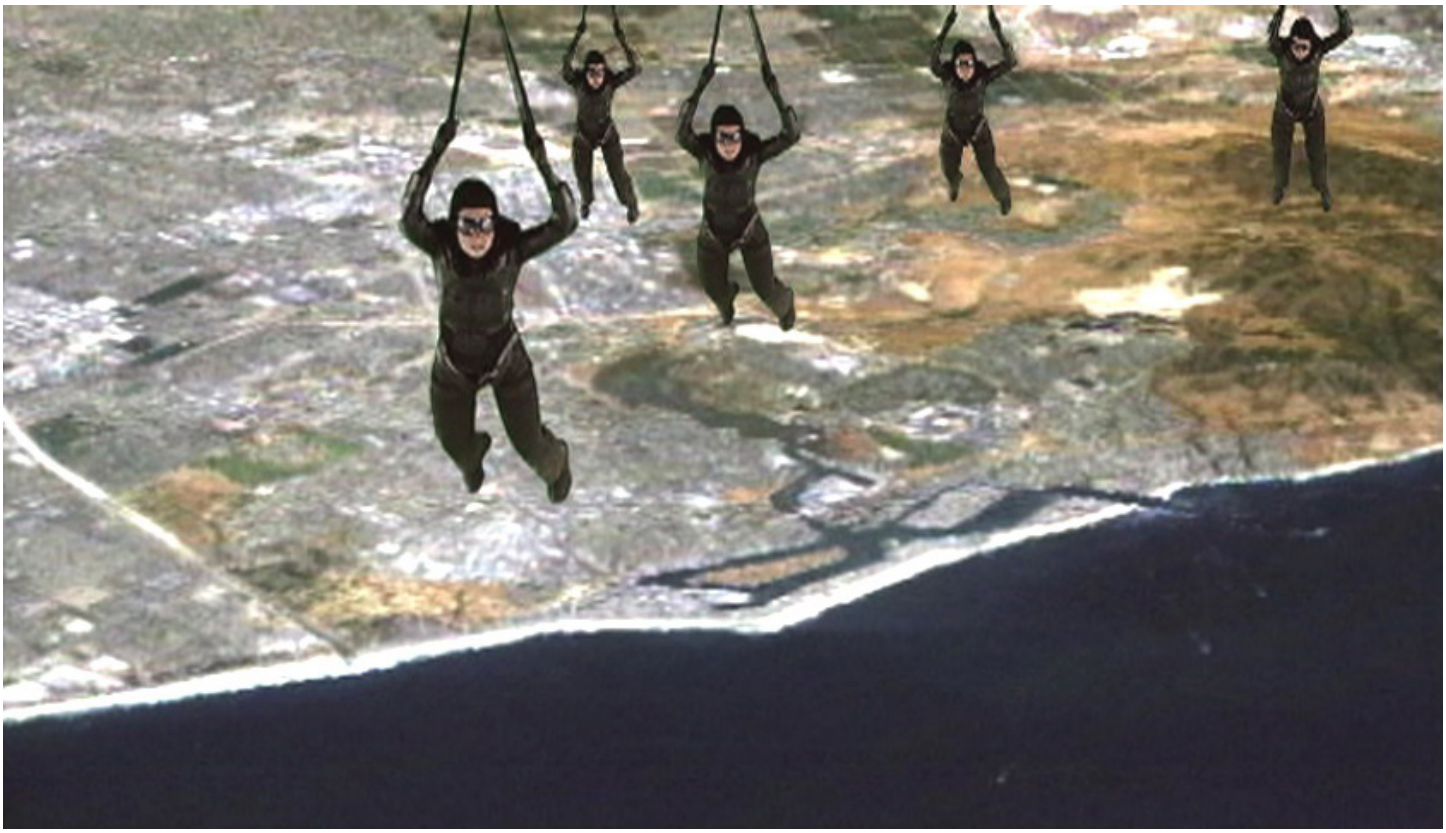


David Maisel

The Mining Project (Butte, MT 3), 1999 (printed 2001)

Archival pigment print
Los Angeles County Museum of Art

David Maisel's photography delves into the environmental impacts of open-pit mining in the United States. The aerial pictures in his series *The Mining Project* document dramatic landscape alterations due to mining activities at sites like the enormous and toxic Berkeley Pit in Butte, Montana, known for its copper. Metals are fundamental in everything from building infrastructure and technology to transportation and even the medium of photography, and the methods used to extract them are often massively destructive and complex. Maisel's images evoke artistic traditions—abstraction, Cubism, and Color Field painting—and the images, presented without context, are initially disorienting, stripped as they are of horizons, recognizable landmarks, or discernible human scale.



Lynne Marsh

L.A., 2003

Digital video (1:25 min., sound)
Courtesy of the artist

L.A. loops avatars performing acrobatic maneuvers over a simulated Los Angeles cityscape and coastline. The flyers' movements are inspired by science fiction and action films that use Southern California terrain as their setting. The work fits in with Lynne Marsh's broader explorations into the labor of cultural production, the correlation of the human figure to digital avatars and assets, and meanderings between virtual and physical spaces.

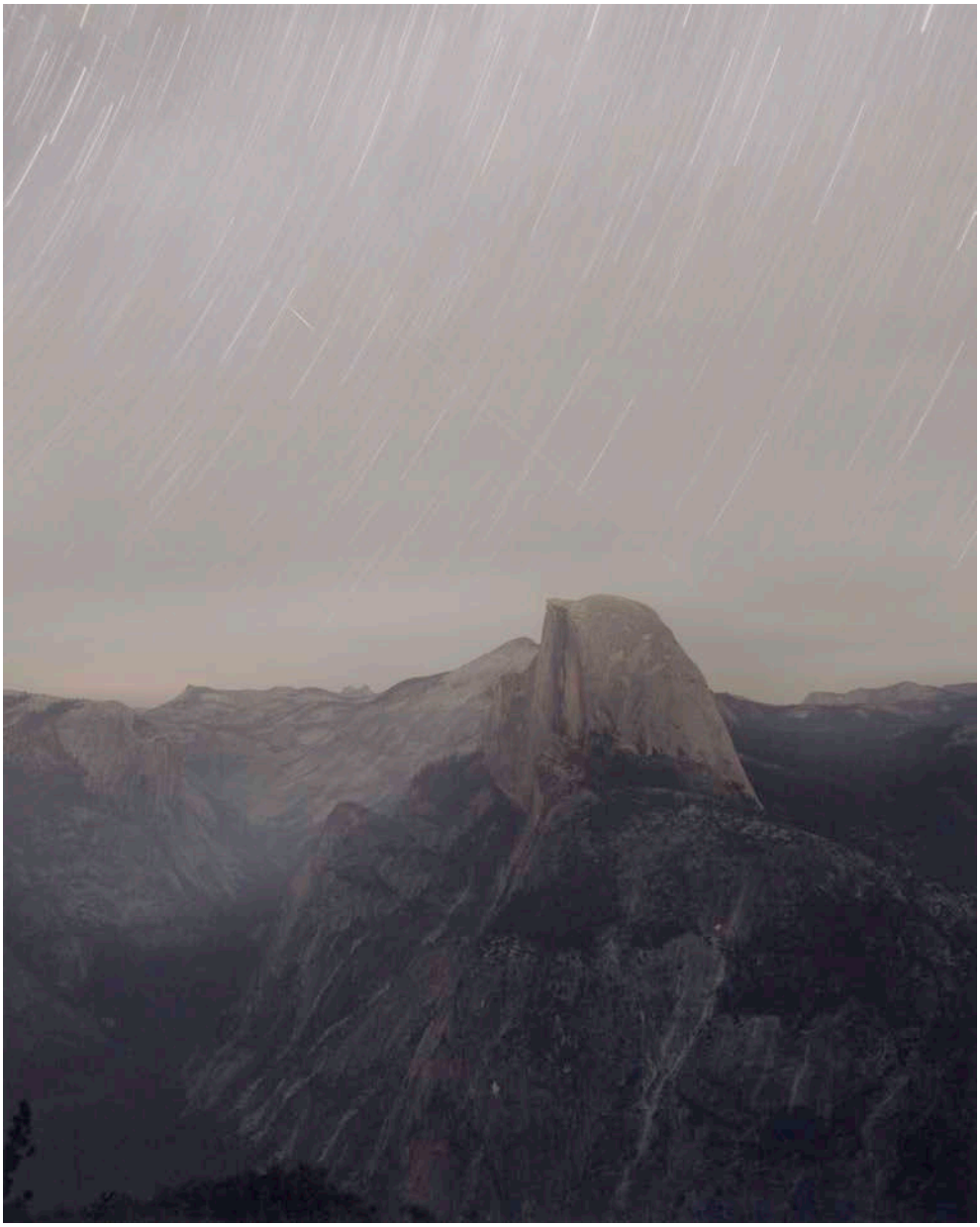
Charles O’Rear

Bliss, 1996

Digital desktop image

Charles O’Rear photographed *Bliss* in 1996 along a highway in California’s wine-growing Sonoma County. He used a Mamiya RZ67 medium-format camera with Fujifilm Velvia film stock, and the highly saturated greens and blues resulted in part from this particular analog camera and film. For years, however, the picture was broadly misconceived as digital due to its use as the default wallpaper for Windows XP. Conceptually, *Bliss* is both site specific and ubiquitous, existing in distinct media contexts and virtually outside of place, evoking both Californian and technological utopianism. The image also marks a pivotal transition (and integration) of photography into digital systems and workflows, as the 1990s saw the emergence of consumer-facing digital cameras and computer workstations, along with internet-based distribution systems.

This image of *Bliss* (1996) was independently screengrabbed and printed for exhibition purposes. This copy is not affiliated with, authorized by, or sponsored by Microsoft Corporation. Microsoft is the sole owner of *Bliss* in its original iteration.

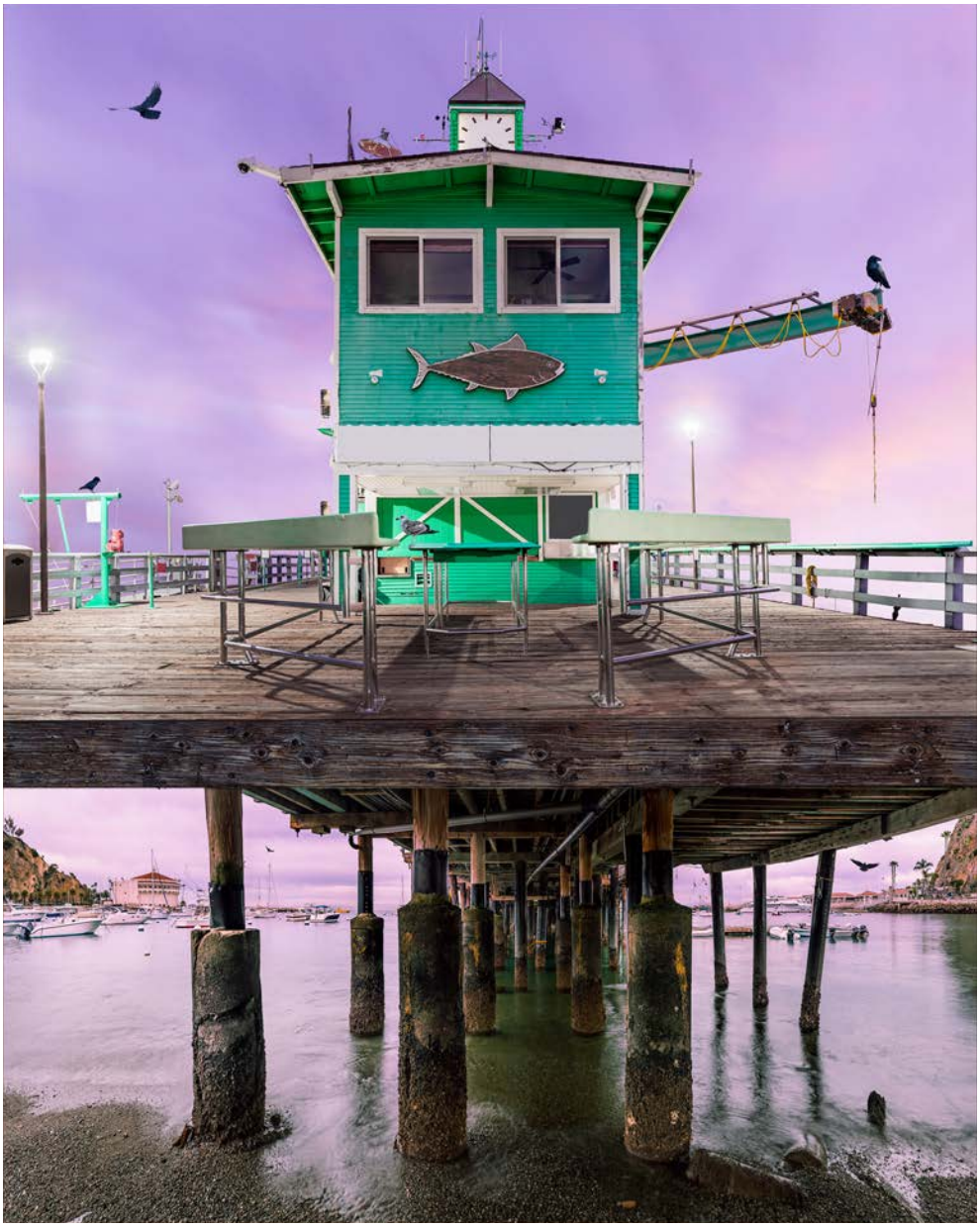


Trevor Paglen

KEYHOLE-IMPROVED CRYSTAL from Glacier Point (Optical Reconnaissance Satellite, USA 186), 2008

Chromogenic print
San Francisco Museum of Modern Art, Accessions Committee Fund purchase

Trevor Paglen's photographic investigations of government surveillance apparatuses demonstrate the many capacities of digital imaging—a technology that lends itself simultaneously to military, industrial, and humanistic possibilities. Digital imaging was initially conceived in Southern California's Cold War technology labs to aid satellites in capturing stars and planets. But soon enough, these satellites were repurposed for spycraft—pointed not at heavenly bodies, but at human ones. Paglen utilizes digital imaging, and specifically its potential for hyper-sensory perception, to unmask state power.

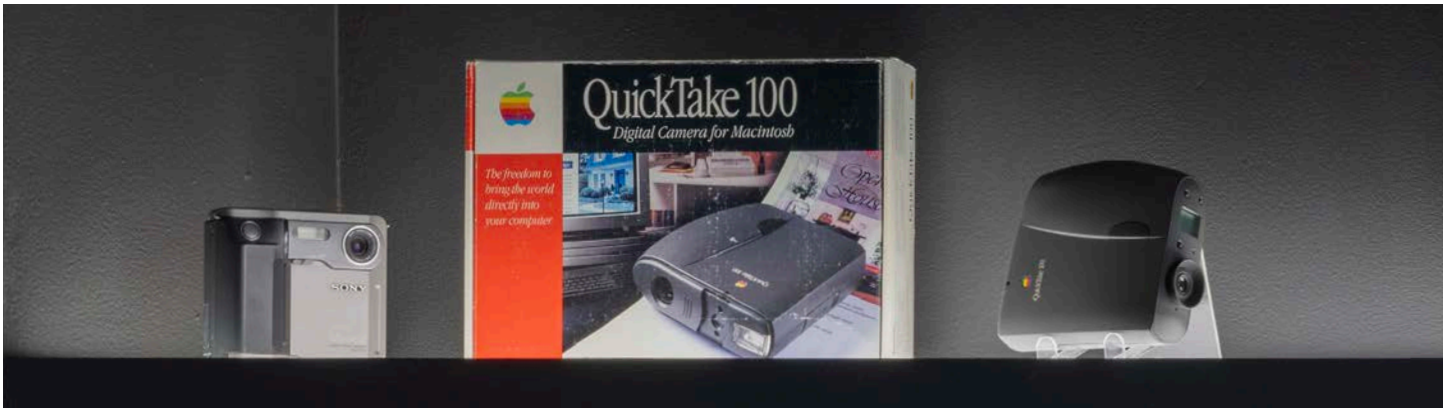


Amir Zaki

***Built in 1906. Damaged in 1908. Renovated in 1907, 1909 X*, from the series *On Being Here*, 2021**

Archival pigment print
Courtesy of the artist and Diane Rosenstein Gallery, Los Angeles

Amir Zaki's California pier scene is a digital composite created using different photographs of the shore and oceanfront. The picture has two vanishing points—one above the pier and one below—thus making it an impossible view of this iconic feature of California's shoreline. The images in *On Being Here* are not titled by location, and several of the piers in the series are no longer standing, but sometimes the titles, reflecting the years of damage and renovation, offer clues. The imagery attests to how the state's landscape is constantly (re)imagined and often misremembered.



Selections from the CMP Technology Collection

This selection of cameras, all from the California Museum of Photography's Technology Collection, highlights early digital image-capture technologies, illustrating the first stages of technologies we now take for granted. Many of these devices are recognizable to us—perhaps even still taking up space in our closets at home. Some ideas were left by the wayside over the years, while others were repurposed or expanded upon.

The Apple QuickTake 100, shown here with its original packaging, was released in 1994 and was the first digital camera widely available to consumers. Other companies soon followed the QuickTake's design and began to evolve it. The Nokia 3600 camera phone, released in August 2008, exemplifies an early integration of a digital camera into a mobile phone.

The California Museum of Photography cares for a collection of more than ten thousand cameras, viewing devices, and other photographic apparatuses. It is the second-largest camera collection in the United States after the Smithsonian Institution's. Founded in 1973 with the donation of the Bingham Camera Collection, it is comprised of four distinct subsets of camera technology: the Kibbey Zeiss-Ikon Collection, the Curtis Polaroid Collection, the Wodinsky Ihagee-Exakta Collection, and the Teague Kodak Brownie Collection. Notable artifacts include a Louis Daguerre camera, a Simon Wing multi-lens wet plate camera, a fully functional Caille Bros. Cail-O-Scope, and a Ponti megalethoscope.

INCLUDED:

Sony Hi-Band Mavica camera model MVC-C1 (pictured)
Sony Electronic Corporation, 1988
Technology Collection, California Museum of Photography at UCR ARTS, gift of John D. Garges, 1999.0016.0001

Apple QuickTake 100 (pictured)
Apple Computer, Inc.
1994–97
Technology Collection, California Museum of Photography at UCR ARTS, 2006.0072.0001

Kodak digital DC20 camera
Eastman Kodak Company, 1996
Technology Collection, California Museum of Photography at UCR ARTS, FIC.2006.0072.a

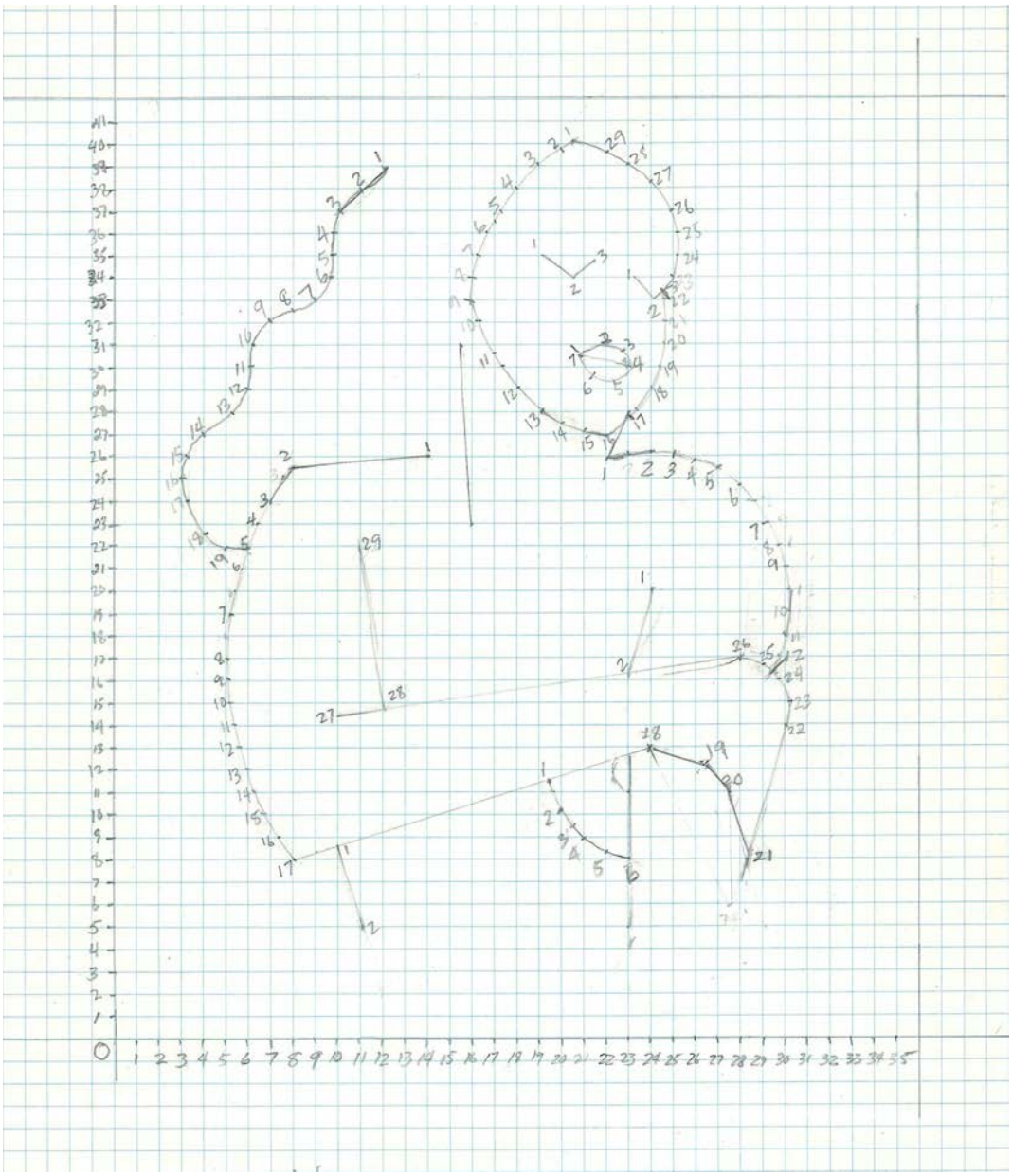
Kodak digital DC260 zoom camera
Eastman Kodak Company, 1999
Technology Collection, California Museum of Photography at UCR ARTS, 2006.0072.0003

Nokia 3600 camera phone
Nokia, 2008
Technology Collection, California Museum of Photography at UCR ARTS, gift of Georg Burwick, 2005.0011.0001

MEDIA MATTERS

SPATIAL ANTAGONISMS AND MATERIAL INQUIRIES

Digital imaging has direct material applications but carries equally significant, if less obvious, ideological implications. This dualism enticed many artists who engaged with the medium in its early days. Coincidentally, many of these artistic experimenters were directly involved in shaping the technologies. An abundance of government funding in the 1960s and 1970s allowed corporations and agencies developing digital imaging to invite artist-engineers to help them explore the aesthetic, conceptual, and technological possibilities. Yet despite a wealth of resources pouring in from government and military sources, access to the early technologies remained restricted along gender, race, and class lines.



Rebecca Allen

Flirt, 1974

Digital video (0:16 min., silent)
Courtesy of the artist

Rebecca Allen's *Flirt* is part of an early series of computer motion studies and was created using a computer and punch cards. It uses hand drawing and image manipulation to explore the intersections between technology and female sensuality. Allen's experimental animation is a rumination on bodily movement, digital seduction, and the absence of what the artist has identified as "the female perspective" in digital technological developments.

John Divola

George Air Force Base, 2021

Diptych; archival pigment prints
Courtesy of the artist

French inventor Nicéphore Niépce made his famous *View from the Window at Le Gras* in 1826 or 1827 using a process known as heliography, which involves using sunlight to create an image on a photosensitive surface. It is the oldest surviving camera photograph. More than a century and a half later, in 1992, Tim Berners-Lee, computer scientist and the inventor of the World Wide Web, uploaded to the internet its first image. The picture was of a parody band named Les Horribles Cernettes, composed of CERN (European Organization for Nuclear Research) employees. In 2021, John Divola photographed reproductions of these two images at the former George Air Force Base in Victorville, California. The base was established during World War II and closed at the end of the Cold War in the early 1990s; ground contamination added to the haste with which its housing units were abandoned. The site itself serves as what the artist calls "an artifact of the militarization of the desert West in the United States."

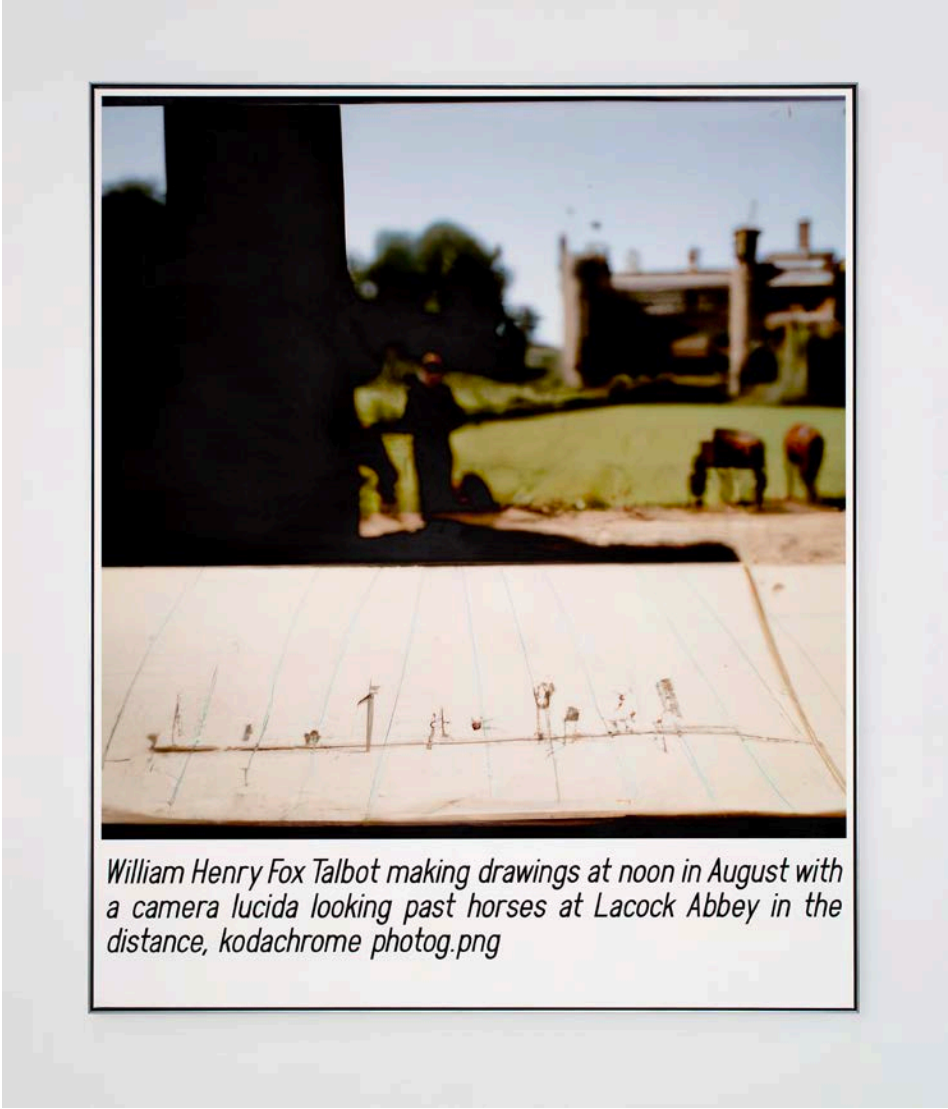
Lucia Grossberger Morales

Huaca, 1987

Mixed-media installation with interactive component
Courtesy of the artist

Much of Lucia Grossberger Morales's practice explores the possibilities of living in a digital culture and pressures dominant visual vocabularies.

This mixed-media installation transforms everyday computational media into a ritual altar with an embedded interactive kaleidoscope, expanding the idea of what constitutes (and is recognizable as) a computer. The Quechua term *huaca* refers to sacred objects, places, or deities in Andean cultures; the work is intended as a shrine that combines the artist's Andean background with the novel possibilities offered by the Apple II.



Brandon Lattu

***William Henry Fox Talbot making drawings at noon in August with a camera lucida looking past horses at Lacock Abbey in the distance, kodachrome photog.png*, 2022**

Pigment print
Courtesy of the artist

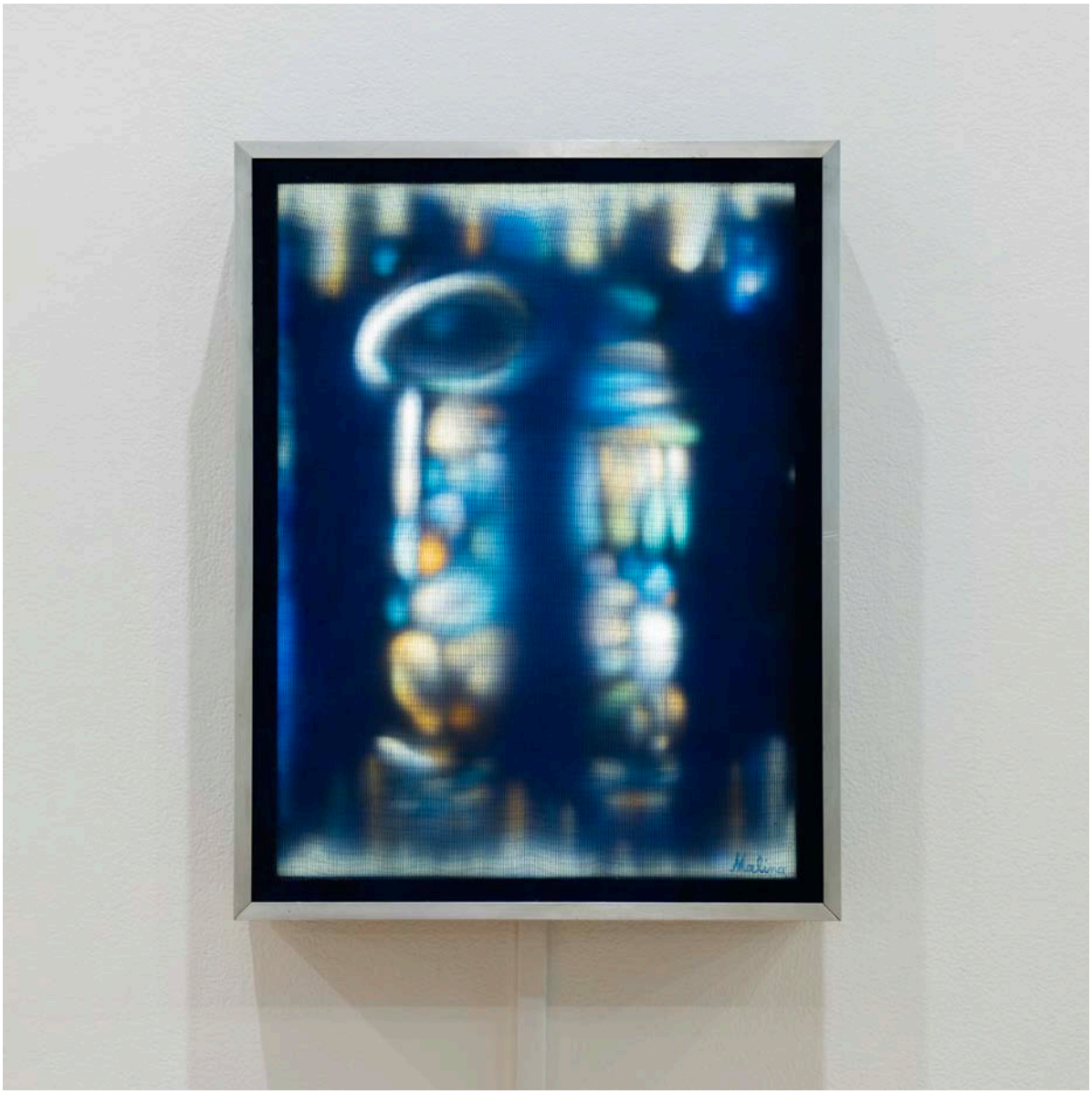
William Henry Fox Talbot (1800–1877) was an integral figure in the development of photography, whose several notable breakthroughs included producing the first negative image from which multiple positive images could be made. Brandon Lattu tasked AI image-generating software to imagine this moment as rendered in Kodachrome, a film stock introduced by Kodak in 1935 and discontinued in 2009. Unlike the reproducibility of the photographic image that marked both Talbot's work and the digital age, AI-generated images are, at present, inherently unstable, in that the same prompt can yield radically different results. This work thus challenges expectations of replication and exact image reproducibility while "capturing" a unique moment in the history of imaging technology.

Ahree Lee

Disrupting the Industry, 2019

Cotton, linen, and copper on canvas
Courtesy of the artist

Ahree Lee's *Disrupting the Industry* draws a parallel between the historically female labor of weaving and the early contributions of women in computing—particularly in roles such as programming, which was in the beginning intensely manual, and the assembly of computer components such as core memory, which was often woven by hand. This weaving visualizes the percentages of computer science degrees earned by women between 1966 and 2010. The dramatic decline after an initial period of equally dramatic growth reflects the broader issues of systemic barriers and gender bias that shape the technology sector, and STEM fields (science, technology, engineering, and math) more broadly. The title invokes the terminology that tech companies love to apply to themselves. Here, "disruption" is dislodged from its use as a marketing slogan and reframed in terms of social and economic realities.



Frank Malina

Reflections III, 1962

Kinetic painting with Lumidyne system (painted Plexiglas, mesh gauze, light sources, and electric motor in painted wooden box)
Collection of the Carl & Marilynn Thoma Foundation

Reflections III is a light artwork by pivotal early media artist Frank Malina. It operates using the artist's custom Lumidyne system, in which two painted panels on an electric motor spin and are projected onto the artwork's external casing using fluorescent tubes, creating ever-changing optical effects. The painted imagery, although abstract, suggests the shape of two rocket ships; Malina worked in aeronautical technology before he became an artist. While the work falls outside contemporary definitions of media art, *Reflections III* exemplifies the spaces, materials, and cutting-edge technologies that led to digital art as we know it today.



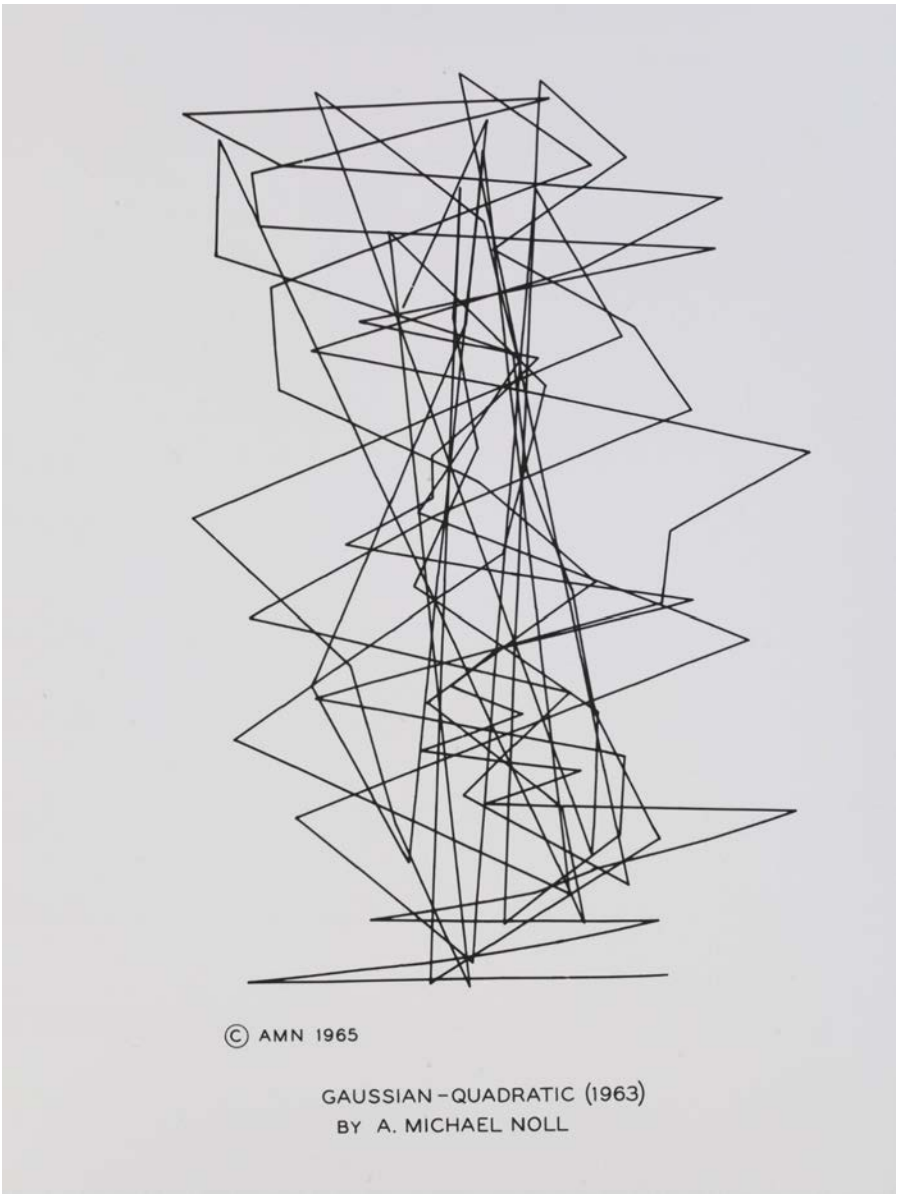



Lee Mullican

Computer Works, 1982–88

Digital inkjet prints
Collection of the Carl & Marilynn Thoma Foundation

To longtime painter Lee Mullican, in his sixties at the time of this work's making, computers offered an exciting new way of creating imagery. In the 1980s, Mullican gained access to an IBM 5170 machine and made it a productive tool with which to express his interests and influences, which ranged from Surrealism to Zen Buddhism and beyond (including, as we can see here, the glitch). Many of Mullican's digital compositions were never printed and remained largely unseen during his lifetime—this edition of six prints was published posthumously—but the artist's fascination with and commitment to novel technologies is palpable in this series and across much of his broader practice.

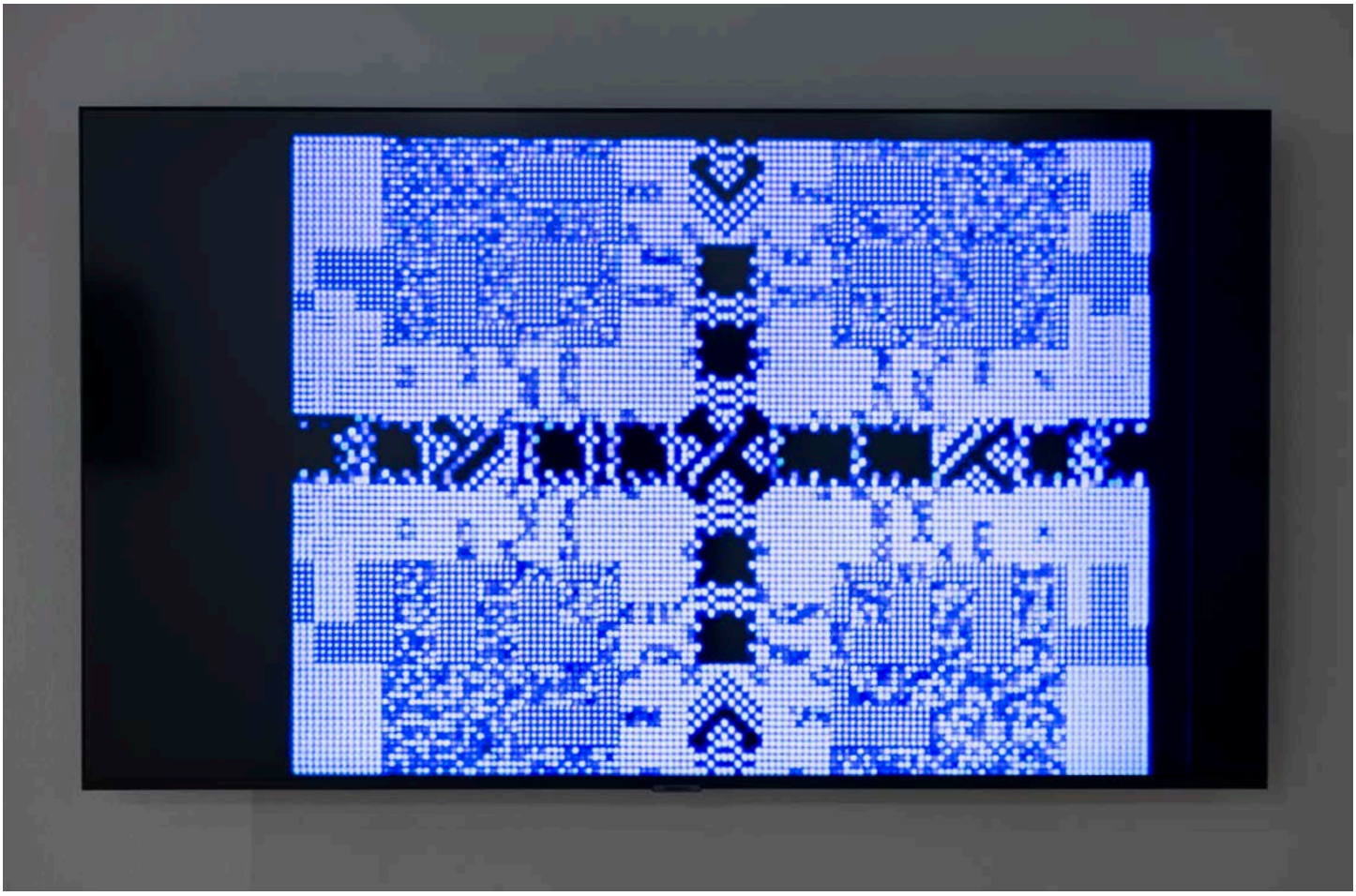


A. Michael Noll

Gaussian-Quadratic, 1962–63

Black-and-white photographic print, computer-generated image
Los Angeles County Museum of Art, gift of the artist, AC1998.105.1

Gaussian-Quadratic is a computer-generated image created at Bell Labs. A. Michael Noll used an IBM 7090 computer and a Stromberg-Carlson 4020 microfilm plotter to produce a series of design experiments he called *Patterns*. These were intended as experimental visual speculations that sought to determine what formal qualities make a picture "pleasing" or "artistic." Noll's image debuted at the 1965 *Computer-Generated Pictures* exhibition at Howard Wise Gallery, New York, one of the earliest known digital art shows. The copyright for *Gaussian-Quadratic* was initially refused on the grounds that a machine produced it, but then eventually granted, making the work among the first pieces of copyrighted art produced with a computer.

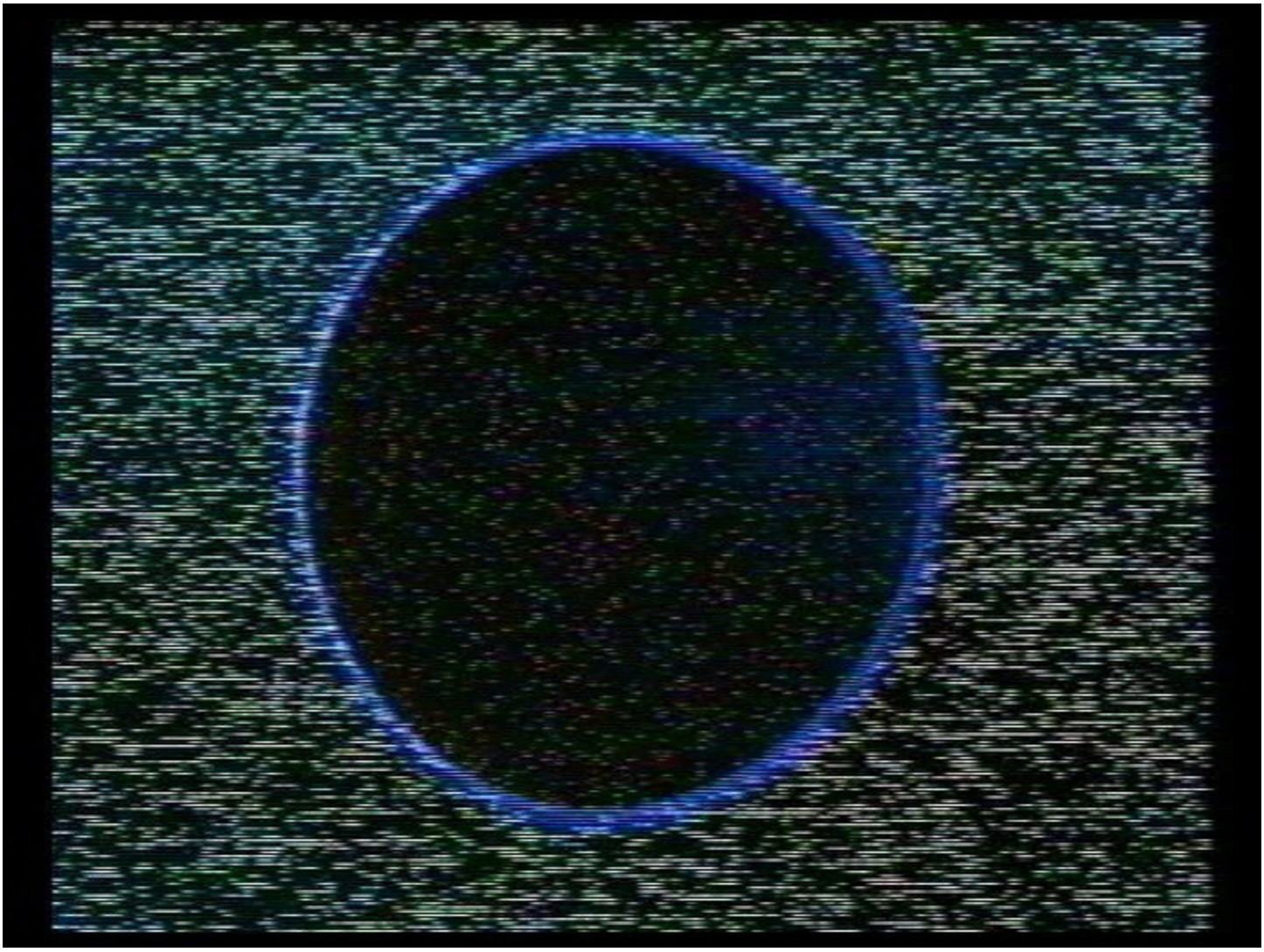


Stan VanDerBeek

Poemfield No. 7, 1967–68

16mm film transferred to digital video (4:09 min., sound)
Collection of the Carl & Marilynn Thoma Foundation

Poemfield No. 7 by experimental filmmaker and animator Stan VanDerBeek was one of the world's first computer-generated films. VanDerBeek utilized computer programming and graphic systems developed at Bell Labs to generate the imagery, which was then transferred directly onto 16mm film. The film shows multicolored geometric shapes rotating and shifting to create new forms and compositions. At the end, the words "no more war" flash blindingly on the screen, eventually fading out into a white background. VanDerBeek intended *Poemfield No. 7* as an anti-Vietnam War message. The soundtrack is by John Cage, the avant-garde composer and occasional VanDerBeek collaborator.



Steina and Woody Vasulka

Noisefields, 1974

Digital video (12:05 min., sound)
Collection of the Carl & Marilynn Thoma Foundation

Noisefields is an electronic video art abstraction created without the use of cameras, representing what is most often thought of as the glitch—a rupture or break in a signal. In effect, the glitches and audiovisual noise are both the work and its subject. *Noisefields* foreshadowed the coming decades, in which digital and media technology would increasingly inspire artistic inquiry and "disruption," formerly a word with generally negative connotations, would become a Silicon Valley cliché. As media content increasingly saturated the home via expanding cable networks, personal computers, and ever-crisper signals, artists like the Vasulkas explored technological "imperfection" as a new form of expression.

Gerardo Velazquez

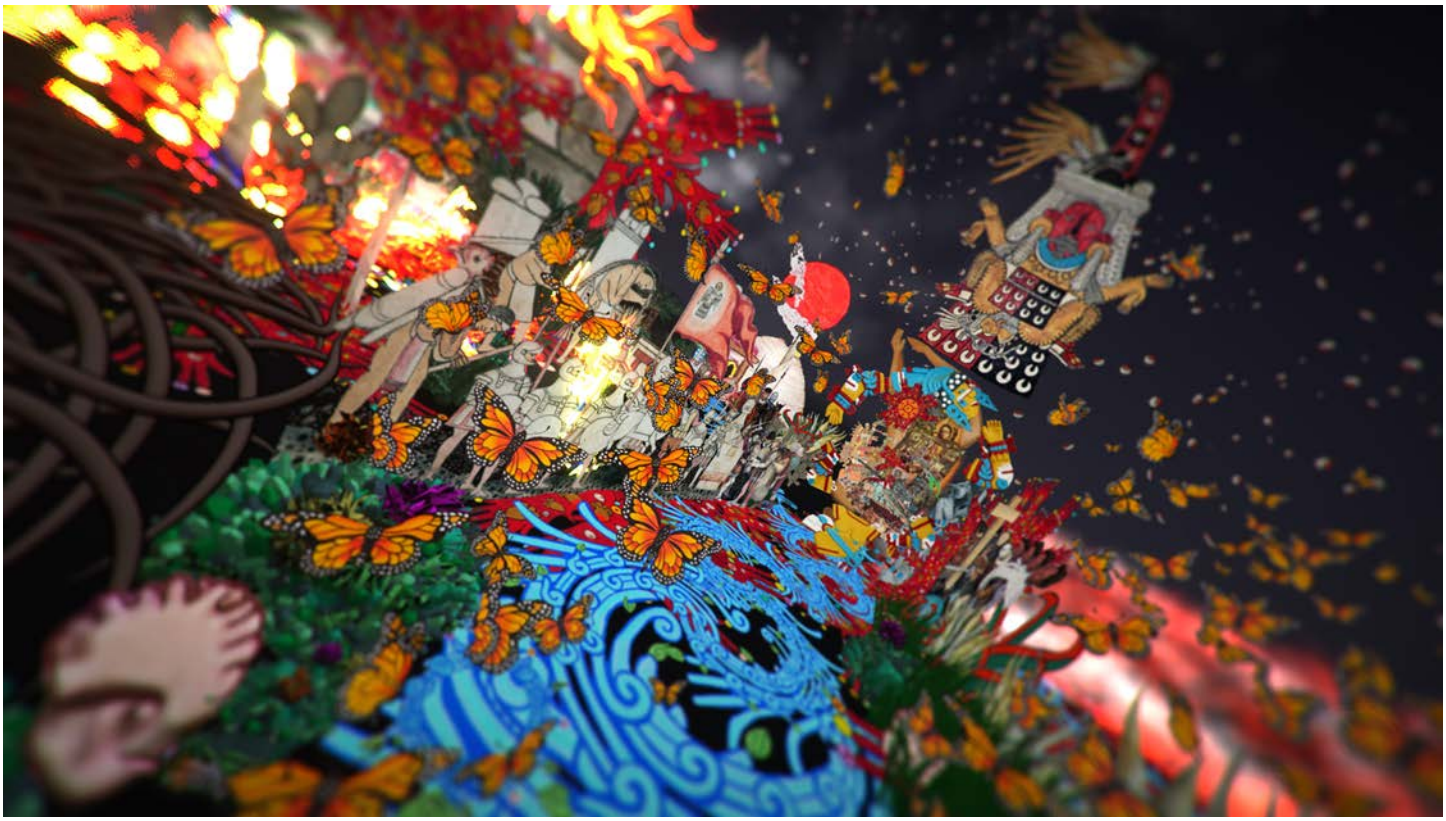
***Audio Manipulation of Digitized Images*, 1987**

Three slow-scan portraits, video (46:39 min., sound)
Courtesy of ONE Archives at the USC Libraries, Gerardo Velasquez Papers, VHS Collection

Gerardo Velazquez was most notably affiliated with the Los Angeles queer synth-punk band Nervous Gender (est. 1978), but he also gained renown in the 1980s for his engagements with then-contemporary digital media technologies that accompanied and expanded on the intensity of his music. As a visual artist and musician, Velasquez operated at the fringe intersection of sound and digital art. His use of sonic elements to visually alter imagery resulted in a snowy, fragmented disarray.

GLITCH DOMESTIC

As the 1970s rolled into the 1980s, digital technologies began to spill over from research labs and corporate centers into everyday life. More and more artists adopted new digital image-making tools, either excited by the tools themselves or lured by the increasing saturation of digital media into everyday life. They explored and intervened in how technology was upending or reinforcing societal norms, cultural practices, and individual identities. More pointedly, as digital technologies became ever more available and integrated into domestic spaces, many artists contended with the increasingly unclear boundary between the private and public realms. The television often served as the focus for these explorations.



Liliana Conlisk Gallegos

The Coyolxauhqui Imperative 2020, 2020

Digital video (11:13 min., sound)
Courtesy of the artist

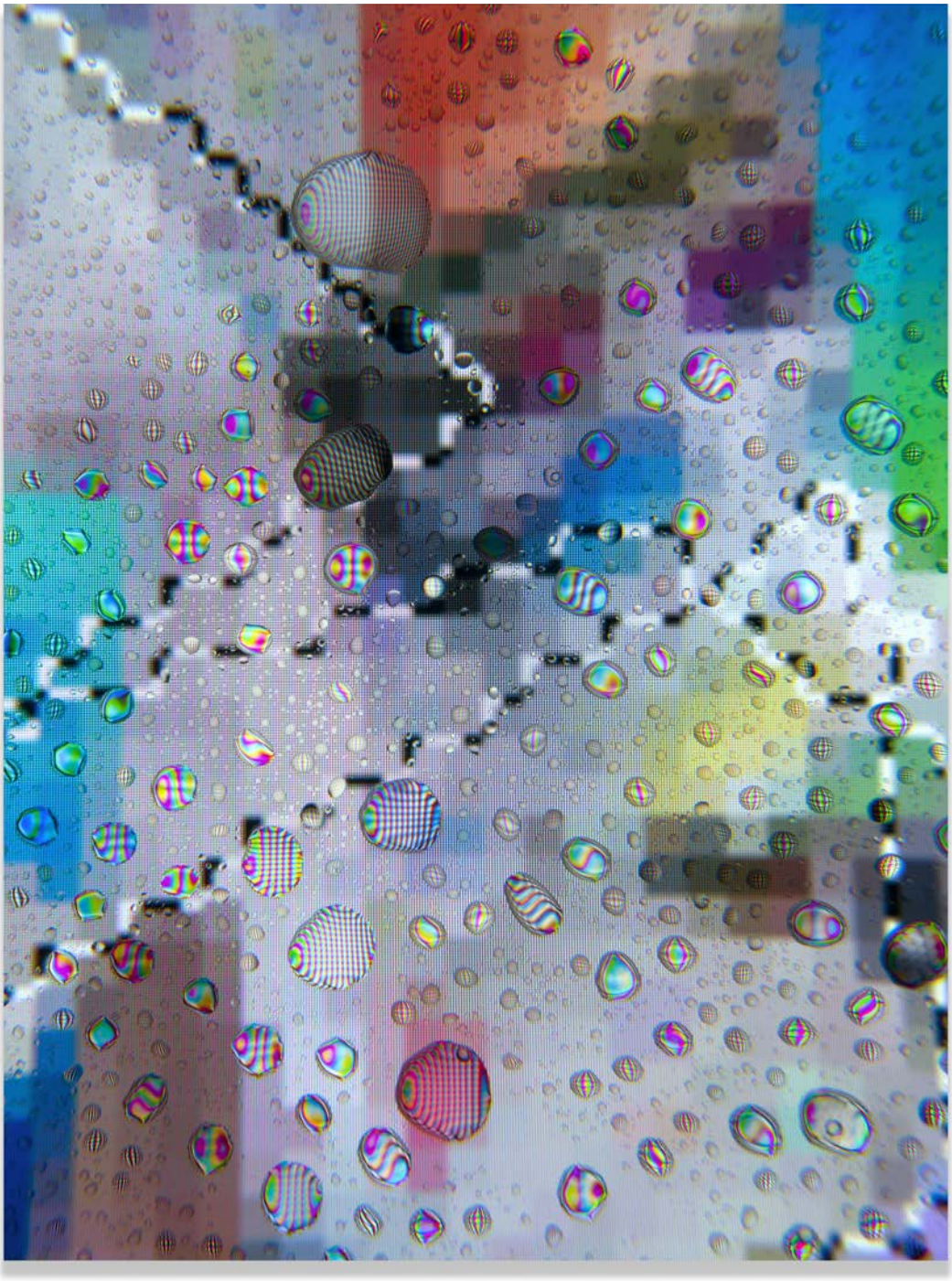
Liliana Conlisk Gallegos pushes against the aesthetic and conceptual expectations associated with media art. She is a self-identified *transfronteriza* artist, a term that signals a traversing of boundaries and borders, be they geopolitical, temporal, historical, or colonial. Her audiovisual virtual-reality work attests to this through a nonlinear retelling of Latinx and Indigenous women's genealogies and experiences. It reconsiders the historical and contemporary experience of womanhood in the Americas in the context of US imperialism and globalization. *Digital Capture* presented a 2D version of what was originally a VR piece.

Elisa Giardina Papa

Technologies of Care, 2016

Downloadable zipped folder, text files, videos with audio (duration variable)
Courtesy of the artist and Galerie Tanja Wagner, commissioned by Rhizome.org

Technologies of Care is a web- and video-based artwork, formally organized as a downloadable zipped folder, that explores the intersections of technology and women's physical and emotional labor. It made its debut as a digital commission on the online art platform Rhizome.org as part of *The Download* (2016), an ongoing web-based exhibition series that considers the act of downloading digital files and user desktops as the architecture of the gallery space itself. The materials included in *Technologies of Care* examine how women's care and service labor are globally outsourced, mediated, and reproduced.



Valerie Green

***IMG1788*, 2015**

Dye sublimation print on aluminum Sweeney Art Gallery Collection, UCR ARTS, gift of the artist and Moskowitz Bayse, Los Angeles, IL.SAG.2015.1.34

Valerie Green applies screen cleaners to various screens (phone, tablet, computer) and then photographs them. The artist then rephotographs those photographs with a new layer of screen-cleaning liquid applied. The drops act as miniature kaleidoscopes, highlighting and magnifying the underlying pixels.

Lynn Hershman Leeson

Lorna, 1979–82

Mixed-media interactive video installation with sound
Collection of the Carl & Marilynn Thoma Foundation

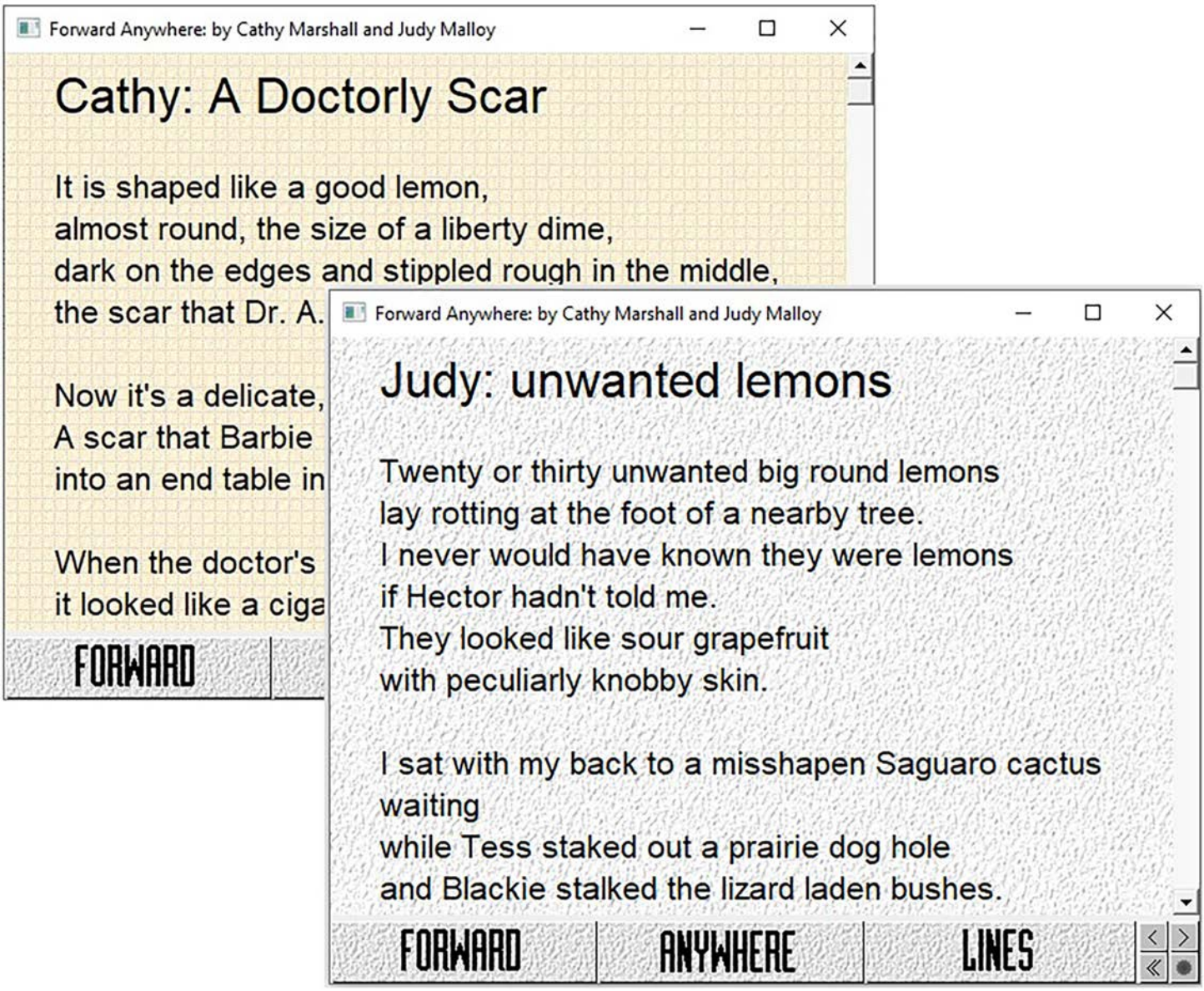
Lynn Hershman Leeson's *Lorna* is an interactive video in which users make choices for the work's agoraphobic protagonist. Through sound and video information accessed by pressing numbers on objects in Lorna's apartment, we learn about her fears, dreams, personal history, conflicts, and future. The work includes seventeen minutes of moving footage and thirty-six chapters that visitors can rearrange into a vast number of different actions and meanings.

Brandon Lattu

Photoshop and Photoshop, 2020

Pigment print
Courtesy of the artist

Photoshop is a program that can generate and manipulate digital images. Created by brothers Thomas and John Knoll and released to the public in 1990, it leveraged new advances in the processing capacities of home computers. Its comprehensive suite of tools popularized the notion of the "digital darkroom," and its name became a synonym for digital photo editing. Photoshop has become an industry standard across a variety of fields, from advertising and media to art and photography. Brandon Lattu's *Photoshop and Photoshop* depicts the scanned sides of Photoshop product boxes, reassembled using Photoshop. The image of a flattened Photoshop box, itself digitally manipulated via Photoshop, is a self-referential feedback loop of image editing.



Judy Malloy and Cathy Marshall

Forward Anywhere, 1993

Interactive hypertext file, digital web video with sound (duration variable)
Courtesy of the artists

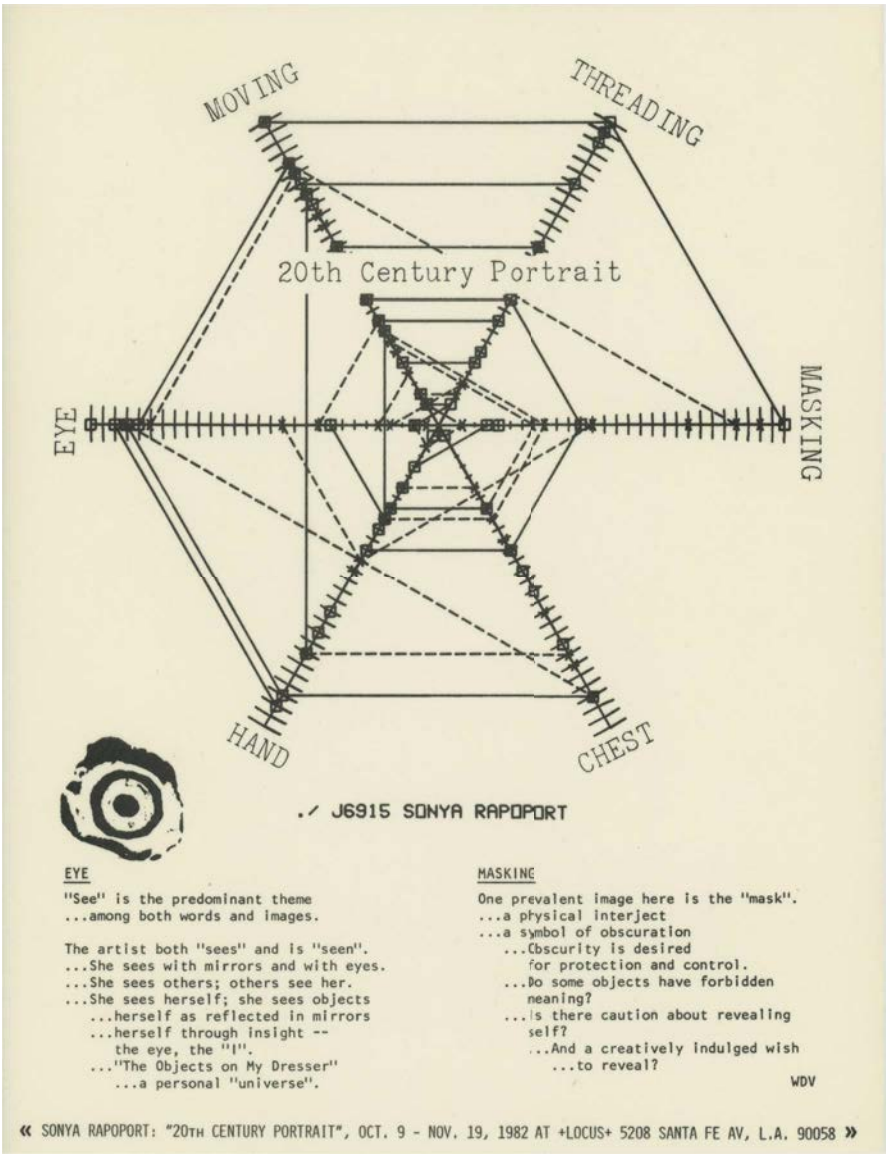
Forward Anywhere began as an email exchange at Xerox PARC in Palo Alto, California, between new-media poet Judy Malloy, an artist in residence there, and staff researcher Cathy Marshall. Their communications touched on various aspects of their lives and were recontextualized and fictionalized to make the final work. Xerox PARC, founded in 1969, is credited with incubating many of the foundations of computing and the internet, including the graphical user interface (GUI), Ethernet, laser printing, and much more. PARC's Artist-in-Residence program (PAIR), created in the early 1990s and lasting about a decade, aimed to bridge the gap between the arts and the sciences by inviting artists to collaborate with researcher staff. Malloy and Marshall were the only pairing of two women in the program's history.

Nam June Paik

Portable God, 1989

Digital video (silent) on two monitors in artist-modified altar, cabinet, antenna, mixed-media altar offerings, and ink on vintage papers
Collection of the Carl & Marilynn Thoma Foundation

Here Nam June Paik transforms an antique altar into a techno-Buddhist shrine. The sculpture is retrofitted with two channels of psychedelic pop-culture imagery playing silently on a loop. The artist's foresight in anticipating the problems, possibilities, and perils of the contemporary digital age is evident in his acknowledgment of technology's dualities: to connect and to alienate, to democratize information and to control narratives. *Portable God* was made at a transitional moment when traditional analog forms of media had begun to give way to a burgeoning digital landscape—a world where screens would dominate most visual and communicative experiences. The television, once the central household technology for information and entertainment, was about to become just another screen, its significance overshadowed by more interactive and versatile devices.



Sonya Rapoport

Objects on My Dresser: Phase 6, 1982/2024

Press release for Sonya Rapoport's *20th Century Portrait*, 1982 (reprinted 2024) Courtesy of the Sonya Rapoport Legacy Trust

This free takeaway offered in *Digital Capture* reproduced the press release for Sonya Rapoport's exhibition *20th Century Portrait*, which premiered at Locus Gallery in Los Angeles in 1982. It prominently features Rapoport's signature net web, a psychoanalytic self-portrait created using word and emotion associations. Like the net web installation also presented in the show, *20th Century Portrait* was created using connections that Rapoport identified between objects and six distinct themes: chest, hand, masking, eye, moving, threading.

ALSO INCLUDED:

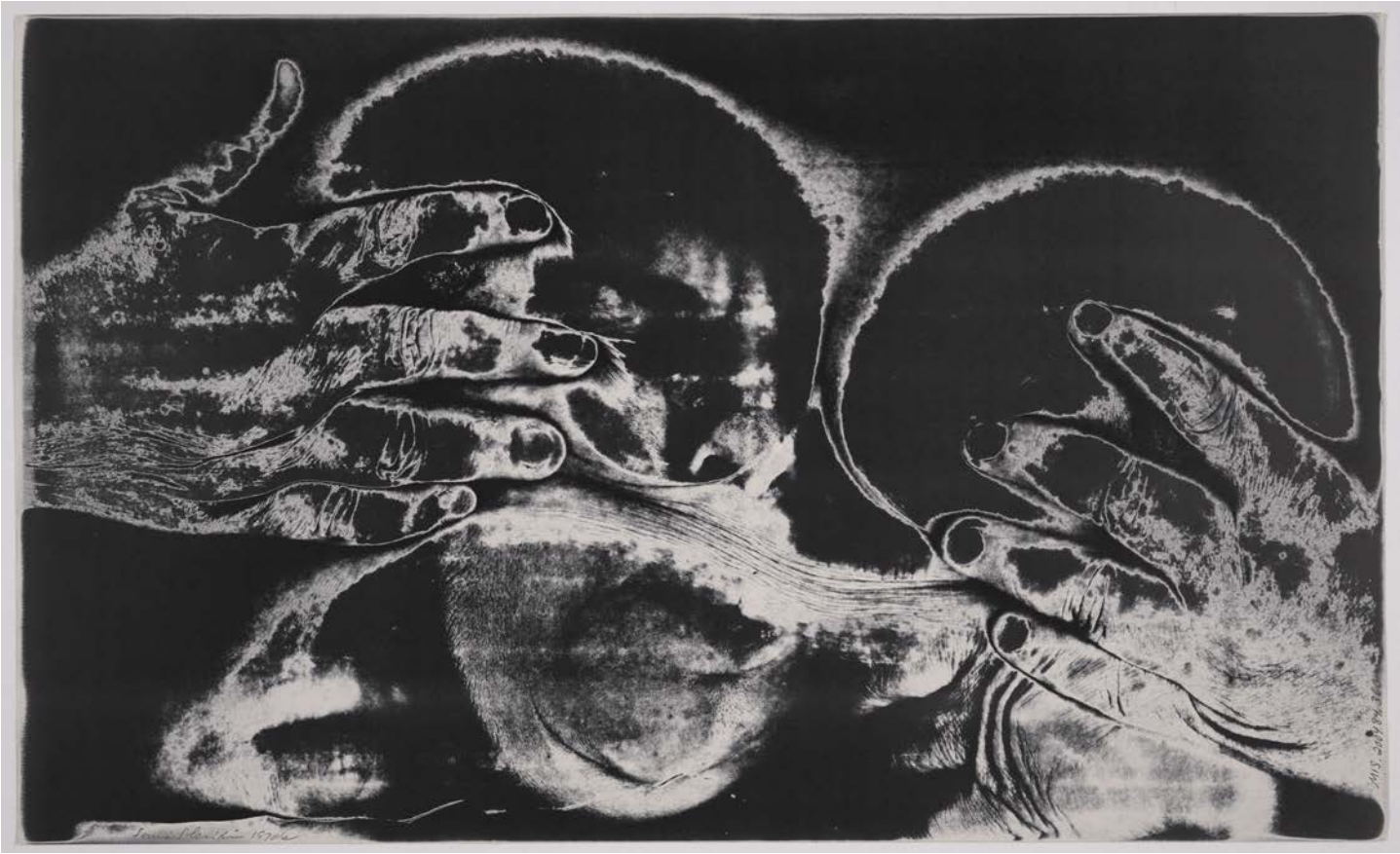
Objects on My Dresser: Phase 2, 1980/2024
Mixed-media installation, dimensions variable
Courtesy of the Sonya Rapoport Legacy Trust

Ilene Segalove

***Why I Got Into TV and Other Stories*, 1983**

Digital video (10 min., sound)
Courtesy of Video Data Bank, School of the Art Institute of Chicago

This collection of personal and revealing stories by Ilene Segalove—some factual, some farcical—expresses the artist's lifelong love of popular culture. Segalove appears on screen as an early TV addict, and visual culture becomes a makeshift mirror for her budding identity. The televised events, movies, advertisements, and fabricated sitcoms that she incorporated into her psyche and that are featured include the artificial romance of melodrama, watching John F. Kennedy's assassination, characters gazing hypnotically into the TV screen, and falling in love with a TV repairman. Segalove's love affair with the TV is also a rumination on memory and nostalgia, not to mention a mechanism for self-analysis. Flows of mass media and pop culture form us in intimate, deeply rooted ways and retain the power to trigger a longing for the past.



Sonia Landy Sheridan

Two Hands, Two Breasts, 1970s

Unique photocopy print on paper
Courtesy of Hood Museum of Art, Dartmouth College, Hanover, New Hampshire, gift of the artist, MIS.2004.84.360

Sonia Landy Sheridan's artistic and scholarly explorations of reproductive image systems were groundbreaking. She was the founding creator of Generative Systems at the School of the Art Institute of Chicago, a pioneering program initiated in 1969 that integrated art and technology. In the 1970s, Sheridan created works by experimenting with office machines like photocopiers. *Two Hands, Two Breasts* amounts to a semi-abstract self-portrait, made by combining photocopy prints of her breasts, belly, hands, and face into a composite image. Sheridan's face is at the center, mouth agape, tongue pressed against the scanner glass. Her hands are positioned on either side, each cupping an orbital breast. Like many of Sheridan's early black-and-white photocopy works, her features are distorted and magnified, and we recognize her body parts primarily through their geometries. The licking of the glass signals a direct physical entanglement with technology, a gesture that cyberfeminist discourses would expand upon in the 1980s. The work is important to media art histories, but due to its fragility, it has rarely been exhibited.

ALSO INCLUDED:

Sonia through Sonia in Time, No. 18, 1974
Sonia with Bill Flanagan Ceramic Cylinder, 1976
Unique photocopy prints on paper
Courtesy of Hood Museum of Art, Dartmouth College, Hanover, New Hampshire, gifts of the artist

Barbara T. Smith

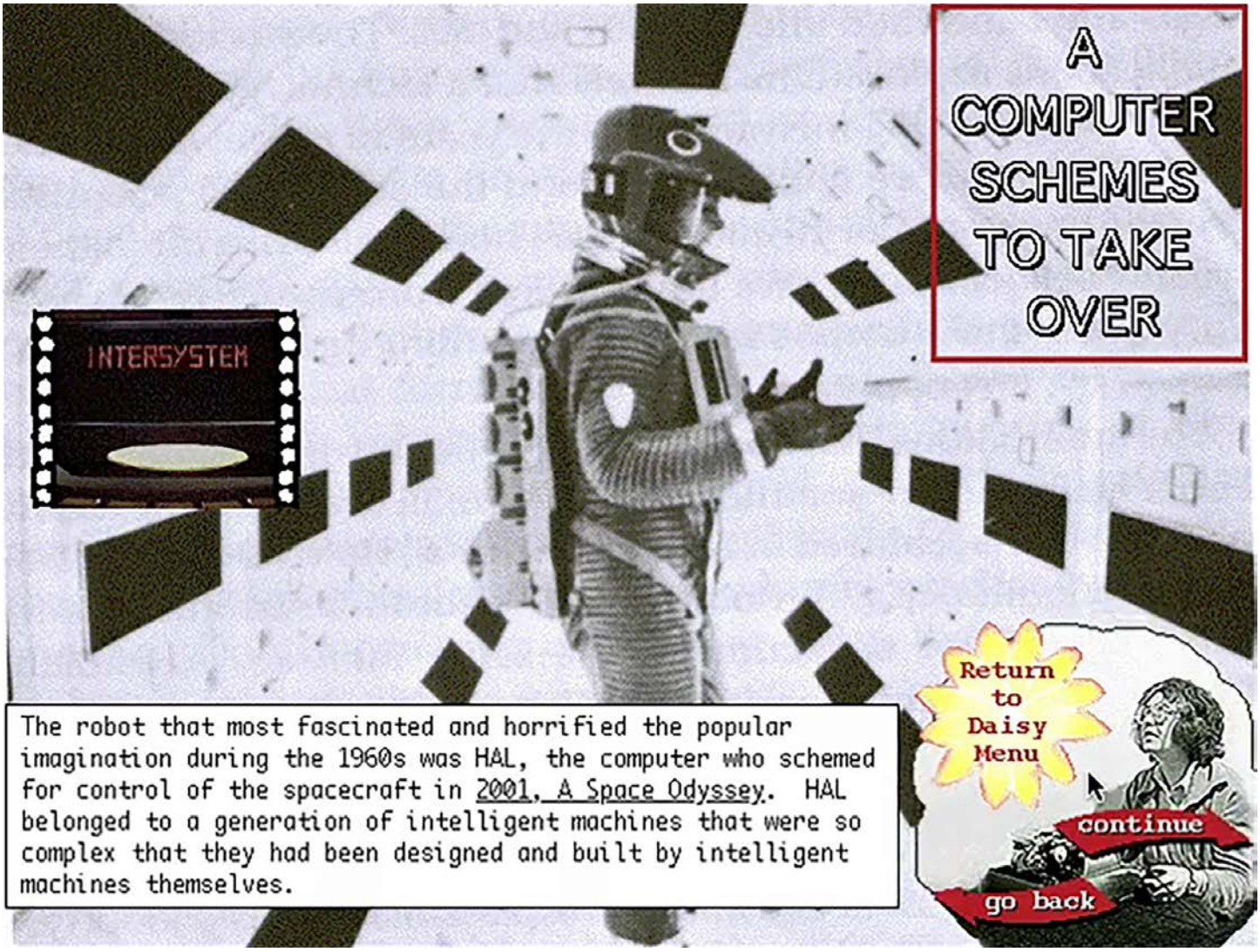
Do Nut Tuch, 1966–67

Spiral-bound artist's book
Courtesy of Getty Research Institute, Los Angeles, 2013.M.23

This work is part of Barbara T. Smith's *Coffin* series, twenty-five unique hand-bound artist's books that document her experiments with a Xerox 914 photocopy machine that she leased in the 1960s and kept at her home. The image studies were meticulous examinations of highly personal and intimate aspects of the artist's daily life, and they show a rich blend of abstracted body parts scrutinized to explore texture, tone, and technical manipulation. The books foreshadowed Smith's subsequent use of the body itself as an artistic medium, as well as the global emergence of second-wave feminism and performance art.

ALSO INCLUDED:

Where Did You Get That Polka-Dot Blouse?, 1966–67
Accordion-fold artist's book
Courtesy of Getty Research Institute, Los Angeles, BS10255-21



Christine Tamblyn

She Loves It, She Loves It Not: Women and Technology, 1993

Digital video with sound (loop)
Courtesy UC Irvine Special Collections and the Tamblyn Estate

This work by Christine Tamblyn examines women's historical omission from and obfuscation in technology fields. (The version presented in *Digital Capture* was an emulation of the original interactive CD-ROM.) Its twelve distinct topics present an array of historical, political, and cultural ephemera, makers, and narratives relating to women, labor, the body, technology, and art.

The artist wrote at the time of its making: "By envisioning a more productive relationship between women and technology, the project will benefit women who are using new technologies in a variety of academic fields and artistic endeavors." This concept continues to resonate in contemporary discussions about representation and inclusion of women and minorities in new-media fields.

Penelope Umbrico

Pirouette for CRT, 2012

Digital video (5 min., sound)
Courtesy of the artist

Pirouette for CRT is a choreographed ode to the once-ubiquitous cathode ray tube. It is part of Penelope Umbrico's larger project *TVs from Craigslist*, comprising images of TVs for sale that the artist found on peer-to-peer market platforms (Craigslist, eBay, Gumtree). Umbrico considers these images as artifacts that are "at once endearing and sad," each offering glimpses into the seller's private (often domestic) space through the screen's reflection. Meanwhile, the collated documentation of each blocky CRT TV serves as a visual archive of defunct and antiquated technologies that have been rejected by their owners yet endure nonetheless. The CRT TV is a veritable symbol of obsolescence, but one whose materiality persists.

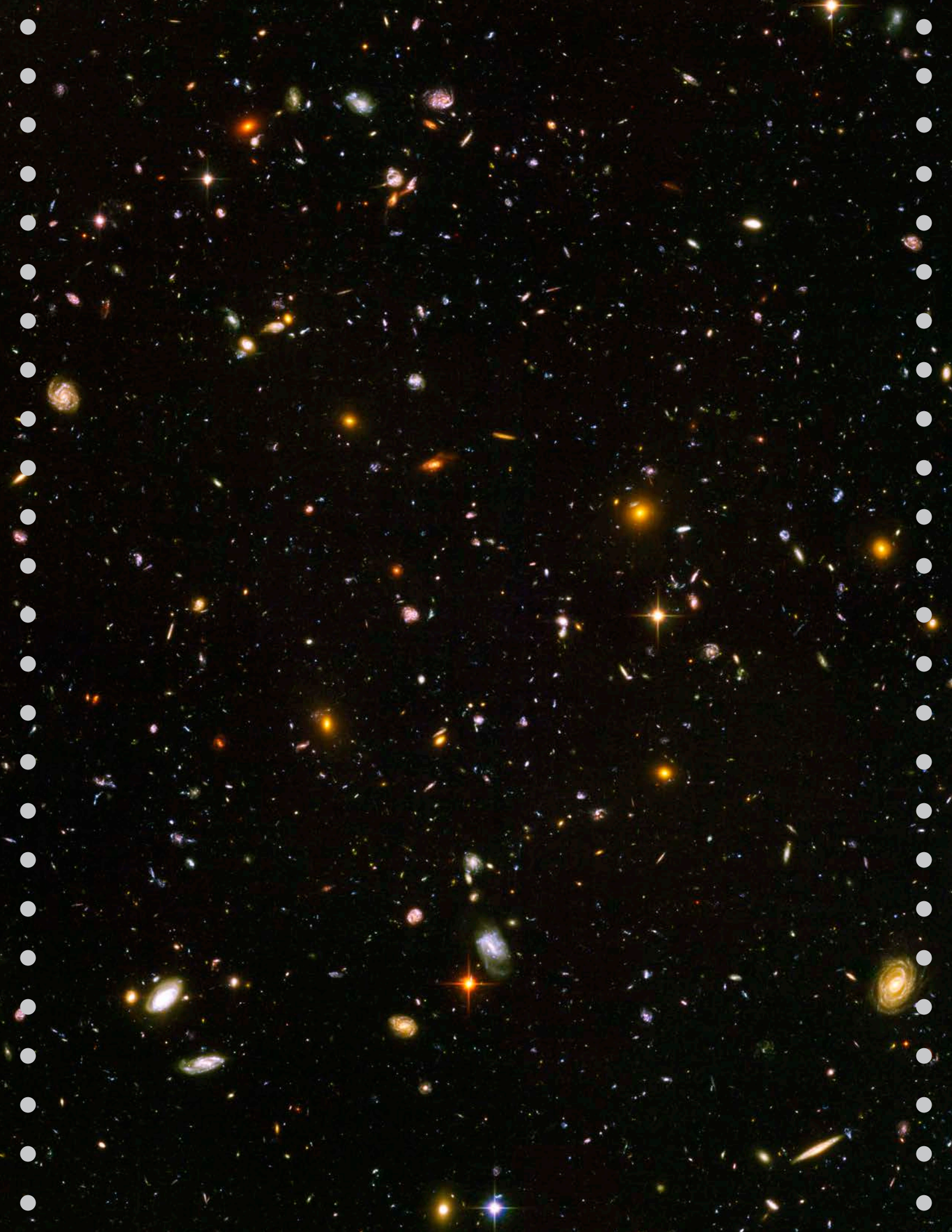
Selected interactive technologies

Blip, the Digital Game
Tomy Games Inc.
1977
Private collection, California

Blip, the Digital Game, is a tabletop game created and marketed by the Japanese company Tomy Games Inc. In an era when most gaming systems were mechanical, Blip was a hybrid console that used both digital and mechanical elements; gameplay requires the physical "winding" of a spring timer. Created in Japan and distributed overseas in the late 1970s, the console is notable for its direct competition with Pong, a two-dimensional table-tennis game created by Atari in Sunnyvale, California. Blip's short-lived attempt to overtake Pong attested to Japan's emergence as a power in the post-World War II global landscape.

Mitsubishi VisiTel Model LU-500 Visual Telephone Display
Mitsubishi Electric Sales America, Inc.
1987
Private collection, California

The VisiTel Model LU-500 Visual Telephone Display is an early videoconferencing technology for both home and commercial use, created and developed at Mitsubishi's Visual Telecom Division in Santa Clara, California. It works by transmitting a series of photographs taken by the sender to a receiver display. The receiver deciphers and displays the photographs, and can respond by sending its own. Unlike modern videoconferencing software like Zoom, the VisiTel does not transmit a continuous video signal; rather, it works like a digital camera combined with a telephone. The data is transmitted as it normally would be for a landline phone, via a cable.



A CHRONOLOGY OF DIGITAL IMAGING, 1906–2023

1906

California-based Lee De Forest invents the Audion, a vacuum-tube device that amplifies weak electrical signals. It aids AT&T in enabling trans-coastal communication networks, and is eventually used in radios, televisions, and early computers.

1927

The first electronic television picture is transmitted by Philo Farnsworth.

1935

Stanley G. Weinbaum publishes his science-fiction short story “Pygmalion’s Spectacles,” wherein the lead character dons a pair of goggles that transport him to a fictional hyper-sensory world composed of holographic recordings.

Walter Benjamin publishes “The Work of Art in the Age of Mechanical Reproduction,” predicting the death of the “aura” of the physical art object thanks to its technological reproducibility.

1936

The Jet Propulsion Laboratory (JPL) is founded in Pasadena, California, by Caltech researchers.

Alan Turing conceptualizes the Turing machine, laying the groundwork for device-based computation.

1938

The first “eletrophotograph” or “xerograph”—a proto-photocopy—is produced by Chester Carlson and Otto Kornei.

1939–52

John Cage creates *Imaginary Landscapes*, a series of early electronic musical works and performances.

1945

The Electronic Numerical Integrator and Computer (ENIAC), the first general-purpose computer—code-named Project PX and funded entirely by the US Army—is developed at the University of Pennsylvania's Moore School of Electrical Engineering. Early ENIAC programmers include Jean Bartik, Marlyn Wescoff Meltzer, Ruth Lichterman Teitelbaum, Frances Bilas Spence, and Frances Elizabeth "Betty" Holberton.

1947

Under the direction of chief engineer (and famed eugenicist) William Shockley, Bell Labs engineers John Bardeen and Walter Brattain demonstrate the first semiconductor amplifier, a point-contact transistor. This device for amplifying or switching electrical signals and power will be a foundational component of modern electronics.

1948–51

American inventor, eugenicist, and physicist William Shockley conceives and builds the first junction "sandwich" transistor, a new and more robust type.

1951

Marshall McLuhan publishes *The Mechanical Bride: Folklore of Industrial Man*, a study of popular culture notable for treating newspapers, comics, and advertisements as poetic texts.

A UNIVAC I, the first commercially available computer, is delivered to the US Census Bureau.

1952

Rear Admiral Grace Hopper works on UNIVAC with the US Navy, laying the groundwork for the COBOL programming language. Her most notable invention will be the compiler, a computer program capable of translating code from one programming language to another.

1953

US mathematician Ben Laposky uses oscilloscopes to create the first graphic images generated by an electronic (analog) machine. He refers to them as "oscillations" and "electronic abstractions."

Color television is made available in the United States through a system developed by RCA.

1954

The IBM 650 data processor is the company's first mass-produced computer. Its magnetic data storage drum permits faster access to stored information than previous drum-based machines.

1955

English Electric's Digital Electronic Universal Computing Engine (DEUCE) is introduced. A commercial version of Alan Turing's Pilot ACE, it is used primarily in science and engineering.

The first meeting of the IBM user group SHARE—an early volunteer-run forum for exchanging computer information and technical details—takes place for Los Angeles-area users.

1956

US television networks begin routinely using VTRs (video tape recorders) to convert analog television images into digital data.

Presidential debates are televised for the first time.

1957

National Bureau of Standards engineer Russell A. Kirsch produces the first digital image scanner, a device capable of sensing and storing digital data in a computer using a drum scanner and photomultiplier tube. The first digital image is a scanned photograph of Kirsch's three-month-old son.

The USSR launches Sputnik, the first human-made Earth satellite.

1958

The National Aeronautics and Space Administration (NASA) is established.

US President Dwight Eisenhower creates ARPA (Advanced Research Projects Agency) in response to the Soviet Union's launch of Sputnik. It will be renamed DARPA (Defense Advanced Research Projects Agency) in 1972. Weather satellites, GPS, drones, stealth technology, personal computers, and the internet will count among the innovations for which DARPA funding or research can claim partial credit.

Texas Instruments electrical engineer Jack St. Clair Kilby invents the monolithic integrated circuit—the microchip—thereby laying the technical and conceptual foundation for modern microelectronics, which encompasses everything from pocket calculators to digital cameras.

1959

Bell Labs artist-engineer Béla Julesz renders random-dot stereograms created by computers on a TV-like device.

Jean Hoerni and fellow Fairchild Semiconductor engineers develop the planar transistor, a major step toward the modern computer chip.

Jack Kilby at Texas Instruments and Robert Noyce at Fairchild Semiconductor demonstrate the first integrated circuits, a major advancement in the miniaturization of electronic circuits and a key development in the birth of modern digital imaging technology.

1960

Cinematographer Morton Heilig patents the first head-mounted display device that provides stereoscopic 3D images, naming it the Telesphere Mask. It is widely recognized as a predecessor to modern virtual reality (VR) technology.

1961

JPL engineer Eugene Lally publishes a paper discussing how to use light sensors to capture digital images from space for onboard navigation and guidance for future Mars missions. These ideas lay the groundwork for the development of digital imaging sensors.

Bell Labs computer center staff member Clement F. Pease writes a FORTRAN software package for the Stromberg-Carlson SC4020 microfilm printer-plotter. The software employs electron beams to draw images on the screen and is installed at Bell Labs in Murray Hill, New Jersey.

NASA launches the Ranger program, whose aim is to capture close-up images of the lunar surface. These expeditions are designed to have video cameras outfitted with transmitters

aboard the spacecraft to broadcast analog signals of the Moon back to Earth. The transmissions are plagued with interference from natural radio sources such as the sun and cannot be transformed into coherent images by conventional television receivers.

The Soviet Union is the first nation to put a human in space. Yuri Gagarin, a twenty-seven-year-old Air Force major, orbits the Earth in a 10,395-pound craft named *Vostok*.

Alan Shepard, a thirty-seven-year-old US Navy commander, makes a fifteen-minute flight 115 miles above Earth in the *Freedom 7* capsule and becomes the first American in space.

The Berlin Wall is built to separate East and West Berlin.

California Institute of the Arts (CalArts), which merges the Los Angeles Conservatory of Music and the Chouinard Art Institute, is founded. It will become a significant breeding ground for artists and animators contributing to digital imaging and animation.

Businessman Arthur Rock moves to California and establishes the Bay Area's first venture capital firm, Davis and Rock. Rock had been an investor in the San Jose-based Fairchild Semiconductor and will go on be a chief investor in Intel, Apple, Scientific Data Systems, and Teledyne.

1962

John Glenn becomes the first American to orbit the Earth.

Bell Labs researchers Leon Harmon and Ken Knowlton develop a programming language to make computer-animated movies.

The first European TV show to be broadcast in the United States—a short program from France featuring a song by Yves Montand—is transmitted via a Telstar communication satellite.

Daphne Oram conceives, codesigns, and commissions the Oramics, an optoelectronic and electromechanical musical interface that is the forerunner to MIDI sequencing and digital audio workstations; it will be completed in 1969. The Oramics uses optical scanning technologies to read and convert hand-drawn waveforms and control information sequences to produce musical pitch and sound dynamics.

Cinematographer Morton Heilig creates the Sensorama, a booth that accommodates up to four people and combines full-color 3D video, stereo audio, a vibrating chair, smells, and atmospheric effects.

1962–63

Bell Labs artist-engineer A. Michael Noll creates the algorithmic artwork *Gaussian-Quadratic*, a computer-generated image outputted on a Stromberg-Carlson 4020 microfilm printer-plotter.

1963

Bell Labs releases a ten-minute BEFLIX (short for "Bell Flicks") film entitled *A Computer Technique for Animated Movies*. The film details the process of digital animation, and was itself made using the first known computer language designed specifically for digital animation.

1964

Korean-born artist Nam June Paik, future pioneer of video art and coiner of the term "electronic superhighway," arrives in New York and begins what will be a long collaboration with classical cellist Charlotte Moorman.

IBM introduces System/360, a family of mainframe computer systems that will be a foundation of the modern computer industry.

The first commercially available fax machine, the Xerox Long Distance Xerography (LDX) system, is introduced. The technology is a precursor to digital scanning and image transmission.

The *Mariner 4* is launched on a 228-day mission to Mars. The spacecraft's translator machine will convert digital image data into numbers printed on strips of paper, which are compiled into the first close-range images of the planet.

1965

Stereo computer animations (random-dot stereograms) are created and exhibited by A. Michael Noll and Béla Julesz at Howard Wise Gallery in New York.

Sony introduces the Portapak, the first consumer video-recording device available in the United States. Nam June Paik reportedly purchases one on the day it is released to the public.

The term "pixel" (short for "picture element") is first used in published research by Frederic C. Billingsley of JPL to describe the individual elements of a digital image.

1966

Military engineer Thomas Furness creates the first flight simulator for the US Air Force.

Curator Maurice Tuchman initiates the Art and Technology program at the Los Angeles County Museum of Art.

Bell Labs' James Tenney and A. Michael Noll invite Nam June Paik to use the company's computer facilities and introduce him to FORTRAN programming. Paik will officially become a "resident visitor" the following year.

Experiments in Art and Technology (EAT) is cofounded by Bell Labs engineer Billy Kluver and a collective of artists, including Robert Rauschenberg, John Cage, and Yvonne Rainer.

1967

The US Defense Department's Advanced Research Projects Agency Network (ARPANET)—the precursor to today's internet—is initiated.

Astronauts Gus Grissom, Ed White, and Roger Chaffee are killed during a full-scale simulation when a flash fire destroys the *Apollo 1* spacecraft.

Nicholas Negroponte and Leon Grossier found MIT's Architecture Machine Group, a laboratory that integrates architecture, engineering, and computing.

Bell Labs' Stan VanDerBeek and Ken Knowlton present their computer-animated movie *Man and His World* at the World's Fair in Montreal.

Ralph Baer designs the first video game console that operates on a standard "brown box" television.

Guy Debord publishes *The Society of the Spectacle*, in which he describes authentic social life in modern society as having been replaced with its representation.

1968

Tendencies 4: Computers and Visual Research takes place in Zagreb. It is the fourth edition of an exhibition series devoted to new visual research.

Curator and art critic Jasia Reichardt presents the book and exhibition *Cybernetic Serendipity*, a landmark exhibition of early digital art, at the Institute of Contemporary Arts in London. Cybernetic artworks prioritize feedback over aesthetic or material concerns.

The Computer Arts Society, an organization devoted to encouraging the creative use of computers in the arts, holds its first meeting in London.

Samuel R. Delany publishes *Nova*, today considered a forerunner of the cyberpunk movement thanks to its descriptions of human-computer interfaces via technological implants and prosthetics.

Ivan Sutherland and his student Bob Sproull create the first virtual-reality head-mounted display system, naming it the Sword of Damocles.

Douglas Englebart introduces the computer mouse at a conference in San Francisco; he had conceived it in 1961 and invented it in 1964.

1969

ARPANET is released, linking distant computers—initially at four major US universities. The first ARPANET message is sent to the Stanford Research Institute from the University of California, Los Angeles.

George E. Smith and Willard Sterling Boyle at Bell Labs develop plans for the coupled-charge device (CCD), a light-sensitive microchip that will enable dramatic advances in digital imaging technology.

Artist Lillian F. Schwartz is invited by Bell engineer-artist Leon Harmon to collaborate with engineers on nascent imaging technologies at Bell Labs. The two had met the preceding year at the group exhibition *The Machine as Seen at the End of the Mechanical Age* at the Museum of Modern Art, New York, in which both were featured.

Bell Labs develops the first known example of a frame buffer, a portion of random-access memory (RAM) that contains a single digital image—the precursor to the modern video card.

ACM SIGGRAPH (Association for Computing Machinery's Special Interest Group on Computer Graphics and Interactive Techniques) is founded in New York by Andries (Andy) van Dam. The first SIGGRAPH conference will take place in 1974.

ca. 1969–72

University of California, Irvine, MFA students Barbara T. Smith, Nancy Buchanan, and Chris Burden open F-Space, an experimental video and performance art space in an Orange County industrial park.

1969–75

Fairchild Semiconductor maintains a large integrated circuit manufacturing plant for various missile guidance systems, calculators, and other early computing devices on a Navajo reservation in Shiprock, New Mexico.

1970

Information, curated by Kynaston McShine at the Museum of Modern Art, New York, features early explorations of globalization as mediated through democratized technologies.

The exhibition *Software – Information Technology: Its New Meaning for Art*, curated by Jack Burnham, opens at the Jewish Museum in New York and the Smithsonian Institution in Washington, DC. It presents the computer as a conceptual artistic medium for the creation of new visual art forms.

Optic Nerve, a photography collective focusing on social issues in US culture through video and computation-based art, is founded in San Francisco.

Shigeko Kubota becomes one of the first artists known to use the Sony Portapak video camera for creative purposes.

The artist journal *Avalanche*, published by Willoughby Sharp and proto-Net artist Liza Béar, launches in New York. It will remain in publication through 1979.

Intel releases the first commercially available dynamic random-access memory (DRAM) chip.

1971

Computer engineer Ray Tomlinson invents and sends the first email message (the contents of which remain unclear).

Intel releases the 4004, the first commercially produced microprocessor.

Bell Labs artist engineer A. Michael Noll creates a "feelies" machine that allows users to "feel" a three-dimensional object that exists only in the memory of the connected computer.

Writer Don Hoefler is the first to use the term "Silicon Valley" in print, in a series of articles for *Electronic News*.

1972

The Magnavox Odyssey, the first commercial home video game console, is released. While not directly related to digital imaging, it represents a significant step in using digital technology for entertainment and graphical display.

Atari releases Pong, the digital table-tennis-themed video game.

Texas Instruments is the first to patent a filmless electronic camera.

1973

NASA launches Skylab, the first US space station.

General Electric founds Genigraphics Corporation, an international business graphics firm specializing in high-definition color computer graphics, workstations, and imaging systems.

Transmission Control Protocol/Internet Protocol (TCP/IP), the basic communication language of the internet, is written; in 1983 it will become the standard for inter-computer internet communications.

Leopold's Records, a student-owned record store in Berkeley, launches the Community Memory terminal—the first public computerized bulletin board system.

The Xerox Alto, the first computer with a graphical user interface (GUI), is developed at Xerox PARC in Palo Alto, California.

The first handheld mobile phone call is made by Martin Cooper, a Motorola researcher and executive.

1974

The Long Beach Museum of Art begins collecting and exhibiting video art.

Engineers Vint Cerf, Yogen Dalal, and Carl Sunshine publish "The Specification of Internet Transmission Control Program," coining the term "internet" as shorthand for internetworking.

1975

Altair 8800, the first personal computer commercially available as a complete kit, is introduced.

Eastman Kodak engineer Steven Sasson builds the first self-contained digital camera. It weighs eight pounds, uses a CCD image sensor, and has a resolution of 0.01 megapixels (100× 100 pixels).

Myron Krueger develops Videoplace, an artificial-reality laboratory that allows users to interact with virtual objects in real time.

Ken Knowlton of Bell Labs creates a version of EXPLOR, a computer program chiefly used for data visualization and analysis, using the programming language FORTRAN, developed specifically for minicomputers (as opposed to mainframes). This leads to more accessible and affordable data visualization tools, contributing to the broader adoption of computing technology.

c a . 1975

The US government installs 177 of the Pentagon's Vietnam-era ground sensors along the US-Mexico border, laying the foundation for what would later become known as the "virtual border." By 2020, the use of these motion-detection technologies across this border will expand to upward of 20,000 units.

The Scitex Company finds a way to use microprocessors to store the signal from a photomultiplier tube (a device that detects and amplifies faint light signals) in a computer. This becomes a key component in applications necessitating precise light measurements, such as scientific research and medical imaging.

1976

California State University, Chico, professor and artist Grace Hertlein founds the (short-lived) computer art magazine *Computer Graphics and Art*.

AT&T commissions and releases *The Artist and the Computer*, a documentary film about Lillian Schwartz's media-based artwork, directed by John K. Ball.

Queen Elizabeth is the first state leader to send an email.

Steve Jobs, Steve Wozniak, and Ronald Wayne found Apple Computer.

At the Long Beach Museum of Art, curator and director David Ross launches the video-centered exhibition series *Southland Video Anthology*.

1977

Fairchild Imaging Systems creates the world's first solid-state CCD night-vision camera for use in remotely piloted vehicles (RPVs) by the US Army.

Blip, the tabletop electro-mechanical game, is marketed and sold in the United States by the Japanese gaming company Tomy.

Ariadne: A Social Art Network, organized by Suzanne Lacy and Leslie Labowitz-Starus, is initiated as a feminist appropriation of mass media and broadcast TV.

The Community Memory terminal, initiated in 1973 in Berkeley, is formally incorporated as a nonprofit with widened accessibility in public gatherings, neighborhood meetings, and community spaces.

The Apple II, the first mass-marketed and user-friendly personal computer, launches.

The Commodore PET (personal electronic transactor), one of the earliest all-in-one personal computers, is released. It features a built-in monochrome display, making it significant in the evolution of digital display technology.

1978

A Hewlett-Packard HP3000 becomes the first computer installed at the White House. A Xerox Alto is later acquired for the Oval Office.

The LaserDisc video format—the first commercial optical disc storage medium, initially introduced as Discovision by MCA and Philips—launches. The first LaserDisc sold in North America is *Jaws* (1975).

WordStar, one of the first popular word-processing systems for personal computers, is created by Rob Barnaby at MicroPro International.

MUD1, the first multi-user domain (or dungeon), which allows multiple people to play against one another online, is created by Richard Bartle and Roy Trubshaw, students at the University of Essex.

1979

The world's first cellular telephone service in a vehicle is installed in Japan.

Consumers in Paris are introduced to the world's first smart card.

The Fairlight CMI (computer musical instrument), a digital sampler and synthesizer, is invented.

Atari introduces its Model 400 and 800 8-bit computers. The 400 is marketed as the more affordable of the two, with the 800 advertised as a higher-end model with memory upgrades available. Both quickly become popular for their library of gaming software.

EZTV, a production company and experimental exhibition venue for media, film, and television, is founded in Los Angeles by film scholar, writer, and video producer John Dorr. EZTV's predominantly gay male membership will collaborate with gay rights activist initiatives and groups such as Queer Nation and ACT UP.

Lynn Hershman Leeson's mixed-media installation *Lorna* is the first interactive video art disc (it will be finalized in 1982).

The Sony Walkman is introduced, revolutionizing portable entertainment. Though primarily an audio device, its success lays the groundwork for the later development of portable digital devices, including those used for imaging.

Texas Instruments' TI99/4, featuring one of the fastest CPUs available in a home computer, is released.

George Lucas recruits Ed Catmull from the New York Institute of Technology to head Lucasfilm's Computer Division, a group charged with developing state-of-the-art computer technology for the film industry. It will become Pixar in 1986.

1980

Seagate Technology creates the first hard disk drive for microcomputers, the ST506.

1980–85

Color printer and scanning equipment makers Scitex, Hell Graphics Systems, and Crosfield introduce computer imaging systems.

1 9 8 1

Sony introduces the first three-and-a-half-inch floppy drives and diskettes.

Paper Tiger Television is launched by media activist DeeDee Halleck as a nonprofit, low-budget, public-access TV program and open media collective dedicated to raising media literacy and challenging corporate control over broadcast mediums.

IBM introduces the IBM 5150 personal computer, which can connect to a television and allows word processing and gameplay, arguably taking computing mainstream.

Performance artist Rachel Rosenthal founds Espace Dbd in Los Angeles as an alternative artist-run venue that encourages, supports, exposes, and develops non-static art forms such as performance, video, experimental media, and dance.

The first mass "web," Minitel, is made public by France Telecom. Free Minitel terminals are available to every phone subscriber and garner immense popularity for such online services as news, tax filing, erotic classified ads, email, and chat.

1 9 8 2

Adobe Systems is founded in California.

Silicon Graphics Inc. is founded by James Clark. SGI will become a leader in high-performance computing solutions, greatly influencing the graphics, scientific, and engineering industries with its visual computing systems.

The first commercial compact disc makes its debut.

Sony demonstrates the Mavica "still video" camera, an electronic camera that takes still images and stores them as single video frames.

Tron is one of the first films to make extensive use of computer graphics, showcasing the potential of computer-generated imagery (CGI) in movies.

The CD-ROM is introduced in Japan; it appears in Europe the following year.

The Commodore 64, equipped with superior graphics and sound capabilities, is released and becomes one of the best-selling personal computers, greatly influencing the development of computer graphics and gaming.

1 9 8 3

The first cellular device service, Motorola, launches and introduces the DynaTAC 8000X, the world's first handheld mobile phone.

The Livraria Nobel bookstore in Portugal sets up a permanent "videotex" gallery, Arte On-Line, which is featured on terminals in the store and can also be accessed from any public or home terminal by entering a special code (similar to URLs today).

1 9 8 4

Apple launches the Macintosh, popularizing the graphical user interface (GUI) and mouse.

Canon demonstrates its first electronic still camera.

FidoNet, a homespun low-cost alternative to ARPANET that connects bulletin board systems (BBSs), is created by Tom Jennings.

Writer William Gibson coins the term "cyberspace" in his novel *Neuromancer*.

Kit Galloway and Sherrie Rabinowitz found and launch Electronic Cafe Network, a telecollaborative network that can connect informal public multimedia communications venues, at 18th Street Arts Center in Santa Monica.

Radia Perlman's work on spanning tree protocol, a virtual tree-like structure in Ethernet networks, enables the development of more efficient and reliable networking, allowing greater network scalability and traffic management.

Steven Levy publishes *Hackers: Heroes of the Computer Revolution*.

1 9 8 5

MIT Media Lab is founded as an extension of the university's Architecture Machine Group.

Symbolics.com becomes the first-ever registered internet domain (belonging to a computer manufacturer).

Seven New Jersey teenagers are arrested for accessing confidential data on Pentagon computers.

Andy Warhol receives his first Amiga 1000 home computer from Commodore International and agrees to be a brand ambassador. His digital drawings, which include re-creations of his iconic *Campbell's Soup Cans* (1962), highlight the emerging possibilities of digital art.

Minolta introduces the first professional auto-focus camera, the Maxxum 9000.

The wreck of the *Titanic* is found after seventy-three years with the help of undersea robots and remote TV cameras.

Mikhail Gorbachev becomes the leader of the Soviet Union and calls for immediate changes in Soviet systems and culture.

Donna Haraway publishes "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late 20th Century," which employs hybrids from science fiction, primatology, and borderlands theory as lenses to analyze the (im)material conditions of women.

Microsoft releases Windows 1.0, its first GUI-based operating system.

1 9 8 6

The space shuttle *Challenger* breaks apart immediately following liftoff—a disaster viewed live on TV by millions.

Pixar, formerly Lucasfilm's Computer Division, becomes an independent company after being purchased by Steve Jobs. It continues to develop computer animation technologies and produce animated films.

Kodak creates a 1.4-megapixel sensor.

The School of Visual Arts in New York founds the first MFA program in computer art in the United States.

One of four nuclear power stations in Chernobyl explodes, releasing one hundred times more radiation than the atomic bombs dropped on Nagasaki and Hiroshima.

Nam June Paik unveils *Something Pacific*, his first permanent outdoor art installation, at the University of California, San Diego. It is comprised of old television monitors and a closed-circuit loop, and users can manipulate sequences of broadcast TV on it. Per his wishes, it has since been continuously updated with current video technology.

1987

Adobe Illustrator, a vector graphics editing and design program developed by Adobe cofounder and CEO John Warnock, is released to the public. The software will become essential to graphic design, including digital imaging.

CompuServe introduces the GIF (graphics interchange format), soon to be widely used for images on the early internet, particularly for its support of animation.

In the "Black Monday" crash, the stock market falls 22 percent over two days.

The Prix Ars Electronica is established to recognize significant achievements in computer graphics, computer animation, and computer music.

Canon produces the RC-760 still video camera, featuring a 600,000-pixel CCD.

1988

Cynthia Pannucci founds Art & Science Collaborations Inc. in New York to support technology-based art.

In France, Paul Virilio publishes *La machine de vision*, detailing the technologies and affiliated images of perception, production, and dissemination; it will be translated into English and debut in the United States as *The Vision Machine* in 1994.

Fuji announces its first digital camera, the Fujix DS-1P.

The Morris worm temporarily shuts down about 10 percent of the world's internet servers. Robert Tappan Morris, the Cornell University computer science graduate student responsible, becomes the first person to be tried and convicted under the 1986 Computer Fraud and Abuse Act.

1989

Tim Berners-Lee, a British scientist at CERN, invents the World Wide Web.

Kodak introduces the Kodak XL 7700 digital continuous-tone printer, which can print large-format prints from digital image files.

NASA sends the space probe *Magellan* to Venus; two other probes head for Neptune and Jupiter.

1990

Kenneth Snelson creates some of the first virtual sculptures using 3D software.

The Dycam Model 1, the first digital camera commercially available in the United States, is released.

Adobe Photoshop becomes available for Mac computers.

Tim Berners-Lee integrates the hyperlink into the World Wide Web to simplify linking computers.

Tom Caudell and David Mizell coin the term "augmented reality" to describe a digital display system they are developing for Boeing to assist in assembling wiring harnesses.

NASA launches the Hubble Space Telescope into orbit 370 miles above Earth.

1991

The first web pages begin to appear and populate the nascent World Wide Web.

Donna Haraway publishes her landmark essay "Simians, Cyborgs, and Women: The Reinvention of Nature."

Kodak introduces its Professional Digital Camera System (a commercially available Nikon F-3 digital camera equipped by Kodak with a 1.3-megapixel sensor) as the first digital camera with the ability to swap lenses.

The so-called Michelangelo computer virus infects IBM computers.

Sony, Rollei, and Arca Swiss announce digital studio (broadcast-quality) cameras.

Judy Wajcman publishes *Feminism Confronts Technology*.

VNS Matrix is formed as a small feminist collective and releases *A Cyberfeminist Manifesto for the 21st Century*.

Thing.net is founded by Wolfgang Staehle as a center for new media practices and theory, social forums, and online art projects. THE THING initially takes the form of a dial-up bulletin board system (BBS) that encourages discussion and experimentation, with a particular emphasis on New York arts communities.

1992

Neil Papworth sends the world's first text message—"Merry Christmas"—to Vodafone director Richard Jarvis's Orbitel TPU 901 mobile phone.

Carolina Cruz-Neira invents the CAVE (cave automatic virtual environment). It works by projecting 3D images, with which viewers wearing 3D glasses can interact, on the floor, ceiling, and walls of a room.

Kodak markets the Photo CD system for storing digitized photographs.

The JPEG (joint photographic experts group) image format is standardized and will soon become very widely used, particularly for photographs.

Neal Stephenson coins the term "metaverse" in his 1992 novel *Snow Crash*, describing it as a fully immersive, virtual-reality successor to the internet.

1993

The movie *Jurassic Park*, remarkable for its use of computer-generated images, takes in $81.7 million in its first weekend.

HyperText Markup Language (HTML) is released for the internet.

Silicon Graphics introduces its Reality Coprocessor GPU partnership with Nintendo. The chip will be used in the Nintendo 64 system, Nintendo's first console made for 3D graphics, released in 1996.

Adobe Photoshop becomes available for MS-DOS/Windows platforms.

Marc Andreessen creates one the first internet browsers, Mosaic, to simplify searching and linking. It is the earliest browser to show images in-line with text, as opposed to opening them in a separate window.

Don Archer and Bob Dodson launch the Museum of Computer Art, moca.virtual.museum, an archive and exhibition space for digital artworks.

1994

The web browser Netscape Navigator 1.0, inspired by the success of Mosaic, is released. By 1996 it will boast an estimated 80 percent of mainstream web browser usage.

The Apple QuickTake 100, one of the first consumer digital cameras, is released. Sony and Kodak also announce additional digital cameras.

Worldwide semiconductor market revenues reach $111 billion, a 30 percent increase over the previous year. This growth trend will continue throughout the mid-1990s, largely fueled by the PC boom.

Curator Benjamin Weil and entrepreneur John Northwick found the multi-artist Net art project äda 'web.

1995

JODI, a Net art website (www.jodi.org), is created by artist duo Joan Heemskerk and Dirk Paesmans.

Artist Spider Redgold initiates WomenzNet on Pegasus Networks (the first public Australian internet service provider), providing activists with access to computer networks for information sharing, broadcasting, and collaboration. Women are particularly encouraged to share ideas and promote their own work and interests.

Lynn Hershman Leeson creates and exhibits her pioneering multimedia artworks *Tillie* and *CyberRoberta*.

Nam June Paik's *Electronic Superhighway: Continental U.S., Alaska, Hawaii* goes on permanent display at the Smithsonian American Art Museum in Washington, DC.

The DVD is invented as a means to store any kind of digital data. It offers much greater storage capacity than a compact disc with the same physical dimensions and becomes widely used for software, computer files, and (playable) films and videos.

Toy Story is the first full-length feature film composed entirely of computer animation.

The Casio QV-10, the first camera to incorporate an LCD screen on the back for previewing images, is released.

Kodak releases the DC40 digital point-and-shoot camera, which captures a 756×504 pixel, 24-bit color image.

1996

IBM's Deep Blue supercomputer is defeated in a series of matches by world chess champion Garry Kasparov.

USB (universal serial bus) technology, enabling universally accepted device-to-peripheral connections, is introduced.

Internet Explorer 3.0 is provided free of charge with Windows 95, a "bundling" deal that will set Microsoft apart from related internet monopolies.

NASA launches the *Global Surveyor* spacecraft on its mission to Mars.

1997

IBM's Deep Blue supercomputer wins its rematch with Garry Kasparov, marking the first defeat of a champion chess player by a computer under tournament conditions.

Kodak introduces the DC210, the world's first consumer model megapixel digital camera.

Philippe Kahn is the first person to share a digital photo (of his newborn daughter) via cell phone; he sends it to two thousand friends and family in his wireless network.

1998

Google opens its first "office" in California, in a garage in Menlo Park. The search platform's emphasis on indexing and technology, imparting the impression that it is a "gateway" to the

wider Web, sets it apart from search engines such as Yahoo!.

Open Diary, the first significant online blogging platform to encourage reader engagement, is launched.

1 9 9 9

Apple releases the digital video editing platform Final Cut Pro.

The Kyocera Visual Phone VP-210, the first commercial camera phone, is released in Japan.

The Nikon D1 digital single-lens reflex (DSLR) camera comes out.

Research In Motion releases the first BlackBerry mobile device, a two-way pager with email capability.

Nvidia introduces the GeForce 256, the first consumer graphics processing unit (GPU) with integrated transform and lighting capabilities. This innovation marks a major advancement in 3D graphics rendering for gaming and professional applications.

The Y2K scare prompts computer users, programmers, and the general public to fear that computers will cease working at the turn of the new millennium.

2 0 0 0

Agricola de Cologne founds www.javamuseum.org, a virtual museum focused on internet-based art.

The first widely known mobile AR game—*ARQuake*, an augmented-reality version of the popular game *Quake*—is developed.

Japan's Sharp Corporation releases the J-SH04 mobile phone, touted as the world's first fully integrated camera and telephone operating over a cellular mobile network.

2 0 0 1

Wikipedia launches. Offering a vast platform for digital content, including images, the site marks a significant milestone in information and media sharing.

The iPod, a Mac-compatible handheld music player with a 5GB hard drive, is released.

Apple introduces Mac OS X 10.0 software, colloquially named Cheetah. It is the first major release of Apple's desktop and server operating system.

The first Apple retail outlets open for business in Tysons Corner, Virginia, and Glendale, California.

BitTorrent, a decentralized peer-to-peer file-sharing protocol, launches; it has since become a dominant protocol for sharing large files across the internet.

The Nintendo GameCube and Microsoft Xbox gaming consoles are released to the general public.

The Whitney Museum of American Art in New York launches Artport, a portal to internet art and an online gallery space for commissions of Net art and new media art.

2 0 0 2

The Sanyo SCP-5300, the first camera phone in the United States, is released.

Star Wars Episode II: Attack of the Clones is among the first major Hollywood films shot entirely on digital cameras.

2003

Conceptual artist Genco Gulan founds the international contemporary art exhibition Web Biennial, hosted exclusively online.

Nvidia launches the GeForce FX 5800, a consumer graphics card introducing programmable pixel and vertex shaders—a graphics processing function used to add special effects to objects in a 3D environment.

Myspace, an online community where anyone can share photos, journals, music, and interests with friends, is founded by Tom Anderson and Chris DeWolfe.

UNESCO adopts the Charter on the Preservation of Digital Heritage, which emphasizes the need to develop long-term standards to ensure the accessibility of digital materials for future generations.

2004

Mark Zuckerberg initiates and launches TheFacebook (later renamed Facebook) to collectively rate the "hotness" of female students at Harvard University.

Vimeo, a website where users can upload and share videos with one another, is founded by Jake Lodwick and Zach Klein.

The Hubble Space Telescope's Deep Field image—the most detailed visible view of the universe to date—is released.

2005

Apple launches the software application GarageBand 2, which allows Mac users to create music and podcasts.

YouTube, a video sharing service that permits anyone with access to post and view videos, is founded by Steve Chen, Chad Hurley, and Jawed Karim.

Digital Cinema Initiatives establishes standardized 2K and 4K formats for digital cinema, with resolutions of 2048×1080 pixels and 4096×2160 pixels, respectively. The standardization and commercial availability of 4K resolutions will continue over the next few years.

2006

Twitter, the online social networking service that (at this point) permits users to post brief 140-character messages called "tweets," is founded.

WikiLeaks, a nonprofit journalistic organization, launches its website as a shared forum where anonymous sources can post secret information, for instance news leaks and classified media.

Google acquires YouTube for $1.65 billion, pointing to the growing importance of digital video content on the internet.

Disney purchases Pixar at a valuation of approximately $7.4 billion.

2007

Google Street View launches.

The iPhone, the first mobile device to feature a touchscreen, launches, drastically altering the consumer's physical relationship with their mobile devices and technology more broadly.

Adobe Lightroom is released, offering advanced digital image processing for photographers.

Netflix introduces its online streaming service, where paying subscribers can access and stream entire movies online.

2008

Satoshi Nakamoto (a presumed pseudonym) publishes the white paper "Bitcoin: A Peer-to-Peer Electronic Cash System."

2009

The Bitcoin network comes online, with Satoshi Nakamoto mining the "genesis block" of Bitcoin (block number 0), which had a reward of 50 Bitcoin.

Minecraft is developed and introduced by Swedish game designer Markus "Notch" Persson.

James Cameron's *Avatar*, noted for its groundbreaking use of stereoscopic 3D and motion-capture technology, sets a new benchmark for 3D cinema and digital visual effects and becomes the highest-grossing film to date.

2010

Chelsea Manning, an intelligence analyst for the US Army in Iraq, leaks classified information related to widespread human rights violations to WikiLeaks.

Instagram, the online mobile photo and video sharing application and social media service, launches.

Microsoft's Kinect for Xbox 360, a motion-sensing input device, marks a significant development in natural user interfaces in gaming and will widely influence VR and AR technologies.

Nam June Paik's first major retrospective takes place at Tate Liverpool and FACT Liverpool, England.

Palmer Luckey, future founder of Oculus VR and the Oculus Rift, builds a prototype of a VR headset in his parents' garage in Long Beach, California.

2011

Federal authorities arrest computer programmer and political internet activist Aaron Swartz in connection with the unauthorized downloading of articles from the academic digital library JSTOR.

Apple introduces Siri, a built-in personal assistant feature, on the new iPhone 4S.

2012

Syria's government disconnects the nation from the internet for two days due to public uprisings.

Lytro releases one of the first consumer light field cameras, a technology that allows users to refocus images after they are taken.

The Hobbit: An Unexpected Journey is the first widely released film to use forty-eight frames per second (double the standard twenty-four), marking another step in digital filmmaking.

2013

Google Glass, a head-mounted optical display, is one of the first consumer-facing AR devices.

Former US National Security Agency contractor and CIA employee Edward Snowden leaks thousands of classified documents to media organizations, exposing mass government surveillance

programs. These include, but are not limited to, data mining from citizens' personal phone and internet records and the monitoring of electronic communications networks.

The movie *Her*, starring Joaquin Phoenix, depicts a man who falls in love with his computer's artificial intelligence operating system, voiced by Scarlett Johansson.

2014

Sony Pictures, Home Depot, JP Morgan, and eBay are hacked, prompting temporary chaos on their websites and jeopardizing sensitive user data.

The first known NFT (non-fungible token) artwork is created by Kevin McCoy and Anil Dash. It is a pixelated image of an octagon filled with shapes created by McCoy's wife, Jennifer.

Amazon acquires Twitch, a live streaming platform for video gamers, for nearly $1 billion, signifying the importance of online digital video content.

Facebook acquires Oculus VR, a leading virtual reality headset maker, for $2 billion, signaling a significant investment and interest in the VR industry.

The concept of computational photography—deploying techniques such as artificial intelligence, machine learning, algorithms, or even simple scripts to capture and enhance images—gains wider prominence with the release of the Google Pixel smartphone.

2015

The first Apple Watch is released. It incorporates Apple's iOS system and sensors for environmental and health monitoring and becomes the world's best-selling wearable device.

The Federal Communications Commission issues a landmark "net neutrality" decision, ruling that all data sent across the internet—regardless of user, content, or platform—should be treated as of equal importance.

2016

Pokémon Go, a mobile AR game, is released and becomes a cultural phenomenon, significantly raising public awareness and adoption of augmented reality.

Google DeepMind's AlphaGo program defeats a world champion in the board game Go, showcasing the power of AI, with implications for image processing and recognition.

Microsoft releases the HoloLens, a "mixed reality" (blending the physical and digital worlds) head-mounted display.

The video-sharing social networking application Douyin is created by Chinese tech firm ByteDance.

The introduction of the Samsung Gear 360 and similar cameras brings 360-degree photography and virtual reality to the consumer market.

2017

OpenAI becomes the first artificial intelligence to defeat the world's best-ranked *Dota 2* player, Danil "Dendi" Ishutin, in a one-to-one game.

Adobe announces that its support of Flash—a multimedia software used for web animations, interactive applications, games, and digital art, but also laden with security vulnerabilities and generally a strain on computer memory resources—will end in 2020.

2018

ByteDance releases TikTok, the global version of Douyin.

Google AI announces the development of Night Sight for Pixel phones, a feature that leverages AI and machine learning to dramatically improve low-light photography.

Microsoft launches Azure Machine Learning, a cloud service that manages machine-learning projects using trainable AI.

2019

Google Wing begins offering drone-based delivery services in selected areas of the United States.

The European Southern Observatory releases the first image of a black hole made using the Event Horizon Telescope, showcasing the latest developments of digital imaging in astrophysics.

AI-driven photo editing apps, among them Adobe Photoshop Camera, use machine learning to enhance photo editing.

Google announces that its quantum computer completed a computational task in two hundred seconds that would take a supercomputer ten thousand years.

2020

Facebook agrees to pay $550 million in a class-action lawsuit settlement regarding the collection of facial recognition data from users without their knowledge or consent.

The COVID-19 outbreak begins to spread worldwide, causing mass illness and death. Global technology sectors identify the public health crisis as causing a significant disruption to the industry, even as the pandemic also leads directly to broader adoption of digital technologies for remote work, learning, health care, and entertainment.

The launch of 5G, the fifth-generation technology standard for cellular networks, enhances mobile connectivity and enables faster transmission of high-quality digital images and videos.

US Customs and Border Protection accepts a proposal to use Google Cloud technology to facilitate the use of AI in border surveillance. Google's CBP technology is used in conjunction with sentry towers operated by Anduril Industries, a conservative defense startup founded by Palmer Luckey of Oculus.

2021

OpenAI releases DALL-E, which uses "deep learning" methodologies to generate digital images from descriptions of natural language (ordinary text).

Mike "Beeple" Winkelmann's NFT artwork *Everydays: the First 5000 Days* sells at a Christie's auction for $69 million in cryptocurrency, making it the most expensive NFT ever.

The Apple AirTag, a tracking device, is released. It uses "ultra-wideband" frequencies uniquely suited to finding things (as opposed to, for instance, data transfer).

NASA launches the James Webb Space Telescope, equipped with advanced digital imaging technologies to observe the universe in unprecedented detail.

2022

Nielsen reports that streaming has surpassed television viewing for the first time in history.

US Customs and Border Protection introduces the use of facial recognition technology for identity checks at thirty-two different border locations.

The San Francisco-based company OpenAI launches ChatGPT, an AI chatbot used to generate human-like text based on given prompts. OpenAI also introduces DALL·E 2, an AI model used to generate images from textual descriptions, and Whisper, a speech transcription model that converts spoken language into text.

The White House releases "Blueprint for an AI Bill of Rights," a guide to averting harm caused by artificial intelligence.

A Lockheed Martin jet is piloted by artificial intelligence software for more than seventeen hours, marking AI's first engagement on a tactical aircraft.

2023

AI image-generation apps such as Lensa garner immense popularity.

OpenAI releases GPT-4, which delivers significant speed and accuracy improvements over previous large language models. GPT-4 also is capable of multimodal interactions, meaning that it can process multiple types of data (for instance text, images, and audio) together.

Apple announces the release of Apple Vision Pro, a mixed-reality headset that will be available in early 2024.

SELECTED BIBLIOGRAPHY

Agnew, John, and David N. Livingstone, eds. "Space and Place." In *The SAGE Handbook of Geographical Knowledge*, 316–30. London: Sage, 2011.

Anderson, Steve F. *Technologies of Vision: The War between Data and Images*. Cambridge, MA: MIT Press, 2017.

Andrejevic, Mark. *iSpy: Surveillance and Power in the Interactive Era*. Lawrence: University Press of Kansas, 2007.

Aranda, Julieta, Anton Vidokle, and Brian Kuan Wood. *The Internet Does Not Exist*. London: Sternberg Press, 2015.

Atanasoski, Neda, and Kalindi Vora. *Surrogate Humanity: Race, Robots, and the Politics of Technological Futures*. Durham, NC: Duke University Press, 2019.

Barad, Karen. "Spacetime Re(con)figurings: Natural Cultural Forces and Changing Topologies of Power." In *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, 223–46. Durham, NC: Duke University Press, 2007.

Barthes, Roland. *Camera Lucida: Reflections on Photography*. New York: Hill & Wang, 2010.

Baudrillard, Jean. *The Ecstasy of Communication*. Los Angeles: Semiotext(e); Cambridge, MA: Foreign Agents, 1987.

———. *Simulacra and Simulation*. Translated by Sheila Faria Glaser. Ann Arbor: University of Michigan Press, 2018.

Bekey, George A., and Michelle Bekey. *A Remarkable Trajectory: From Humble Beginnings to Global Prominence: The History of the USC Viterbi School of Engineering*. Scotts Valley, CA: CreateSpace, 2015.

Benjamin, Ruha. *Captivating Technology: Race, Carceral Technoscience, and Liberatory Imagination in Everyday Life*. Durham, NC: Duke University Press, 2019.

———. *Race after Technology: Abolitionist Tools for the New Jim Code*. Cambridge, MA: Polity, 2019.

Bentham, Jeremy. "The Panopticon: Or, The Inspection House." In *The Panopticon Writings*, edited by Miran Bozovic, 29–95. London: Verso, 1995.

Bowen, Bleddyn E. *War in Space: Strategy, Space Power, Geopolitics*. Edinburgh: Edinburgh University Press, 2020.

Boyle, Deirdre. "Don't Call Them Video Freaks: Video Artists and Activists in the 70s." *Journal of Film and Video* 44, nos. 1/2 (1992): 67–79.

Brock, Andre. *Distributed Blackness: African American Cybercultures*. New York: NYU Press, 2020.

Brooks, Michael. *Against the Web: A Cosmopolitan Answer to the New Right*. Winchester, UK: Zero Books, 2020.

Brose, Christian. *The Kill Chain*. New York: Hachette Books, 2020.

Browne, Simone. *Dark Matters: On the Surveillance of Blackness*. Durham, NC: Duke University Press, 2015.

Burton, Tara. "Apocalypse Whatever." *Real Life*, December 13, 2016, 2–5, https://reallifemag.com/apocalypse-whatever.

Bush, Randy. "Fidonet: Technology, Tools, and History." *Communications of the ACM* 36, no. 8 (1993): 31–35.

Caldwell, Luke. *The Military-Entertainment Complex*. Cambridge, MA: Harvard University Press, 2017.

Campany, David. *On Photographs*. Cambridge, MA: MIT Press, 2020.

Campbell-Kelly, Martin, William Aspray, Nathan Ensmenger, and Jeffrey R. Yost. *Computer: A History of the Information Machine*. 3rd ed. New York: Westview Press, 2014.

Carbone, Mauro. *Philosophy-Screens: From Cinema to the Digital Revolution*. Albany: State University of New York Press, 2020.

Castleman, Kenneth R. *Digital Image Processing*. Englewood Cliffs, NJ: Prentice-Hall, 1979.

Chomsky, Noam. "The Cold War and the University." In *The Cold War and the University: Towards an Intellectual History of the Postwar Years*, edited by Noam Chomsky, 171–94. New York: The New Press, 1997.

Christensen, Clayton. *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*. Cambridge, MA: Harvard Business Review Press, 2013.

Chun, Wendy Hui Kyong. *Discriminating Data: Correlation, Neighborhoods, and the New Politics of Recognition*. Cambridge, MA: MIT Press, 2021.

———. *Programmed Visions*. Cambridge MA: MIT Press, 2011.

———. "Race and/as Technology, or How to Do Things with Race." In *Race after the Internet*, edited by Lisa Nakamura and Peter A. Chow-White, 38–60. New York: Routledge, 2012.

Cornell, Lauren, and Ed Halter, eds. *Mass Effect: Art and the Internet in the Twenty-First Century*. Cambridge, MA: MIT Press, 2015.

Cotton, Charlotte. *The Photograph as Contemporary Art*. 4th ed. World of Art. London: Thames & Hudson, 2020.

———. *Public, Private, Secret: On Photography and the Configuration of Self*. New York: Aperture, 2018.

Crary, Jonathan. *Scorched Earth: Beyond the Digital Age to a Post-Capitalist World*. London: Verso, 2022.

Davis, Angela. *Women, Race, and Class*. New York: Vintage Books, 1983.

Deleuze, Gilles. *Cinema I: The Movement-Image*. London: Routledge, 1983.

———. *Cinema II: The Time-Image*. London: Routledge, 1985.

———. "Postscript on the Societies of Control." *October* 59 (Winter 1992): 3–7.

Dery, Mark, ed. *Flame Wars: The Discourse of Cyberculture*. Durham, NC: Duke University Press, 1994.

Dewdney, Andrew. *Forget Photography*. Cambridge, MA: MIT Press, 2021.

Dhaliwal, Ranjodh Singh. "What Do We Critique When We Critique Technology?." In *Technoprecarious*, edited by Precarity Lab, 305–19. London: Goldsmiths Press, 2020.

Doane, Mary Ann. *The Emergence of Cinematic Time: Modernity, Contingency, the Archive*. Cambridge, MA: Harvard University Press, 2002.

——. “Technophilia: Technology, Representation, and the Feminine.” In *Body/Politics*, edited by M. Jacobus et al., 20–33. New York: Routledge, 1990.

Doctorow, Cory. *The Internet Con: How to Seize the Means of Computation*. New York: Verso, 2023.

Domingos, Pedro. *The Master Algorithm: How the Quest for the Ultimate Learning Machine Will Remake Our World*. New York: Basic Books, 2018.

Edwards, Paul N. “‘We Defend Every Place’: Building the Cold War World.” In *The Closed World: Computers and the Politics of Discourse in Cold War America*, 1–41. Cambridge, MA: MIT Press, 1996.

Efland, Arthur. “An Interview with Charles Csuri.” In “Cybernetic Serendipity: The Computer and the Arts.” Special issue, *Studio International* (1968): 81–84.

Ernst, Wolfgang, and Jussi Parikka. *Digital Memory and the Archive*. Minneapolis: University of Minnesota Press, 2013.

Eubanks, Virginia. *Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor*. New York: St. Martin’s Press, 2018.

Feigelfeld, Paul. “Media Archaeology Out of Nature: An Interview with Jussi Parikka.” *e-flux Journal*, no. 62 (February 2015): https://www.e-flux.com/journal/62/60965/media-archaeology-out-of-nature-an-interview-with-jussi-parikka/.

Filippone, Christine. *Science, Technology, and Utopias*. Abingdon, UK: Routledge, 2019.

Fisher, Mark. *Capitalist Realism: Is There No Alternative?*. Washington, DC, and Winchester, UK: Zero Books, 2009.

——. *Ghosts of My Life: Writings on Depression, Hauntology and Lost Futures*. Washington, DC, and Winchester, UK: Zero Books, 2014.

Foucault, Michel. “Of Other Spaces: Utopias and Heterotopias.” *Architecture/Mouvement/Continuité*, no. 5 (October 1984): 46–49.

——. “Panopticism.” In *Discipline and Punish: The Birth of the Prison*, 195–230. New York: Vintage Books, 1975.

——. “Space, Knowledge, and Power.” In *The Foucault Reader*, edited by Paul Rabinow, 239–56. New York: Pantheon Books, 1984.

Furlong, Lucinda. “Notes Towards a History of Image-Processed Video: Steina and Woody Vasulka.” *Afterimage* 11, nos. 1/2 (December 1983): 35–38.

Gaboury, Jacob. *Image Objects*. Cambridge, MA: MIT Press, 2021.

Giblin, Rebecca, and Cory Doctorow. *Chokepoint Capitalism: How Big Tech and Big Content Captured Creative Labor Markets and How We’ll Win Them Back*. Boston: Beacon Press, 2022.

Gitelman, Lisa. *Always Already New: Media, History, and the Data of Culture*. Cambridge, MA: MIT Press, 2006.

——, ed. *Raw Data Is an Oxymoron*. Cambridge, MA: MIT Press, 2013.

Gonzalez, Jennifer. “The Appended Subject: Race and Identity as Digital Assemblage.” In *Race in Cyberspace*, edited by Beth E. Kolko, Lisa Nakamura, and Gilbert B. Rodman, 27–50. New York: Routledge, 2000.

Gray, Kishonna L. *Intersectional Tech: Black Users in Digital Gaming*. Baton Rouge: Louisiana State University Press, 2020.

Greengard, Samuel. *Virtual Reality*. Cambridge, MA: MIT Press, 2019.

Grove, Andrew. *Only the Paranoid Survive: How to Exploit the Crisis Points That Challenge Every Company*. New York: Crown Currency, 1999.

Halberstam, Judith. “Automating Gender: Postmodern Feminisms in the Age of the Intelligent Machine.” *Feminist Studies* 17, no. 3 (1991): 439–60.

Haraway, Donna J. “SF: Speculative Fabulation, String Figures, So Far.” *Ada: A Journal of Gender, New Media, and Technology*, no. 3 (2013): 1–18.

——. *Simians, Cyborgs, and Women: The Reinvention of Nature*. New York: Routledge, 1991.

Harris, Blake J. *The History of the Future: Oculus, Facebook and the Revolution That Swept Virtual Reality*. New York: Dey Street Books, 2020.

Hayles, N. Katherine. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: University of Chicago Press, 1999.

———. *My Mother Was a Computer: Digital Subjects and Literary Texts*. Chicago: University of Chicago Press, 2005.

———. "Subversion of the Human Aura: A Crisis in Representation." *American Literature* 95, no. 2 (2023): 256–79.

Heavy Collective. "Lucien Samaha: Kodak and the Birth of the Digital Camera," November 5, 2013. No longer available online.

Hecht, Gabrielle, ed. "Introduction." In *Entangled Geographies: Empire and Technopolitics in the Global Cold War*, 1–12. Cambridge, MA: MIT Press, 2011.

Helmond, Anne. "The Platformizations of the Web: Making the Web Data Platform Ready." *Social Media + Society* 1, no. 2 (2015): 1–11.

Hester, Helen. *Xenofeminism*. Cambridge, UK: Polity, 2018.

Hu, Tung-Hui. *A Prehistory of the Cloud*. Cambridge, MA: MIT Press, 2016.

Huhtamo, Erkki, and Jussi Parikka, eds. *Media Archaeology: Approaches, Applications, and Implications*. Berkeley: University of California Press, 2011.

Innes, Harold Adams. *Empire and Communications*. Oxford: Clarendon Press, 1950.

Irani, Lilly, and M. Six Silberman. "From Critical Design to Critical Infrastructure: Lessons from Turkopticon." *Interactions* 21, no. 4 (2014): 32–35.

Jackson, Zakiyyah. "Black Light: On the Origin and Materiality of the Image." *TOPIA: Canadian Journal of Cultural Studies*, no. 46 (March 2023): 134–48.

James, David E. *The Most Typical Avant-Garde: History and Geography of Minor Cinemas in Los Angeles*. Berkeley: University of California Press, 2005.

Janssen, Volker, ed. *Where Minds and Matters Meet: Technology in California and the West*. Berkeley: University of California Press, 2012.

Jenkins, Henry. *Convergence Culture: Where Old and New Media Collide*. New York: NYU Press, 2007.

Keeling, Kara. "Queer OS." *Cinema Journal* 53, no. 2 (2014): 152–57.

Knowlton, K. C. "A Computer Technique for Producing Animated Movies." *Proc. AFIPS Conference* 25 (Spring 1964): 67–87.

Koppes, Clayton. *JPL and the American Space Program: A History of the Jet Propulsion Lab*. New Haven, CT: Yale University Press, 1982.

Kostelanetz, Richard. "Machine Art." *Centennial Review* 15, no. 3 (Summer 1971): 229–49.

Kurzweil, Ray. *The Singularity Is Near: When Humans Transcend Biology*. New York: Viking, 2005.

Lally, Eugene F. "How Spaceflight Was Born," 2008. No longer available online.

———. "Mosaic Guidance for Interplanetary Travel." In *Space Flight Report to the Nation*, edited by Jerry Grey and Vivian Grey, 2249–61. New York: American Rocket Society, 1961.

Laurel, Brenda. *Computers as Theatre*. Menlo Park, CA: Addison-Wesley, 1991.

Lawrence, Halcyon M. "SIRI Disciplines." In *Your Computer Is on Fire*, edited by Thomas S. Mullaney, Benjamin Peters, Mar Hicks, and Kavita Philip, 179–97. Cambridge, MA: MIT Press, 2021.

Leeson, Lynn Hershman. "Romancing the Anti-Body: Lust and Longing in (Cyber)space," 1994, https://www.lynnhershman.com/wp-content/uploads/2016/06/Romancing-the-Anti-Body.pdf.

Lefebvre, Henri. *The Production of Space*. Translated by Donald Nicholson-Smith. Oxford: Blackwell, 1991.

Lewis, Michael. *The New New Thing: A Silicon Valley Story*. New York: W. W. Norton, 2014.

Lialina, Olia. "Rich User Experience and the Desktopization of War," 2014, http://contemporary-home-computing.org/RUE/.

Lister, Martin. *The Photographic Image in Digital Culture*. Abingdon, UK: Routledge, 1995.

Lovink, Geert. *Networks Without a Cause: A Critique of Social Media*. Cambridge, UK: Polity, 2012.

——. *Social Media Abyss: Critical Internet Cultures and the Force of Negation*. Cambridge, UK: Polity, 2016.

Lyon, Matthew, and Katie Hafner. *Where Wizards Stay Up Late: The Origins of the Internet*. New York: Simon and Schuster, 1999.

Malloy, Judy, ed. *Women, Art, and Technology*. Cambridge, MA: MIT Press, 2003.

Manovich, Lev. *Software Takes Command*. New York: Bloomsbury Academic, 2013.

——. "What Is Digital Cinema?," 1995, http://manovich.net/index.php/projects/what-is-digital-cinema.

Markoff, John. *What the Dormouse Said: How the Sixties Counterculture Shaped the Personal Computer Industry*. New York: Viking Penguin, 2005.

Massey, Doreen. *For Space*. London and Los Angeles: SAGE, 2005.

McKittrick, Katherine, ed. *Sylvia Wynter: On Being Human as Praxis*. Durham, NC: Duke University Press, 2015.

McLuhan, Marshall. *Understanding Media: The Extensions of Man*. New York: McGraw-Hill, 1964.

McPherson, Tara. *Feminist in a Software Lab: Difference + Design*. Chicago: University of Chicago Press, 2018.

——. "U.S. Operating Systems at Mid-Century: The Intertwining of Race and UNIX." In *Race after the Internet*, edited by Lisa Nakamura and Peter Chow-White, 21–37. New York: Routledge, 2011.

Mechner, Jordan. *The Making of Prince of Persia: Journals 1985–1993*. San Francisco: Stripe Press, 2020.

Michalik Gratch, Lyndsay, et al. "Tech/Trans/Fem: Feminism Is." Video essay in "Nasty Womanifestos: Remixing Feminisms for Social Change." Special issue, *Women and Language Online* 40, no. 2 (2018): https://www.lyndsaymichalik.com/video.

Minh-ha, Trinh T. "She, the Inappropriate/d Other." *Discourse: Journal for Theoretical Studies in Media and Culture* 8 (Winter 1986): 3–10.

Mitchell, W. J. T., ed. *Landscape and Power*. Chicago: University of Chicago Press, 2002.

——. "There Are No Visual Media." In *Media Art Histories*, edited by Oliver Grau, 395–408. Cambridge, MA: MIT Press, 2007.

Mobile Image. "The Challenge: We Must Create at the Same Scale as We Can Destroy: Electronic Cafe Manifesto," 1984, http://www.ecafe.com/museum/about_festo/84manifesto.html.

Muñoz, José Esteban. *Cruising Utopia: The Then and There of Queer Futurity*. New York: NYU Press, 2009.

Nakamura, Lisa. *Cybertypes: Race, Ethnicity, and Identity on the Internet*. New York and London: Routledge, 2002.

——. "Race in/for Cyberspace: Identity Tourism and Racial Passing on the Internet." *Works and Days* 13 (1995): 181–93.

Nash, Katherine. "Computer Program for Artists: Art 1*." *Leonardo* 3 (October 1970): 439–42.

Noble, Safiya Umoja. *Algorithms of Oppression*. New York: NYU Press, 2018.

Noll, A. Michael. "The Digital Computer as a Creative Medium." *IEEE Spectrum* 4, no. 10 (October 1967): 89–95.

Nooney, Laine. *The Apple II Age: How the Computer Became Personal*. Chicago: University of Chicago Press, 2023.

Nyong'o, Tavia. "Introduction" and "Chore and Choice: The Depressed Cyborg Manifesto." In *Afro-Fabulations: The Queer Drama of Black Life*, 1–26, 185–98. New York: NYU Press, 2018.

O'Neil, Cathy. *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*. New York: Broadway Books, 2017.

Oram, Daphne. *An Individual Note: of Music, Sound, and Electronics*. London and New York: Galliard Paperbacks, 1972.

Oreskes, Naomi, and John Krige. *Science and Technology in the Global Cold War*. Amsterdam: Amsterdam University Press, 2014.

Paglen, Trevor. "Experimental Geography: From Cultural Production to the Production of Space." In *Critical Landscapes: Art, Space, Politics*, edited by Emily Eliza Scott and Kirsten Swenson, 34–42. Berkeley: University of California Press, 2015.

Paik, Nam June. "Expanded Education for the Paperless Society." In *TV Variations*, 1–8. Gothenburg, Sweden: Paletten, 1964/1968/2006. Available at https://s3.amazonaws.com/arena-attachments/690470/097ea8636b5c386a47dcab229ceebb44.pdf.

Parikka, Jussi. *A Geology of Media*. Minneapolis: University of Minnesota Press, 2015.

Parks, Lisa, and Nicole Starosielski, eds. *Signal Traffic: Critical Studies of Media Infrastructures*. Champaign: University of Illinois Press, 2015.

Paul, Christiane. *Digital Art*. World of Art. London: Thames & Hudson, 2015.

Pinkel, Sheila. "Pioneers and Path: Early Phenomenological Light Works." *Leonardo* 53, no. 2 (2020): 213–19.

Plant, Sadie. *Zeros and Ones: Digital Women and the New Technoculture*. London: Fourth Estate, 2016.

Precarity Lab. "Digital Precarity Manifesto." *Social Text* 37, no. 4 (December 2019): 77–93.

Raheja, Michelle H., Andrea Smith, and Stephanie Nohelani Teves, eds. *Native Studies Keywords*. Tucson: University of Arizona Press, 2015.

Raley, Rita, and Jennifer Rhee. "Critical AI: A Field in Formation." *American Literature* 95, no. 2 (2023): 185–204.

Rapoport, Sonya. "Process(ing) Interactive Art: Using People as Paint, Computer as Brush and Installation Site as Canvas." *Leonardo* 24, no. 3 (1991): 285–88.

Ravetto-Biagioli, Kriss. *Digital Uncanny*. Oxford: Oxford University Press, 2019.

Respini, Eva, ed. *Art in the Age of the Internet, 1989 to Today*. New Haven, CT: Yale University Press, 2018.

Rhizome. "Net Art Anthology," https://anthology.rhizome.org/.

Richardson, Allissa V. *Bearing Witness While Black: African Americans, Smartphones, and the New Protest #Journalism*. Oxford: Oxford University Press, 2020.

Rossiter, Ned. *Software, Infrastructure, Labor: A Media Theory of Logistical Nightmares*. London and New York: Routledge, 2016.

Rush, Michael. *New Media in Art*. World of Art. London: Thames & Hudson, 2015.

Russell, Catherine. "The Body as the Main Attraction." In *Experimental Ethnography: The Work of Film in the Age of Video*, 51–75. Durham, NC: Duke University Press, 1999.

Russell, Legacy. *Glitch Feminism: A Manifesto*. London: Verso, 2020.

Samer, Rox. "Remixing Transfeminist Futures." *Transgender Studies Quarterly* 6, no. 4 (November 2019): 539–55.

Sandström, Christian. "Hasselblad and the Shift to Digital Imaging." *IEEE Annals of the History of Computing* 33, no. 3 (2011): 55–66.

Schnepf, J. D. *Killer Apps: War, Media, Machine*. Durham, NC: Duke University Press, 2020.

Sekula, Allan. "The Body and the Archive." *October* 39 (Winter 1986): 3–64.

Seu, Mindy, ed. *Cyberfeminism Index*. Los Angeles: Inventory Press, 2023.

Shalloe, Harper. "I Sexually Identify as an Attack Helicopter." *Transgender Studies Quarterly* 6, no. 4 (2019): 667–75.

Shanahan, Murray. *The Technological Singularity*. MIT Press Essential Knowledge. Cambridge, MA: MIT Press, 2015.

Sheridan, Sonia Landy. "Mind/Senses/Hand: The Generative Systems Program at the Art Institute of Chicago 1970–1980." *Leonardo* 23, nos. 2/3 (1990): 175–81.

Smith, Shawn Michelle. *Photographic Returns: Racial Justice and the Time of Photography*. Durham, NC: Duke University Press, 2020.

Solon, Olivia. "It's Digital Colonialism: How Facebook's Free Internet Service Has Failed Its Users." *The Guardian*, July 27, 2017, https://www.theguardian.com/technology/2017/jul/27/facebook-free-basics-developing-markets.

Sontag, Susan. *On Photography*. London: Picador, 2001.

Spigel, Lynn. *Welcome to the Dreamhouse: Popular Media and Postwar Suburbs*. Durham, NC: Duke University Press, 2001.

Stanley, Autumn. *Mothers and Daughters of Invention: Notes for a Revised History of Technology*. Metuchen, NJ: Scarecrow Press, 1993.

Steyerl, Hito. *The Wretched of the Screen*. London: Sternberg Press, 2013.

Tanner, Grafton. *Babbling Corpse: Vaporwave and the Commodification of Ghosts*. Washington, DC, and Winchester, UK: Zero Books, 2016.

———. *The Circle of the Snake: Nostalgia and Utopia in the Age of Big Tech*. Washington, DC, and Winchester, UK: Zero Books, 2020.

Terranova, Tiziana. "Free Labor: Producing Culture for the Digital Economy." *Social Text* 63, vol. 18, no. 2 (Summer 2000): 33–58.

———. *Network Culture: Politics for the Information Age*. Ann Arbor, MI: Pluto Press, 2004.

Tsing, Anna. "Supply Chains and the Human Condition." *Rethinking Marxism: A Journal of Economics, Culture, and Society* 21, no. 2 (April 2009): 148–76.

Turner, Fred. *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism*. Chicago: University of Chicago Press, 2006.

Vale, V. "Bay Area Punk Film/Video Making and the Emergence of Alternative Gallery/Club Venues." *American Periodicals* 27, no. 2 (2010): 180–205.

van Dijck, Jose. "Datafication, Dataism and Dataveillance: Big Data between Scientific Paradigm and Ideology." *Surveillance and Society* 12, no. 2 (2014): 197–208.

Vint, Sherryl. "Literary A.I.: Are We Ready for the Future We Might Imagine?." *American Literature* 95, no. 2 (2023): 397–413.

VNS Matrix. "The Cyberfeminist Manifesto for the 21st Century," 1991, https://vnsmatrix.net/projects/the-cyberfeminist-manifesto-for-the-21st-century.

Wajcman, Judy. *Feminism Confronts Technology*. Cambridge, UK: Polity, 1991.

Walsh, Joanna. *Girl Online: A User Manual*. New York: Verso, 2022.

Wark, McKenzie. *A Hacker Manifesto*. Cambridge, MA: Harvard University Press, 2004.

Westwick, Peter J. *Into the Black: JPL and the American Space Program, 1976–2004*. New Haven, CT: Yale University Press, 2011.

———. *The National Labs: Science in an American System, 1947–1974*. Cambridge, MA: Harvard University Press, 2002.

Wiener, Anna. *Uncanny Valley: A Memoir*. New York: MCD, 2020.

Youngblood, Gene. *Expanded Cinema*. New York: Fordham University Press, 2020.

Zylinska, Joanna. *AI Art: Machine Visions and Warped Dreams*. London: Open Humanities Press, 2020.

———. *The Perception Machine: Our Photographic Future between the Eye and AI*. Cambridge, MA: MIT Press, 2023.

ABOUT THE ARTISTS

SARAH GRACE FAULK

Rebecca Allen (b. 1953, Ohio) came early to computer art and has experimented with video, virtual reality, and performance to explore technology's effects on reality and humanity. Her work has been included in the recent group exhibitions *Body Constructs*, Museum of Modern Art, New York (2024) and *Digital Witness*, Los Angeles County Museum of Art (2024). Her work is in the collections of the Los Angeles County Museum of Art; the Whitney Museum of American Art, New York; and the Museum of Modern Art, New York, among others. Allen holds an MS from the Massachusetts Institute of Technology (1980) and a BFA from the Rhode Island School of Design (1975). Since 1996, she has been a professor in the Design Media Arts program at the University of California, Los Angeles.

Refik Anadol (b. 1985, Turkey) uses data and machine intelligence to create "post-digital architecture" via sculpture, painting, performance, and installation. Recent solo exhibitions include *Echoes of the Earth: Living Archive*, Serpentine Galleries, London (2024); *Unsupervised*, Museum of Modern Art, New York (2023); and *Machine Hallucinations: Sphere*, The Sphere, Las Vegas (2023). He is the recipient of the Lorenzo il Magnifico Lifetime Achievement Award for new media art, the SEGD Global Design Award, and Google's Artists + Machine Intelligence artist residency, among others. Anadol holds an MFA from the University of California, Los Angeles, and an MFA and a BA from Istanbul Bilgi University.

Natalie Bookchin (b. 1962, New York) works across media—film, games, photography, installation—to explore the digital realm and its social complications. She presented the solo show *Natalie Bookchin: Now he's out in public and everyone can see* at Los Angeles Contemporary Exhibitions (2012) and was included in the group shows *WebRetro*, SeMA, Seoul Museum of Art (2019) and *Common Spaces*, Whitney ISP, The Kitchen, New York (2014). Her work is in the collections of the Los Angeles County Museum of Art; Centre Pompidou, Paris; and the Whitney

Museum of American Art, New York. Bookchin received her MFA in 1990 from the School of the Art Institute of Chicago, and her BA in 1984 from the State University of New York. She was a 2001–2 Guggenheim Fellow, and has been a professor at Rutgers University since 2015.

micha cárdenas (b. 1977, Florida) is an artist, poet, and academic who uses new technologies in combination with performance to explore the dynamics of identity. Her work has been presented at the Thessaloniki Biennial, Greece; the Museum of Contemporary Art, San Diego; the Museum of Modern Art, New York; and Los Angeles Contemporary Exhibitions, among others. In 2022, cárdenas's book *Poetic Operations* was the co-winner of the Gloria E. Anzaldúa Book Prize from the National Women's Studies Association. cárdenas earned her PhD at the University of Southern California (2015), and also holds an MFA from the University of California, San Diego (2009), an MA from the European Graduate School (2008), and a BA in computer science from Florida International University (2001). She is an associate professor at the University of California, Santa Cruz.

Liliana Conlisk Gallegos (b. Tijuana–San Ysidro border region) is a scholar, curator, and artist pushing multidimensional technological formats beyond coloniality. Her art has been exhibited at the ARS Electronica Festival; Leonardo, the International Society of Arts, Sciences, and Technology; and the Centre for Digital Media, Vancouver. Her writing has appeared in *Critical Storytelling from Global Borderlands: En la línea* 8 (2022), *Re-Activating Critical Thinking in the Midst of Necropolitical Realities: For Radical Change* (Cambridge Scholars Publishing, 2022), and *Departures in Critical Qualitative Research* 10, no. 3 (2021). Conlisk Gallegos holds a PhD from the University of California, Santa Barbara, an MA from San Diego State University, and a BA from the University of California, Berkeley. She is an associate professor in Communication Studies at California State University, San Bernardino.

Nonny de la Peña (b. 1963, California) is a journalist, filmmaker, and founder and CEO of Emblematic Group, known for pioneering immersive virtual-reality journalism. Her work *Hunger in Los Angeles* was the first VR piece ever shown at the Sundance Film Festival. De la Peña holds a PhD in media arts and practice (2019) and an MA in communications (2009) from the University of Southern California, and a BA from Harvard University (1984). She was named a *Wall Street Journal* Tech Innovator of the Year (2018), and received the Knight Foundation Journalism Innovation Award (2017) and the Sundance People's Choice Award – Future of Storytelling (2016).

John Divola (b. 1949, California) is a photographer who has questioned the limits of the medium, while examining the Southern California landscape, in a practice spanning more than forty years. Exhibitions include *California Photography: Remaking Make-Believe*, Museum of Modern Art, New York (1989); the Whitney Biennial, Whitney Museum of American Art, New York (1981); and *Mirrors and Windows*, Museum of Modern Art, New York (1978). His work is in the collections of the J. Paul Getty Museum, Los Angeles; the Los Angeles County Museum of Art; and the Metropolitan Museum of Art, New York. Divola holds a BA (1971) and an MA (1973) from California State University, Northridge, and an MFA from the University of California, Los Angeles (1974). He has been a professor at the University of California, Riverside, since 1988.

Dynasty Handbag is the alter ego of Jibz Cameron (b. 1975, California), an artist and performer. Cameron's performance of Dynasty Handbag has spanned more than twenty years, and is described as an exploration of queer failure and political refusal. Solo performances have taken place at New York Live Arts (2024); *Titanic Depression*, Pioneer Works, Brooklyn (2023); and *The Bored Identity*, Elysian Theater, Los Angeles (2023). Her work was included in *Made in LA: Acts of Living*, Hammer Museum, Los Angeles (2023), and

has also been presented at the New Museum of Contemporary Art, New York; MOCA, Los Angeles; REDCAT, Los Angeles; the Brooklyn Academy of Music; and the Centre Pompidou, Paris, among other venues. Cameron holds a BFA from the San Francisco Art Institute (1999). She is a 2022 Guggenheim fellow, a 2021 United States Artist award recipient, and a 2020 Creative Capital grant awardee.

EPOCH is a virtual exhibition space for contemporary digital art practices conceived by artist Peter Wu+ (b. 1976, Canada). Wu+ interrogates reality and its construction, using technology to intervene in and then examine that intervention. EPOCH's recent exhibitions include *Catalyst*, a traveling show originating at MoMA PS1, New York (2023–24) and *Biennale de l'Image de Mouvement 2024: A Cosmic Movie Camera*, Centre d'Art Contemporain, Switzerland (2024). Wu+ was awarded the COLA Individual Artist Fellowship and a commission for the Public Art Division with the Los Angeles World Airports arts exhibition program in 2019, shown in 2022–23. Other recent group exhibitions include *Posthuman Vernacular*, Paris Blockchain Week (2023) and *TRANSFER Download*, Spring/Break Art Show, Los Angeles (2019). Wu+ is a recipient of the 2023 Eyebeam Fractal Fellowship, and his work is in the permanent collection of the Los Angeles County Museum of Art. He received his BFA in 1999 from the University of Windsor, and his MFA in 2001 from the San Francisco Art Institute.

Elisa Giardina Papa (b. 1979, Italy) works across the internet, video, and film to examine knowledges and desires that resist capture. Notable recent exhibitions include the solo show *Ether's Bloom*, Gropius Bau, Berlin (2024) and the online Sunrise/Sunset commission *Labor of Sleep, Have you been able to change your habits??*, Whitney Museum of American Art, New York (2017). She was also included in *The Milk of Dreams*, 59th Venice Biennale (2022), and MoMA's Modern Mondays, Museum of Modern Art, New York (2013). She holds a BA from Politecnico di Milano (2007), an MFA from the Rhode Island School of Design (2013), and a PhD in film and media from the University of California, Berkeley (2023).

Goldin+Senneby (established 2004) is a collaboration between artists Simon Goldin (b. 1971, Sweden) and Jakob Senneby (b. 1981, Sweden). Their work uses financial structures to reframe art production, the body, and care. Notable exhibitions include the solo shows *Insurgency of Life*, Nome, Berlin (2021) and *Pool of Life*, CFHill, Stockholm (2020), and the group exhibitions *Economics the Blockbuster*, Whitworth Art Gallery, Manchester, England (2023) and *I Was Raised on the Internet*, Museum of Contemporary Art Chicago (2018). Their work resides in the collections of the Moderna Museet, Stockholm; the Centre Pompidou, Paris; and the Museum of Modern Art, New York. Senneby and Goldin received MFA degrees from Stockholm's Royal Institute of Art in 2004 and 2007, respectively.

Valerie Green (b. 1981, California) is a photographer exploring the concept of interface. Recent exhibitions include the solo show *Reprograph*, Moskowitz Bayse, Los Angeles (2021) and the group exhibitions *Sculpture into Photography*, Moskowitz Bayse, Los Angeles (2023); *Experimental Photography*, Tasweer Photo Festival, Doha, Qatar (2021); and *After Hours*, New Wight Gallery, University of California, Los Angeles (2018). Green's work is in the collections of the J. Paul Getty Museum, Los Angeles; the Los Angeles County Museum of Art; and the California Museum of Photography, Riverside. She holds an MFA from the California Institute of the Arts (2011) and a BA from the University of California, Los Angeles (2006).

Lucia Grossberger Morales (b. 1952, Bolivia) is a computer artist who has been working since 1979 on the design potential of Apple computers. She is the coauthor of *The Designer's Toolkit* (1982), a software package published by Apple. Her *Sangre Boliviana* (1995), an

interactive CD-ROM exploring her relationship with Bolivia as an immigrant, was shown in the United States, Europe, and South America, and is now archived at the Bibliothèque nationale de France. Her work has been shown in *The Artist and the Computer*, Long Beach Museum of Art, California (1982) and *The Artist in the Lab*, Harvard University, Cambridge, Massachusetts (1982). She holds an MS in instructional design and a BA in anthropology from the University of Southern California.

Maggie Hazen (b. 1989, California) is an artist, activist, and filmmaker who seeks to combat hidden architectures of control through her own playful construction of new realities. Her ongoing project *Fraught Imaginaries* is a collaboration with incarcerated individuals in New York. Recent exhibitions include the public work *Hidden in Plein Site*, Hunter Mountain, New York, produced by Shandaken Projects (2023), the solo show *Comedy of Errors*, Vox Populi, Philadelphia (2021), and the group exhibitions *A Copious Flow*, Athens Cultural Center, New York (2023) and *Belly Ache*, Chart Gallery, New York (2023). She holds an MFA from the Rhode Island School of Design (2016) and a BFA from Biola University (2011).

Lynn Hershman Leeson (b. 1941, Ohio) is an artist and filmmaker who has persistently investigated new media technologies and their consequential transformations of human relationships in terms of identity, surveillance, and political repression. Recent solo exhibitions include *Twisted*, New Museum, New York (2021) and *Civic Radar*, Zentrum für Kunst und Medientechnologie, Karlsruhe, Germany (2014). Notable group exhibitions include *The Milk of Dreams*, 59th Venice Biennale (2022); *The Body Electric*, Walker Art Center, Minneapolis (2019); and *Art in the Age of the Internet, 1989 to Today*, Institute of Contemporary Art, Boston (2018). Her work is in many public collections, including the Museum of Modern Art, New York; Tate Modern, London; and the Whitney Museum of American Art, New York. Hershman Leeson holds an MA from San Francisco State University (1972) and a BS from Case Western Reserve University (1963). She is the recipient of the Siggraph Lifetime Achievement Award, the Prix Ars Electronica Golden Nica, and a John Simon Guggenheim Memorial Foundation fellowship.

Huntrezz Janos (b. 1996, California) experiments with contemporary technologies to construct real and virtual objects and spaces that present aesthetic and political challenges to conceptions of personhood. Notable exhibitions include *Make Me Feel Mighty Real: Drag/Tech and the Queer Avatar (1969–2023)*, Honor Fraser, Los Angeles (2023); *Machine Violence*, Postmasters, New York (2023); and *I'll Be Your Mirror: Art and the Digital Screen*, Modern Art Museum of Fort Worth, Texas (2023). Janos holds an MS in integrated design, business, and technology from the University of Southern California (2024) and a BFA in experimental animation from California Institute of the Arts (2018).

Eugene Lally (1934–2014) was an aerospace engineer and photographer known for being the first to conceptualize digital photography in 1961, and coining the phrase "digital photography." The first digital camera was developed for spacecraft navigation fifteen years after his initial concept. Lally received his BA from Northeastern University (1957), and after leaving NASA in 1966 went on to found his own company, Dynamic Development.

Brandon Lattu (b. 1970, Georgia) works with photography, sculpture, and video to investigate the structure of representation within images, and the relationships between spaces and systems. Recent solo exhibitions include *Brandon Lattu: Empirical, Textual, Contextual*, California Museum of Photography, Riverside (2021) and *Full to Bursting*, Richard Telles Fine Art, Los Angeles (2019). Notable group exhibitions include *RIDEAUX / BLINDS*, Institut d'art contemporain, Lyon, France (2015) and *Everyday Epiphanies: Photography and Daily Life since 1969*, Metropolitan Museum of Art, New York

(2014). His work is in the collections of the Metropolitan Museum of Art, New York, and the Centre Pompidou, Paris, among others. Lattu holds an MFA from the University of California, Los Angeles (1998) and a BFA from Corcoran School of the Arts and Design (1994), and is an associate professor of art at the University of California, Riverside.

Ahree Lee (b. 1971, South Korea) works with video, textiles, and new media to examine technology's role in labor and relationships. Notable exhibitions include the recent solo show *Fabrication*, Carolyn Campagna Kleefeld Contemporary Art Museum, California State University, Long Beach (2024) and the group exhibitions *Day Jobs*, Cantor Arts Center, Stanford University, California (2024) and *Weaving Data*, Jordan Schnitzer Museum of Art at Portland State University, Oregon (2023). Her work is in the collections of the Museum of the Moving Image, Long Island City, New York; San Francisco State University; and Sterling Memorial Library, Yale University, New Haven, Connecticut. Lee holds an MFA in graphic design from the Yale School of Art and a BA in English literature from Yale University.

David Maisel (b. 1961, New York) uses photography, video, and painting to interrogate the changing landscape of the US West, with an eye toward the impact of climate change, mineral extraction, and weapons testing. Notable exhibitions include his solo traveling show *Black Maps: American Landscape and the Apocalyptic Sublime*, originating at the University of Colorado Art Museum, Boulder (2014) and the group exhibitions *Civilization: The Way We Live Now*, Saatchi Gallery, London (2023) and *Landmark: The Fields of Photography*, Somerset House, London (2013). His work is in many public collections, including the J. Paul Getty Museum, Los Angeles; the Los Angeles County Museum of Art; and the Metropolitan Museum of Art, New York. Maisel is the recipient of a 2018 Guggenheim Fellowship. He holds an MFA from California College of the Arts (2006), an MA from Harvard University (1988), and a BA from Princeton University (1984).

Frank Malina (1912–1981) was an aeronautical engineer and the founder of *Leonardo*, an academic journal about applications of science and technology in the arts. He was a pioneer of light and motion in art, and notable for his kinetic experiments in painting. His works reside in many collections, including the Musée National d'Art Moderne, Paris; the Smithsonian Institution, Washington, DC; and UNESCO, Paris. Malina received his PhD from the California Institute of Technology (1940) and his BS from Texas A&M University (1934). In 1990 he was inducted into the International Space Hall of Fame.

Judy Malloy (b. 1942, Massachusetts), a poet, and **Cathy Marshall**, a scientist, began working together in 1993 through the artist in residence program at Xerox PARC in Palo Alto, California. Together, they made *Forward Anywhere*, a project of narrative fiction and digital architecture. Malloy has worked in electronic literature since her seminal hyperfiction effort *Uncle Roger* (1986), and her work has been published and exhibited widely, including in the Bienal de São Paulo; the Institute of Contemporary Art, Los Angeles; and the Walker Art Center, Minneapolis. Marshall is a principal researcher at Microsoft Research Silicon Valley, and among the world's leading authorities on hypertext. She has led a series of projects investigating collaborative hypertext, including Aquanet and VIKI. Malloy holds a BA from Middlebury College (1964), and Marshall holds an MA in computer science and a BA in English, both from the California Institute of Technology.

Lynne Marsh (b. 1969, Vancouver) is known for her photography and video work that examines the viewing experience and the status of the image within that. Recent solo exhibitions include *Who Raised It Up So Many Times?*, UCR ARTS, Riverside, California (2021) and *Taking Positions*, Tintype Gallery, London (2018), and notable group exhibitions and screenings

include *Builders: Canadian Biennial*, National Gallery of Canada, Ottawa (2012) and *Les Rencontres Internationales*, Centre Pompidou, Paris (2011). Her work is in the collections of the National Gallery of Canada and the Musée national des beaux-arts du Québec. She received her MFA in 1998 from Goldsmiths, University of London, and her BFA in 1992 from Concordia University. She is an associate professor of art at the University of California, Riverside.

Lauren Lee McCarthy (b. 1987, Massachusetts) works across media and installation to explore the relational effects of technology, particularly automation, surveillance, and algorithmic determination. Her most recent solo exhibition is *Bodily Autonomy*, Mandeville Art Gallery, San Diego, California (2024), and notable group exhibitions include *Open Secret*, KW Institute for Contemporary Art, Berlin (2021) and *AI: More Than Human*, Barbican Centre, London (2019). She is the recipient of the LACMA Art + Technology Lab Grant (2022), the Ars Electronica Golden Nica Interactive Art+ Award (2020), and the Creative Capital Award (2019). Her work is in the collection of the Whitney Museum of American Art, New York. McCarthy holds an MFA in design media arts from the University of California, Los Angeles (2011) and a BS in computer science and art and design from the Massachusetts Institute of Technology (2008). She is an associate professor at the University of California, Los Angeles.

Mobile Image (established 1975) was a collaboration between the artists **Kit Galloway** (b. 1948) and **Sherrie Rabinowitz** (1950–2013). They sought to use satellite broadcast, computer networks, and public space to imagine new connections across space and time. Notable exhibitions of their work include *Art, Technology and Informatics*, 42nd Venice Biennale (1986); *Electronic Cafe Network*, Summer Olympic Arts Festival, Museum of Contemporary Art, Los Angeles (among other venues, 1984); and *Hole in Space: A Public Communication Sculpture*, Museum of Modern Art, New York (1980).

Lee Mullican (1919–1998) was a painter identified with the Dynaton group, which merged a Surrealist aesthetic philosophy with West Coast mysticism. Notable solo exhibitions include *Lee Mullican: Computer Joy*, Marc Selwyn Fine Art, Los Angeles (2021) and *Lee Mullican: An Abundant Harvest of Sun*, Los Angeles County Museum of Art (2006). His work has been included in the recent group exhibitions *Singularity*, Decentral Art Pavilion at the 59th Venice Biennale (2022) and *Outward Sight and Inner Vision: Paul Klee and Lee Mullican*, San Francisco Museum of Modern Art (2021). His work is in the collections of the Museum of Modern Art, New York; the San Francisco Museum of Modern Art; and the Metropolitan Museum of Art, New York, among many others. Mullican received a BA in 1942 from the Kansas City Art Institute, and taught at the University of California, Los Angeles, from 1961 to 1990.

A. Michael Noll (b. 1939, New Jersey) is a researcher and academic who pioneered computer art and animation during his time as a researcher at Bell Labs. His work was included in the earliest exhibitions of computer art, including the historic *Cybernetic Serendipity*, Institute for Contemporary Arts, London (1968) and *Computer-Generated Pictures*, Howard Wise Gallery, New York (1965). His work is in the collections of the Museum of Modern Art, New York; the Los Angeles County Museum of Art; and the USC Fisher Museum of Art, Los Angeles. Noll holds a PhD in electrical engineering from the Polytechnic Institute of Brooklyn, a BSEE from Newark College of Engineering, and an MEE from New York University. He is a professor emeritus at the USC Annenberg School for Communication and Journalism.

Mendi Obadike (b. 1973, California) and **Keith Obadike** (b. 1973, Tennessee) are collaborators who create art, music, and writing. Early on, they produced pioneering internet-based work interrogating race in digital space through experimental performance. Solo exhibitions of their work include *Mendi + Keith Obadike:*

Anyanwu, Carnegie Mellon College of Fine Arts, Pittsburgh (2019) and *Mendi + Keith Obadike: American Cypher*, Studio Museum in Harlem, New York (2013), and notable group exhibitions include *Difference Machines: Technology and Identity in Contemporary Art*, Albright Knox Gallery, Buffalo, New York (2021); *Programmed: Rules, Codes, and Choreographies in Art*, Whitney Museum of American Art, New York (2018); and *Electronic Superhighway*, Whitechapel Gallery, London (2016). Mendi Obadike holds a PhD in literature from Duke University and a BA in English from Spelman College. Keith Obadike holds an MFA in sound design from Yale University and a BA in art from North Carolina Central University. They are both professors at Cornell University.

Charles O'Rear (b. 1941, Missouri) is the photographer behind *Bliss*, the iconic default wallpaper that has accompanied Microsoft's Windows XP since 2001. Since 1978, his focus has been on wine regions in California; he has written, produced, and photographed ten books on the subject. O'Rear photographed for *National Geographic* from 1971 to 1995, and he worked for the Environmental Protection Agency's DOCUMERICA project from 1972 to 1975. His career began with daily newspapers, including the *Emporia Gazette*, the *Kansas City Star*, and the *Los Angeles Times*.

Trevor Paglen (b. 1974, Maryland) works across image making, research, and writing to investigate the political and cultural undertow of the surveillance state. Recent solo exhibitions include *Opposing Geometries*, Carnegie Museum of Art, Pittsburgh (2020) and *Sites Unseen*, Smithsonian American Art Museum, Washington, DC (2018), and notable group exhibitions include *Everything Is Connected: Art and Conspiracy*, Met Breuer, New York (2018) and *Exposed: Voyeurism, Surveillance and the Camera*, Tate Modern, London (2010). His work is in the permanent collections of the San Francisco Museum of Modern Art; the Columbus Museum of Art; and the Metropolitan Museum of Art, New York. Paglen holds a PhD in geography and a BA in religious studies from the University of California, Berkeley, and an MFA from the Art Institute of Chicago. He was named a MacArthur Fellow in 2017.

Nam June Paik (1932–2006), often called the "father of video art," experimented with video not only as a new art form, but as an emergent vessel of hyper-communication. Retrospectives of Paik's work have been organized by the National Museum of Modern and Contemporary Art, Korea (2022); Tate Modern, London (2019); and the Guggenheim Museum, New York (2000). Paik's work has been included in the Venice Biennale (1984, 1993), the Whitney Biennial (1977, 1981, 1983, 1989), and Documenta (1977, 1987). It resides in numerous public collections, including the National Museum of Modern and Contemporary Art, Seoul; the Musée d'Art Moderne de Paris; and the Smithsonian American Art Museum, Washington, DC. Paik received his BA in aesthetics from the University of Tokyo in 1956, and later studied music history at Munich University.

Sheila Pinkel (b. 1941, Virginia) first gained notice for her experimental cameraless photographic works, and later combined her explorations of light with data imagery and documentary photography toward a critical visualization of the military-industrial complex and displacement. Recent solo exhibitions include *Pinkelgraphs: The Murals and Cyanotypes, 1974–1982*, Higher Pictures Generation, New York (2021) and *Light Works*, Irenic Projects, Pasadena, California (2021). Pinkel's work was included in *Coded: Art Enters the Computer Age, 1952–1982*, Los Angeles County Museum of Art (2023) and *CMP at Fifty*, California Museum of Photography, Riverside (2023). Her work is in the collections of the Los Angeles County Museum of Art; the Metropolitan Museum of Art, New York; the Museum of Modern Art, New York; and the Musée National d'Art Moderne, Paris. Pinkel holds an MFA from the University of California, Los Angeles (1977) and a BA from the University of California, Berkeley (1963).

She taught at Pomona College from 1986 to 2012, and is now an emerita professor of art.

Sonya Rapoport (1923–2015) worked across analog and digital media to explore the aesthetic potentialities of technology, and is best known for her participatory installations and systems-based work. Recent solo exhibitions include *Sonya Rapoport: Force Fields*, Casemore Gallery, San Francisco (2023) and *Sonya Rapoport: biorhythm*, San José Museum of Art, California (2020), and notable group exhibitions include *Coded: Art Enters the Computer Age, 1952–1982*, Los Angeles County Museum of Art (2023) and the Whitney Biennial, Whitney Museum of American Art, New York (2006). Her work is in the collections of the Los Angeles County Museum of Art; the Stedelijk Museum Amsterdam; and the Victoria and Albert Museum, London, among others. Rapoport held an MA from the University of California, Berkeley (1949) and a BA from New York University (1946).

Marton Robinson (b. 1979, Costa Rica) engages the cultural imaginary of Black identity across geographies through video and digital experiments. Notable exhibitions include the solo show *¿Y qué fue de Cocorí?*, TEOR/éTica: Sala Poligráfica, San José, Costa Rica (2014) and the group exhibitions *Forecast Form: Art in the Caribbean Diaspora, 1990s–Today*, Museum of Contemporary Art Chicago (2022); *Fallen Monuments*, EPOCH Gallery (virtual) (2020); and *Recent Video from Latin America*, Getty Center, Los Angeles (2015). Robinson holds an MFA from the USC Roski School of Art and Design (2018), a BFA from the Universidad Nacional de Costa Rica (2015), an MSc in integral health and human movement (2013), and a BPhEd, teaching of physical education, sports, and recreation, from the Universidad Nacional de Costa Rica (2007). Robinson received the Eyebeam Fractal Fellowship (2021) and is currently on the faculty of the Ontario College of Art and Design University.

Dean Sameshima (b. 1971, California) uses photography as a meditation on queer space and relations. Recent solo exhibitions include *being alone*, O-Town House, Los Angeles (2023) and *647(a)*, Peres Projects, Berlin (2017), and notable group exhibitions include *Scratching at the Moon*, Institute of Contemporary Art, Los Angeles (2024); *Histórias da Sexualidade (Histories of Sexuality)*, Museu de Arte de São Paulo (2017); and *Art AIDS America*, Tacoma Art Museum, Washington (2015). His work is in the collections of the J. Paul Getty Museum, Los Angeles; the Los Angeles County Museum of Art; and the Henry Art Gallery, Seattle. Sameshima received his MFA in 2001 from Art Center College of Design, and his BFA in 1997 from California Institute of the Arts.

Julia Scher (b. 1954, California) uses video and installation, among other mediums, to expose ideologies of surveillance in the cybersphere. Recent solo exhibitions include *Julia Scher: Maximum Security Society*, Kunsthalle Zürich and Abteiberg Museum, Mönchengladbach, Germany (2023) and *Wonderland*, Maison Populaire, Montreuil, France (2022). Notable group exhibitions include *Signals: How Video Transformed the World*, Museum of Modern Art, New York (2023) and *Art in the Age of the Internet: 1989 to Today*, Institute of Contemporary Art, Boston (2018). Her work is in the collections of numerous institutions, including the Museum of Modern Art, New York; the San Francisco Museum of Modern Art; the Centre Pompidou, Paris; and the Walker Art Center, Minneapolis. She holds an MFA from the University of Minnesota (1984) and a BA from the University of California, Los Angeles (1975). Scher has taught at Columbia University, the Massachusetts Institute of Technology, and the University of California, Los Angeles.

Ilene Segalove (b. 1950, California) is an artist and educator who uses video, in combination with appropriated images, to mine her personal experience. Notable exhibitions include the solo show *Dialogues in Time*, Jancar Gallery,

Los Angeles (2013) and the group exhibitions *Everyday Epiphanies: Photography and Daily Life since 1969*, Metropolitan Museum of Art, New York (2013) and *California Video*, J. Paul Getty Museum, Los Angeles (2008). Her work is in the collections of the Metropolitan Museum of Art, New York; the Museum of Modern Art, New York; and the J. Paul Getty Museum, Los Angeles. Segalove earned an MA from Loyola Marymount University in 1975 and a BFA from the University of California, Santa Barbara, in 1972. She has taught at Otis College of Art and Design; the University of California, San Diego; California College of the Arts; and the University of California, Santa Barbara.

Sonia Landy Sheridan (1925–2021) was an artist and academic devoted to exploring the impact of new communications technologies on the arts as "intertwining systems of thought." In 1969 she founded the Generative Systems department at the School of the Art Institute of Chicago, dedicated to integrating new technologies into art practice. Notable solo exhibitions include *Exhibition Imaging with Machine Processes*, Transmediale Festival for Art and Visual Culture, Berlin (2013) and *The Art of Sonia Landy Sheridan*, Hood Museum of Art, Dartmouth College, Hanover, New Hampshire (2009). Sheridan was included in the historic exhibition *Software*, Jewish Museum, New York (1970), and her work is in the collections of the National Gallery of Canada, Ottawa; Fundación Telefónica, Madrid; and the Brooklyn Museum. Sheridan held an MFA from the California College of Arts and Crafts (1961), an MA in French and Russian from Columbia University (1947), and a BA in French and visual arts from Hunter College (1945).

Barbara T. Smith (b. 1931, California) is a key figure in Southern California's history of feminist performance art thanks to her explorations of power, spirituality, and the body as a performance space. Recent solo exhibitions include *Barbara T. Smith: The Way to Be*, Getty Research Institute, Los Angeles (2023) and *Barbara T. Smith: Proof*, Institute of Contemporary Art, Los Angeles (2023), and notable group exhibitions include *Experiments in Electrostatics: Photocopy Art from the Whitney's Collection, 1966–1986*, Whitney Museum of American Art, New York (2018) and *WACK! Art and the Feminist Revolution*, Museum of Contemporary Art, Los Angeles (2007). Smith is a recipient of the Women's Caucus for Art Lifetime Achievement Award (1999) and numerous National Endowment for the Arts grants (1973, 1974, 1979, 1985). Her work is in the collections of the J. Paul Getty Museum and the Getty Research Institute, Los Angeles; the Museum of Contemporary Art, Los Angeles; and the Art Institute of Chicago. Smith holds an MFA from the University of California, Irvine (1971) and a BA from Pomona College (1953).

Christine Tamblyn (1951–1998) was a first-generation critic and artist involved in video art, interested in creating conceptual art with emergent video and computer technologies. Tamblyn also wrote about this shift in *Afterimage*, *High Performance*, *ARTnews*, and *Leonardo*, among other publications. While her work has rarely been shown since her death in 1998, her CD-ROM works were exhibited widely during her lifetime, including in the group exhibition *Seduced and Abandoned: The Body in the Virtual World*, Institute of Contemporary Arts, London (1994) and several solo exhibitions, including *Archival Quality*, Los Angeles Center for Photographic Studies (1998) and *Mistaken Identities*, International Center for Photography, New York (1996). Tamblyn received her MFA from the University of California, San Diego (1986) and her BA from the School of the Art Institute of Chicago (1979), and went on to teach at San Francisco State University, Florida International University, and the University of California, Irvine.

Penelope Umbrico (b. 1957, Pennsylvania) uses the internet as raw material and subject to create installation, video, and digital works that explore the production and consumption

of images. Solo exhibitions include *Suns from Sunsets from Flickr* and *Screen Sun*, Hangar Y, Meudon and Paris (2023) and *Learning from eBay*, Finnish Museum of Photography, Helsinki (2022). Recent group exhibitions include *I'll Be Your Mirror: Art and the Digital Screen*, Modern Art Museum of Fort Worth, Texas (2023) and *Civilization: The Way We Live Now*, Saatchi Gallery, London (2023). Her work is in the collections of the Metropolitan Museum of Art, New York; the Los Angeles County Museum of Art; and the Victoria and Albert Museum, London. Umbrico holds an MFA from the School of Visual Arts, New York (1989) and a BA from the Ontario College of Art (1980). She is currently a faculty member at the School of Visual Arts.

Stan VanDerBeek (1927–1984) was an animator and experimental filmmaker who blended art and technology toward a utopian vision of their union. His work *Movie-Drome* (1963–65) was key in what media arts theorist Gene Youngblood would term "expanded cinema," an elastic set of practices combining film and performance. Recent exhibitions of VanDerBeek's work include *VanDerBeek + VanDerBeek*, Black Mountain College Museum + Arts Center, Asheville, North Carolina (2019) and *Stan VanDerBeek: The Cultural Intercom*, MIT List Visual Arts Center, Cambridge, Massachusetts (2011), and the group show *Signals: Video and Electronic Democracy*, Museum of Modern Art, New York (2023). VanDerBeek's work is in the collections of the Museum of Modern Art, New York; the Whitney Museum of American Art, New York; and the Walker Art Center, Minneapolis, among others. He studied art and architecture at Manhattan's Cooper Union for the Advancement of Science and Art from 1948 to 1952, and at Black Mountain College from 1949 to 1951.

Steina Vasulka (b. 1940, Iceland) and **Woody Vasulka** (1937–2019) were early pioneers of video art whose experiments in blending video, performance, space, and perception remain singular. They cofounded The Kitchen in New York in 1971 to foster emerging experiments in new media and performance. In 1998 the couple received the National Association of Media and Culture's award for their contributions to the field of media arts. Recent exhibitions of their work include *Woody and Steina Vasulka: Signal/Form*, Hilliard Art Museum, Lafayette, Louisiana (2020) and *Steina & Woody Vasulka: Machine Vision*, Raven Row, London (2016), and the group show *Electronic Superhighway: 1966–2016*, Whitechapel Gallery, London (2016). Steina Vasulka trained as a classical musician and violinist, receiving a scholarship at the Prague Conservatory in 1959. Woody Vasulka studied at the School of Industrial Engineering in Brno from 1952 to 1956 before settling in Prague in 1960 to study television and film production at the Academy of Performing Arts.

Gerardo Velazquez (1958–1992) was an artist and member of the band Nervous Gender who worked across photography, performance, and early digital experiments. He operated at the intersection of queer, Chicano, and punk identities, and his work has only recently gained wider recognition. His work was featured in the solo show *Nervously Gendered: The Art of Gerardo Velazquez*, Coagula Curatorial, Los Angeles (2017), and recent group exhibitions include *Sonic Terrains in Latinx Art*, Vincent Price Art Museum, Monterey Park, California (2022) and *Axis Mundo: Queer Networks in Chicano L.A.*, Museum of Contemporary Art, Los Angeles (2017).

Andrew Norman Wilson (b. 1983, California) makes videos about the language of images and the texture of technology. Solo exhibitions include *List Projects 23*, MIT List Visual Arts Center, Cambridge, Massachusetts (2021) and *Lavender Town Syndrome*, Ordet, Milan (2020), and recent group exhibitions include *Systems*, Museum of Modern Art, New York (2022); *Fear of Property*, Renaissance Society, Chicago (2022); and *The Image and Its Double*, Centre Pompidou, Paris (2021). Wilson's work is in the collections of the Museum of Modern Art, New York; the Whitney Museum of American Art, New York; and the Centre

Pompidou, Paris. Wilson received his MFA in 2011 from the School of the Art Institute of Chicago, and a BS in television, radio, and film in 2006 from Syracuse University's S. I. Newhouse School of Public Communications.

Amir Zaki (b. 1974, California) captures California landscapes and architecture through a photographic practice that embraces digital technology. Recent exhibitions include the solo shows *Nothing to Say*, Diane Rosenstein Gallery, Los Angeles (2024) and *Empty Vessel*, James Harris Gallery, Seattle (2021), and the group shows *Golden Hour: California Photography from the Los Angeles County Museum of Art*, Vincent Price Art Museum, Monterey Park, California (2022) and *The New City: Sub/urbia in Recent Photography*, Whitney Museum of American Art, New York (2006). His work is in the collections of the J. Paul Getty Museum, Los Angeles; the Los Angeles County Museum of Art; and the Hammer Museum, Los Angeles, among others. Zaki holds a BA from the University of California, Riverside (1996) and an MFA from the University of California, Los Angeles (1999), and is a full professor of art at the University of California, Riverside.

CONTRIBUTORS

April Baca is a writer, educator, and curatorial assistant at UCR ARTS. Xer research focuses on contemporary visual media with an emphasis on queer Latina/x ontologies and digital forums created for connection, community, and pleasure. Xe has published in myriad scholarly journals, artist catalogues, and other art-related publications, including *Artforum*, *Art Journal*, the *Journal of Curatorial Studies*, and *X-TRA*. Baca holds a BA in art history from California State University, San Bernardino, and an MA in curatorial practice from USC Roski School of Art and Design, and is a doctoral candidate in cinema and media studies at UCLA.

Liliana Conlisk Gallegos is a scholar, curator, and artist featured in *Digital Capture*. Her art has been exhibited at the ARS Electronica Festival; Leonardo, the International Society of Arts, Sciences, and Technology; and the Centre for Digital Media, Vancouver. Her writing has appeared in *Critical Storytelling from Global Borderlands: En la línea* 8 (2022), *Re-Activating Critical Thinking in the Midst of Necropolitical Realities: For Radical Change* (Cambridge Scholars Publishing, 2022), and *Departures in Critical Qualitative Research* 10, no. 3 (2021). Conlisk Gallegos holds a PhD from the University of California, Santa Barbara, an MA from San Diego State University, and a BA from the University of California, Berkeley. Currently she is an associate professor in the Communication Studies department at California State University, San Bernardino.

Nikolay Maslov is curator of film and media projects at UCR ARTS, where he curates the film screening series as well as exhibitions spanning media, digital technology, and popular culture. He also oversees OFF THE BLOCK, the award-winning summer documentary workshop for local high school students. Additionally, he is associate faculty at Riverside City College in the department of Film, TV, and Video Production. He earned his MA in cinema and media studies at the USC School of Cinematic Arts, where he was an Annenberg Fellow.

Douglas McCulloh is a practicing artist and senior curator and interim executive director of UCR ARTS. Exhibitions curated by McCulloh have taken place at the Kennedy Center, Washington DC; the Canadian Museum for Human Rights, Winnipeg; Centro de la Imagen, Mexico City; Flacon, Moscow; Center for Visual Art, Denver; Centro Fotográfico Manuel Álvarez Bravo, Oaxaca, Mexico; Sejong Center, Seoul; Central Academy of Fine Arts, Beijing; the Petersen Automotive Museum, Los Angeles; and of course UCR ARTS. His own work has been shown nationally and internationally in more than 250 exhibitions at such venues as the Victoria & Albert Museum, London; Central Academy of Fine Arts, Beijing; Musée de l'Elysee, Lausanne, Switzerland; Musée Nicéphore Niépce, Chalon-sur-Saône, France; La Triennale di Milano, Italy; Centro de la Imagen, Mexico City; Institut de Cultura de Barcelona; ArtCenter College of Design, Pasadena, California; the Southeast Museum of Photography, Daytona Beach, Florida; Contemporary Arts Center, New Orleans; the Smithsonian National Air and Space Museum, Washington, DC; and Cooper Union School of Art, New York. McCulloh's books include *More Dreamers of the Golden Dream* (Inlandia Institute, 2021), *In the Sunshine of Neglect: Defining Photographs and Radical Experiments in Inland Southern California, 1950 to the Present* (Inlandia Institute, 2019), and *The Great Picture: Making the World's Largest Photograph* (Hudson Hills Press, 2012). McCulloh is an honors graduate of the University of California, Santa Barbara, and holds an MFA in photography and digital media from Claremont Graduate University.

IMAGE CREDITS

pp. 5, 86: from Dean Sameshima, *Figures of Lust Furtively Encountered in the Night*, 2001–4, courtesy of the artist and Kristina Kite Gallery, Los Angeles, © Dean Sameshima

pp. 19, 94: screenshot taken from Microsoft Windows XP, original photograph taken by Charles O'Rear. All Microsoft products and services are owned either by Microsoft Corporation or by third parties who have granted Microsoft permission to use the content, this reproduction appears under fair use for educational and noncommercial purposes, © Microsoft Corporation

pp. 36, 85: Fabian H. Mena, concept still for Marton Robinson, *Mirror Mirror, No hay más que un nombre*, 2019, courtesy of the artist, © Marton Robinson

pp. 52, 72: stills from Refik Anadol, *Machine Hallucination: Keystone-Mast Collection*, 2024, courtesy of Refik Anadol Studio, © Refik Anadol

pp. 62, 100: courtesy of the artist, © John Divola

p. 65: courtesy of EPOCH and the artists, © EPOCH

p. 66: courtesy of the artist, © Maggie Hazen

p. 67: courtesy of the artist, © Huntrezz Janos

p. 68: from "Mosaic Guidance for Interplanetary Travel," in Space Flight Report to the Nation, ed. Jerry Grey and Vivian Grey, published by the American Rocket Society, pp. 2249–61, courtesy of the American Rocket Society, New York

pp. 69, 125: courtesy of NASA, ESA, and S. Beckwith (STScI) and the HUDF Team, reproduced with permission by ESA/Hubble, Space Telescope Science Institute, USA, © ESA/Hubble

p. 70: courtesy of the artist, © Sheila Pinkel

p. 73: Nikolay Maslov/UCR ARTS, © Natalie Bookchin

p. 74: courtesy of the artist and Galerie Tanja Wagner, Berlin, © Elisa Giardina Papa

p. 75: Bob Riha Jr., courtesy of Getty Images, © Getty Images

p. 76: courtesy of the artist, © Sheila Pinkel

p. 77: courtesy of the artist and DOCUMENT, Chicago, © Andrew Norman Wilson

p. 78: Nikolay Maslov/UCR ARTS, collection of the California Museum of Photography at UCR ARTS

p. 80: courtesy of the artist, © Nonny de la Peña

p. 81: courtesy of the artist, © Lauren Lee McCarthy

p. 82: courtesy of Kit Galloway, © Mobile Image

p. 83: courtesy of the artists, © Mendi + Keith Obadike

p. 84: courtesy of the artist, Altman Siegel, San Francisco, and Pace Gallery, © Trevor Paglen

p. 87: Nikolay Maslov/UCR ARTS, © Julia Scher

p. 89: courtesy of the artist and the UCSC Critical Realities Studio, © micha cárdenas

pp. 90, 146: stills from Dynasty Handbag, *Oh, Hummingbird*, 2017, courtesy of the artist, © Dynasty Handbag

p. 91: courtesy of the artists and Nome, Berlin, © Goldin+Senneby, CC 2.5 S.A.

p. 92: courtesy of the artist, Edwynn Houk Gallery, New York, Haines Gallery, San Francisco, and Robischon Gallery, Denver, © David Maisel

p. 93: courtesy of the artist, © Lynne Marsh

p. 95: Don Ross, courtesy of the San Francisco Museum of Modern Art, © Trevor Paglen

p. 96: courtesy of the artist and Diane Rosenstein Gallery, Los Angeles, © Amir Zaki

p. 97: Nikolay Maslov/UCR ARTS, collection of the California Museum of Photography at UCR ARTS

p. 99: preparatory drawing for *Flirt*, 1974, courtesy of the artist, © Rebecca Allen

p. 101: Nikolay Maslov/UCR ARTS, © Lucia Grossberger Morales

p. 102: courtesy of the artist, © Brandon Lattu

p. 103: courtesy of the artist, © Ahree Lee

p. 104: Nikolay Maslov/UCR ARTS, © Marjorie and Frank J. Malina Estate

p. 105: courtesy of the Carl & Marilynn Thoma Foundation Collection, Chicago, and Mullican Hurtado Archive, Los Angeles, © Estate of Lee Mullican

p. 106: courtesy of the artist, © A. Michael Noll

p. 107: Nikolay Maslov/UCR ARTS, © Stan VanDerBeek Archive

p. 108: courtesy of BERG Contemporary, © Steina Vasulka

p. 109: courtesy of ONE Archives at the USC Libraries, © Gerardo Velasquez

p. 111: courtesy of the artist, © Liliana Conlisk Gallegos

p. 112: courtesy of the artist and Galerie Tanja Wagner, Berlin, © Elisa Giardina Papa

p. 113: courtesy of the artist and Moskowitz Bayse, Los Angeles, © Valerie Green

p. 114: Nikolay Maslov/UCR ARTS, © Lynn Hershman Leeson

p. 115: David Hartwell/UCR ARTS, © Brandon Lattu

p. 116: screen shots, © Judy Malloy and Cathy Marshall

p. 117: courtesy of the Carl & Marilynn Thoma Foundation, Dallas, James Cohan Gallery, and the Paik Estate, Woodside, California, © Estate of Nam June Paik

p. 118: courtesy of the Sonya Rapoport Legacy Trust, Berkeley, © Estate of Sonya Rapoport

p. 119: courtesy of the artist, © Ilene Segalove

p. 120: courtesy of the Hood Museum of Art, Dartmouth, © Sonia Landy Sheridan, reproduced by permission of the Hood Museum of Art, Dartmouth, Hanover

p. 121: Nikolay Maslov/UCR ARTS, © Barbara T. Smith

p. 122: courtesy of UC Irvine Special Collections and the Estate of Christine Tamblyn, © Estate of Christine Tamblyn

p. 123: courtesy of the artist, © Penelope Umbrico

p. 124: Nikolay Maslov/UCR ARTS

This book is published in conjunction with the exhibition *Digital Capture: Southern California and the Pixel-Based Image World*, on view at UCR ARTS, Riverside, California, from September 21, 2024, through February 2, 2025.

Concept
Douglas McCulloh

Curators
Nikolay Maslov and April Baca

Managing Editor
Joanna Szupinska

Copy Editor
Lindsey Westbrook

Image Permissions
April Baca and Kathryn Poindexter-Akers

Research
Sarah Grace Faulk

Design
Henk van Assen and Melissa Leone, HvADesign

Published 2024
Printed in Riverside, California
Edition of 300
ISBN 979-8-9904124-1-5

Digital Capture: Southern California and the Pixel-Based Image World was made possible with leading support from Getty through the PST ART: Art & Science Collide initiative. Additional support is provided by the Carl & Marilynn Thoma Foundation, Keith Downs, and the Voy and Fay Wong Family (AAPI) Endowment. Programs at UCR ARTS are supported by the College of Humanities, Arts, and Social Sciences (CHASS) at UCR and by the City of Riverside.

PST ART: ART & SCIENCE COLLIDE
Presented by Getty

UCR ARTS

UCR ARTS
Rene Balingit, Assistant Scene Technician; Trudy Cohen, Deputy Director; Emily Gray, Senior Museum Preparator; Lindsey Hammel, Associate Director of Education and Public Programs; Douglas McCulloh, Senior Curator and Interim Executive Director; Amy Metcalf, Senior Public Events Manager; Victoria Naser-Saravia, Museum Preparator; Steffanie A. Padilla, Education Program Coordinator; Allissa Payne, Finance & Visitor Services Assistant; Danielle Peltakian, Museum Registrar; Kathryn Poindexter-Akers, Exhibitions Manager; Grace Saunders, Exhibition & Design Assistant; Joanna Szupinska, Senior Curator; Hannah Waiters, Curatorial Assistant; Alyse Yeargan, Collections Manager

59 ARTISTS AND GROUPS

DATE OF EARLIEST WORK: 1962

DATE OF MOST RECENT WORK: 2024

6 THEMATIC SECTIONS

15 ARCHIVES VISITED

49 MONTHS OF RESEARCH AND PLANNING

99,725 MEGABYTES OF VIDEO WORK

4 AUTHORS

15 WORKS EXHIBITED IN CALIFORNIA FOR THE FIRST TIME

5 NEW ESSAYS

18,500 SQUARE FEET OF EXHIBITION SPACE

180 BIBLIO-GRAPHIC SOURCES

GREATEST SHIPPING DISTANCE FOR AN EXHIBITED ARTWORK: 2,914 MILES

11 HISTORIC TECHNOLOGIES ON VIEW

169 PAGES

40 COLLABORATORS

2 NEW WORKS CREATED FOR THIS SHOW

11 WORKS INVOLVING INTERACTIVE TECH

55 PLATES

EARLIEST WORK INVOLVING INTERACTIVE TECH: 1995

LATEST WORK INVOLVING INTERACTIVE TECH: 2024

6 ARTWORKS USING AI/AR

54,233 WORDS

65,354 KEYSTONE-MAST IMAGES IN REFIK ANADOL'S WORK

1 OF OVER 70 PST ART: ART & SCIENCE COLLIDE EXHIBITIONS PRESENTED BY GETTY

DATES ON VIEW: SEPTEMBER 21, 2024, THROUGH FEBRUARY 2, 2025

ISBN 979-8-9904124-1-5

9 798990 412415