

ARTS
CENTER FOR ART,
SCIENCE & TECHNOLOGY
AT MIT

Programs 2022-23



Ecliptic

CAPRICORNUS

Long long looooooooooooooooooooo
ago, in a galaxy far far away....
Ade Lovelace, legitimate child
of "mad, bad and dangerous to
know" poet and nutcase, LORD

**MIT Center for Art,
Science & Technology**
2022–23 Programs



The
/ ARTS
AT MIT
are rooted in
experimentation, risk-
taking, and imaginative
problem-solving.

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Center for Art, Science & Technology
Massachusetts Institute of Technology
77 Massachusetts Avenue
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arts.mit.edu/cast

Written by Anya Ventura and Matilda Bathurst
Edited by Leila W. Kinney and Evan Ziporyn
Copyedited by Linda Walsh
Design by Heidi Erickson
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Cover image: *The Thrilling Adventures of Lovelace and Babbage*
performed at MIT's W97 Theater Arts Building. Photo: Sham Sthankiya.

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From the Directors

Over the past decade, CAST has supported and helped to produce an outstanding array of artistic work in multiple disciplines. Our approach to supporting this work is equally multifaceted, starting with a “call and response” selection process that we have refined over a number of years—and continuing with a mostly behind-the-scenes ethos, facilitating rather than shaping the self-organizing capabilities of unscripted collaborations as they materialize.

During the 2022–23 academic year, CAST supported 20 new and seven ongoing projects. As always, we listened attentively to the evolving priorities and circumstances of MIT’s creative community, and adapted our methods accordingly. Two overlapping trends have emerged in the past year, each demonstrating the ways in which artists react and respond to larger cultural issues. First, after grappling with the unprecedented constraints imposed by the pandemic, the performing arts came back to life with renewed vigor and purpose. Second, MIT’s arts and design faculty increasingly focused on works addressing the ever-more-present climate crisis.

The History of Empires began in 2020 as a collaboration by three individuals working in seclusion. After the reopening of campus, a multidisciplinary ensemble joined the project, and in fall 2022 presented a live dance/theater performance that embodied the circumstances of its creation, moving through isolation and fear toward connection and hope. Another multiyear initiative, *Hearing Amazônia: The Responsibility of Existence*, utilized the pandemic and its aftermath to gestate, eventually encompassing field research, cross-cultural collaboration, and multiple concerts that presented the physical and Indigenous cultural beauty of the Amazon, while highlighting the existential threats facing both. Morphing into various formats and venues as possibilities widened, the work eventually toured to Brazil and was performed in celebration of the

inauguration of MIT’s new president in May 2023. Finally, *Poppy@88* was an exuberant manifestation of lessons learned during the pandemic about real-time, remote coordination of live-streamed musical performances, in which 88 individuals were assembled across 60 locations in 23 countries and six continents to gather online and perform a live, worldwide collective composition in celebration of Terry Riley’s 88th birthday.

At the moment, nothing is more urgent on the research agenda at MIT than global warming and its ecological consequences. Several exhibitions created for venues in Venice, New York, and MIT—*Climate Inheritance*; *The Swamp Observatory*; *Proofing: Resistant and Ready*; *Testbeds*; and *The Deep Time Project*—addressed everything from the impact of the deteriorating climate on World Heritage sites, the threat to wetlands, and the mounting pollution caused by plastics and cast-off building materials to the long-term thinking needed to replace extractive and destructive environmental practices.

Like *Climate Inheritance*, *The Swamp Observatory*, and *The Deep Time Project*, many other efforts that CAST supports are ongoing, multidisciplinary platforms of inquiry, research, and investigation. For *Bootleg Futures: The Pilgrimage*, Ana Miljački and her team are using machine learning and deep fake technologies to strategically add new data into architectural discourse, and thereby alter its dominant narratives and established archives. Similarly, Yolande Daniels is engaged in corrective archival work. The *BLACK City Editions* is an extended excavation of the socio-spatial phenomena that have affected Black settlements in the United States. The most recent iteration of the series, *The BLACK City Astrolabe: A Constellation of African Diasporic Women*, was created for the 2023 Venice Architecture Biennale as a space-time field comprising a 3D map and a 24-hour cycle of narratives about women in the African diaspora and the

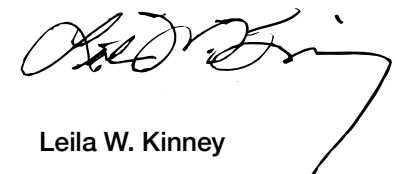
spaces they inhabit. Preventing erasure also is the goal of *Ways of Seeing: Documenting Endangered Built Heritage in Afghanistan*, a large endeavor in the Sociotechnical Systems Research Center, led by Fotini Christia and an international team of archaeologists, architects, conservationists, digital artists, journalists, and political scientists. Using data collected with drones and 3D scanning technology, the team creates digital twins of threatened monuments in Afghanistan, as well as detailed hand drawings of their architectural elements. This documentation preserves evidence of these cultural sites, offers an embodied virtual experience of them, and provides learning resources for remote audiences, including Afghan refugee children displaced around the world.

CAST was established to provide a supportive infrastructure for artistic work created on campus that is research focused, technologically advanced, and aesthetically important. To that end, CAST faculty grants have helped MIT’s rehearsal stages, design studios, and exhibition spaces to function as research labs, places where difficult challenges can be met by sustained attention from multiple individuals. We are gratified to see how the mission of the Center is being fulfilled on a larger scale than ever before—and how quickly and far afield the reputation of this kind of work has traveled in a relatively short period of time, as we hope you will note from the global presence of many of the projects described in the pages that follow.



Evan Ziporyn

Kenan Sahin (1963) Distinguished Professor, Music and Theater Arts
Faculty Director, CAST
Artistic Director, *MIT Sounding*



Leila W. Kinney

Executive Director of Arts Initiatives
Executive Director, CAST

CAST Mission Statement

The MIT Center for Art, Science & Technology (CAST) creates new opportunities for art, science, and technology to thrive as interrelated, mutually informing modes of exploration, knowledge, and discovery. CAST's multidisciplinary platform presents performing and visual arts programs, supports research projects for artists working with science and engineering labs, and sponsors symposia, classes, workshops, design studios, lectures, and publications.

CAST Activities

Cross-Disciplinary Classes

Soliciting and supporting cross-disciplinary curricular initiatives that integrate the arts into the core curriculum and create new artistic work, materials, media, and technologies for artistic expression.

Public Outreach

Disseminating to the public the creative and intellectual production supported by the center through performances, exhibitions, installations, videos, publications, and a biennial symposium.

2012–23 Program Statistics

8,500+ students participated in classes.

170+ MIT faculty and staff representing all five schools collaborated with CAST.

450+ Visiting Artists engaged with students during **360+** class visits.

Funders

The Center for Art, Science & Technology is funded in part through 2024 by a grant from the Andrew W. Mellon Foundation. Additional support comes from Dasha Zhukova; Michael and Sonja Koerner; the late Fay Chandler; Ann Allen; the late Ron Kurtz; Joan and Paul Gluck; Terry and Rick Stone; Eugene Stark; Peter Athens; and other individual benefactors. MIT support comes from Cynthia Barnhart, Provost and Ford Foundation Professor of Engineering and professor in Operations Research at MIT Sloan, and Philip S. Khoury, Vice Provost for the Arts and Ford International Professor of History.

Residencies

Producing a Visiting Artists program that emphasizes research and development of creative work, cross-fertilization among disciplines, and extensive interaction with MIT faculty, students, and researchers.

Support

Assisting in the presentation and curation of art relevant to the research of engineers, scientists, and the MIT community as a whole; supporting faculty, students, and postdoctoral researchers whose work advances the mission of the Center.

55,400+ people attended **660+** public programs in person, and another **160,400+** joined via live web streams.

195+ projects were presented off-campus at locations including Amsterdam, Basel, Berlin, Cairo, New York, Paris, São Paulo, Tel Aviv, Tokyo, Toronto, and Venice.

Partners at MIT

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School of Architecture + Planning (SA+P)

Architecture
Art, Culture, and Technology
Community Innovators Lab
History, Theory, and Criticism of Architecture and Art
Media Lab
Urban Studies and Planning

School of Engineering

Aeronautics and Astronautics
Civil and Environmental Engineering
Computer Science and Artificial Intelligence Laboratory
Electrical Engineering and Computer Science
Glass Lab
Materials Science and Engineering
Mechanical Engineering

School of Humanities, Arts, and Social Sciences (SHASS)

Anthropology
Comparative Media Studies/ Writing
Global Languages
History
Linguistics
Literature
Music and Theater Arts
Political Science
Science, Technology, and Society

School of Science

Biology
Brain and Cognitive Science
Earth, Atmospheric, and Planetary Sciences
Edgerton Center
Laboratory for Multiscale Regenerative Technologies
McGovern Institute
Physics

Sloan School of Management

Martin Trust Center for MIT Entrepreneurship

Student Life

Concourse Program
Hillel Program



Reimagining the Performing Arts

In these innovative and entertaining performances, musicians, dramaturgs, actors, activists, dancers, and scholars delve into the many facets of the human experience.

These interdisciplinary and imaginary works range from personal explorations of fraught mental conditions to retellings of centuries-old stories and traditions. Elena Ruehr's comedic steampunk opera *The Thrilling Adventures of Lovelace and Babbage* transforms computer pioneers Charles Babbage and Ada Lovelace into time-traveling crime-fighters, while the *Ballet des Porcelaines*, performed by members of the Oakland Ballet Company and led by Graham Lustig, reinterprets an 18th-century fairytale into a contemporary dance that questions imperial desire. Meanwhile, Jay Scheib and Ken Urban's *The Conquered* chronicles one woman's unsettling paranoid journey, similar to the dance-theater piece *The History of Empires*, by Dan Safer and the group Witness Relocation, which conveys the fragility of the human psyche with dark and dreamlike scenarios.

The MIT community also performed in places far afield. To raise awareness of the rich musical traditions of the Amazon, an area threatened by climate change, nearly 80 MIT musicians, led by MIT music director Frederick Harris, Jr., traveled to the Amazon for collaboration and exchange. In addition, MIT also virtually celebrated the 88th birthday of new music pioneer Terry Riley, the definition of creative experimentation, with a community of 88 talented musicians hailing from six continents.

With these far-ranging works, performed everywhere from a 19th-century Brazilian opera house to MIT's own theaters to Zoom, audiences around the world had the opportunity to witness all the diverse and cutting-edge ways of electrifying the stage.

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Hearing Amazônia: The Responsibility of Existence

Poppy@88

Image: Set of *The History of Empires* in MIT's W97 Theater Arts Building. Photo: Sham Sthankiya.

Ballet des Porcelaines

Revealing the fragility of orientalist fantasies

Performance: *Ballet des Porcelaines*,
MIT Theater Arts Building W97, September 27–28, 2022



Since its premiere at the Metropolitan Museum of Art in 2021, the *Ballet des Porcelaines* has traveled to leading cultural and educational institutions in the United States and Europe. It was staged at MIT in September 2022 as part of ongoing campus conversations about diversity, equity, and inclusion.

The idea for the production was sparked by the discovery of a libretto for a divertissement first performed in 1739 at the height of the European craze for porcelain. Reinterpreted by art historian Meredith Martin and choreographer and activist Phil Chan, the ballet centers upon the seemingly innocent tale of a magician who transforms people into porcelain—a narrative with an implicit subtext of extraction and exoticization. By intentionally foregrounding the Asian American experience and challenging the racial stereotypes of the original performance, the production aspires to shift the prevailing perception of ballet as a Eurocentric art form.

“How can this art form be bigger and for everybody—especially in our multiracial society, and in a diverse city like Boston?”

– Phil Chan

At MIT, Professor Kristel Smentek collaborated with Professor Jeffrey S. Ravel to stage a series of discussions and class visits related to the ballet. Smentek is a specialist in 18th-century visual culture and European encounters with Asian art, while Ravel studies the history of French and European political culture; together, they recognized the ballet’s relevance to a community driven by the advancement of emerging technologies.

Rather than turning away from a problematic past, the *Ballet des Porcelaines* seeks to deconstruct and reclaim a rich historical artifact, contributing to a process of continual cultural evolution. At what point does the pursuit of technological discovery become potentially harmful, and how can the human instinct for beauty also be inclusive? These are among the questions prompted by the ballet, demonstrating how an attitude of criticality and creativity can serve as a stimulus to research and innovation.

Images: (left) Dancers Logan Martin, Lawrence Chen, and Karina Eimon perform *Ballet des Porcelaines* in the W97 Theater Arts Building at MIT. (right) Dancer Karina Eimon with musicians Leah Gale Nelson and Sarah Kenner on baroque violin, Arnie Tanimoto on viola da gamba, Daniel Swenberg on theorbo, and Dongsok Shin on harpsichord. Photos: Sham Sthankiya.

2022–23 Visiting Artist Grant

Phil Chan, Co-Founder of Final Bow for Yellowface and CAST Visiting Artist

Meredith Martin, Professor of Art History, New York University

Jeffrey S. Ravel, Emeritus Professor of History, History at MIT, MIT

Kristel Smentek, Associate Professor of Art History, School of Architecture + Planning, MIT

The History of Empires

Unlocking the power of a work-in-progress

Work-in-Progress Performance: *The History of Empires*,
MIT Theater Arts Building W97 September 10, 2022

Class Visits: 21M.623 Physical Improvisation: Bodies in Motion, 21M.622
Physical Improvisation: Scores and Structures, 21M.790 Director's Craft

Premiere: *The History of Empires*, La MaMa Theater,
October 27–November 6, 2022



The incubation period of a work of dramatic art is crucial to the development of the final performance. For Dan Safer, MIT lecturer and artistic director of the dance-theater company Witness Relocation, an MIT residency allowed him to unlock the power of a concept he had developed during the pandemic.

The History of Empires grew from a work-in-progress performance that Safer had presented at MIT in 2021, *House of Cards*, a collaboration with dancer and choreographer Marcus McGregor and violist and composer Christian Frederickson. The original performance was based on a monologue by

“The ability to do a finished version, and then do a round-two finished version—I’ve never had that before.”

– Dan Safer

the playwright Charles Mee, and during the residency the group expanded the original premise to include additional excerpts of Mee’s work. They also had the chance to experiment with design and bring in new collaborators: lighting designer Jay Ryan, set and costume designer Deb O, and performer Daniel Pettrow.

The result was *The History of Empires*: a series of vivid dystopian scenarios of dreamlike strangeness, oscillating between humor and nihilism. The title refers to the rise and fall of civilizations, and the fragile empires in microcosm that shape our inner worlds. The performance—from the opening scene of a monster trying to answer a telephone through to the finale of a convivial picnic—does not follow a narrative arc, but there is a thematic thread.

The consistent trajectory of moving through isolation and fear toward an appreciation for human society is strongly influenced by the circumstances of the artists’ collaboration. What started as a pandemic pod of three individuals grew into a multidisciplinary ensemble, an evolving process that became a source of hope and connection. The eight-day residency included open rehearsals and classroom workshops by the visiting artists, and culminated in a performance and artist talk in advance of the premiere of the finished work at La MaMa in New York City.

Image: (left) Marcus McGregor and Daniel Pettrow perform *The History of Empires* in MIT’s W97 Theater Arts Building. (right) Dancer Marcus McGregor. Photos: Sham Sthankiya.

2022–23 Visiting Artist Grant

Sophie Ancival, Producer, The Perelman Performing Arts Center

Christian Frederickson, Technical Instructor in Sound Design, Music and Theater Arts, MIT

Tom Kalin, Filmmaker

Kevin Mambo, Actor

Marcus McGregor, Dancer and Choreographer

Charles Mee, Playwright

Deb O, Set and Costume Designer

Daniel Pettrow, Actor and Director of Performance and Communication Training, Heifetz International Music Institute

Katherine Profeta, Assistant Professor, Department of Drama, Theatre, and Dance, Queens College of the City University of New York

Jay Ryan, Lighting Designer

Dan Safer, Lecturer in Dance and Theater, Music and Theater Arts, MIT and Artistic Director, Witness Relocation

Angela Winkler, Actor

The Conquered

Dramatizing neurotechnology

Work-in-Progress Performances: *The Conquered*, MIT Theater Arts Building W97, December 9–10, 2022

Storytelling is arguably one of the earliest forms of neurotechnology, a method of ordering information and rendering it memorable. The multimedia theater piece, *The Conquered*, expands this premise by exploring the adaptability of the mind—both in terms of art making and technological innovation. Written by Ken Urban, senior lecturer in dramatic writing, and staged by Jay Scheib, Class of 1949 Professor of Music and Theater Arts, the performance was developed during a weeklong intensive workshop.

The idea for the play grew from Urban's childhood memory of seeing a mysterious face in his second-floor bathroom window. After hearing reports about the experiences of epileptic patients who had undergone brain implants, he decided to merge the distant memory with a scientific premise, imagining the disorientation of living with the grey matter of another mind.

Urban reached out to Scheib, who recognized the potential for using technological devices to communicate psychological pressure.

Adjacent to the action performed on stage, a large screen displayed a live feed from three cameras, focusing in on the actors and sharpening the sense of surveillance and the uncanny.

The plot centers on Jane, who begins to distrust her own memories and feels as though someone else is living inside her head. After an encounter with a stranger who claims to recognize her, Jane discovers that she has been living under an illusion. As the first test subject in a pilot program for criminal rehabilitation, she has no memories of the crimes she has committed; new memories have been implanted and her previous life has been erased. The set was designed to switch from Jane's living room to her psychiatrist's office, and the atmosphere was heightened by an eerie score designed by Christian Frederickson, a technical instructor in sound design at MIT.

"We've been able to treat the theater the same way you might use the labs on campus."

– Jay Scheib

Adaptation and neuroplasticity were inherent to the development of the project as a whole, workshopped within a week and presented to the MIT community as a series of work-in-progress performances. As such, *The Conquered* became an ideal teaching opportunity; Urban's playwriting class examined the evolution of the script, and students from Scheib's live cinema performance course worked with him on set

while he directed rehearsals. By embracing the risk and serendipity of rapid collaboration, *The Conquered* brought the spirit of the lab into the context of the theater: a space of new knowledge and ambitious experimentation.

Images: (left and right) Stage view of *The Conquered* at MIT's W97 Theater Arts Building. Photos: Caroline Alden.



2022–23 Fay Chandler Creativity Grant

Christian Frederickson, Technical Instructor in Sound Design, Music and Theater Arts, MIT

Jay Scheib, Class of 1949 Professor of Music and Theater Arts, MIT

Ken Urban, Senior Lecturer in Dramatic Writing, Music and Theater Arts, MIT

The Thrilling Adventures of Lovelace and Babbage

Operatic explorations of the history of computing

Artist Talk: "From Graphic Novel to Opera: The Thrilling Adventures of Lovelace and Babbage," MIT Lewis Music Library, February 3, 2023

Performance: *The Thrilling Adventures of Lovelace and Babbage*, MIT Theater Arts Building W97, February 3–5, 2023



The Thrilling Adventures of Lovelace and Babbage is a comedic new chamber opera about the historical inventors of the first computer, Ada Lovelace and Charles Babbage, as they use their brilliant invention to fight crime in alternate universes.

Based on the celebrated graphic novel by Sydney Padua, the premiere of the opera at MIT featured music by the composer and MIT lecturer Elena Ruehr, a libretto by the Pulitzer Prize-winning Royce Vavrek, and stage direction by Giselle Ty, with the experimental Boston-based chamber opera ensemble, Guerilla Opera.

Ada Lovelace was a mathematician and proto-programmer, whose writings contained the first-ever appearance of general computing theory. Charles Babbage was the eccentric inventor of the Difference Engine, an enormous clockwork calculating machine that set the scene for the digital age. By dramatizing Lovelace's role as the first computer programmer, the opera raises awareness of the role of women in the history of science.

Guerilla Opera, a BIPOC and feminist organization committed to radicalizing the art form, was the ideal partner on the project. Ty worked closely with Ruehr to develop the opera's high-energy steampunk aesthetic, and the performance is characterized by surprising technological details. The noisy workings of a contemporary Difference Engine served as a surprising source for percussion—the sounds recorded and reproduced via an electronic marimba—and the performance overall paid homage to the duo's prophetic imagination. Although the early prototype of the computer was never realized in the lifetimes of Lovelace and Babbage, Ruehr's vision for the opera conjures an alternate reality for the Difference Engine in time, space, and song.

"I really wanted the opera to be produced here, because it's such an important MIT subject."

– Elena Ruehr

Images: *The Thrilling Adventures of Lovelace and Babbage* performed at MIT's W97 Theater Arts Building. Photos: Sham Sthinkya.



2022-23 Ida Ely Rubin Visiting Artist Fund

Guerilla Opera

Sydney Padua, Graphic Novelist

Elena Ruehr, Lecturer in Music,
Music and Theater Arts, MIT

Giselle Ty, Stage Director

Royce Vavrek, Librettist

Hearing Amazônia: The Responsibility of Existence

Activism through sonic immersion and expression

Performance: *We Are the Forest: Music of Resilience and Activism*, Performance for the Inauguration of MIT President Sally Kornbluth, MIT Kresge Auditorium, April 29, 2023

Performance: *Hearing Amazônia: Arte é Resistência*, Teatro Amazonas Opera House, Manaus, Brazil, March 31, 2023

Performance: *Hearing Amazônia*, Commission Premiere, *Amazônia Sem Lei*, MIT Kresge Auditorium, March 11, 2023



Hearing Amazônia: The Responsibility of Existence is a multiyear initiative encompassing concerts, field research, and cross-cultural collaboration. By celebrating and communicating the musical heritage of the region, the project seeks to deliver a sonic awakening about the plight of the Amazon and the urgency of the global climate crisis.

“I wanted to provide as many students as possible with an opportunity to bring their musical and scientific talents together in a deep and spiritual manner.”

– Frederick Harris, Jr.

Directed by Frederick Harris, Jr., *Hearing Amazônia* launched in 2021 with an activism-inspired concert of Brazilian and Amazonian music influenced by the rhythms of the natural world. In March 2023, a second concert was staged featuring the world premiere of *Amazônia Sem Lei* by Grammy-nominated Brazilian-American composer Clarice Assad. The title of the work, translated as “Lawless Amazon,” is a Brazilian term referring to the exploitative actions of corporate institutions and the failure of accountability toward Indigenous communities and the natural world.

Amazônia Sem Lei was performed by Assad as vocalist, pianist, and percussionist, alongside violinist and MIT assistant professor Natalie Lin Douglas and the MIT Wind Ensemble.

2021–23 MIT Sounding Series

Kenneth Amis, Assistant Conductor, MIT Wind Ensemble, MIT

Clarice Assad, Composer and 2022–23 CAST Visiting Artist, MIT

Anat Cohen, Clarinetist / Composer, 2020–21 Virtual Visiting Artist, MIT

Genevieve Dempsey, Lecturer in World Music, Music and Theater Arts, MIT

Laura Grill Jaye, Director, MIT Vocal Jazz Ensemble, MIT

Frederick Harris, Jr., Music Director, MIT Wind Ensemble and MIT Festival Jazz Ensemble; Director in Music, Music and Theater Arts, MIT; and Project Creator and Leader, MIT

Diego Janatã, Percussionist

Talia Khan '20, Guest Speaker

Guillermo Klein, Composer / Arranger and CAST Visiting Artist

Natalie Lin Douglas, Violinist and Assistant Professor in Performance, Music and Theater Arts, MIT

Miguel Martinez, Percussionist

MISTI Brazil

MIT Festival Jazz Ensemble

MIT Vocal Jazz Ensemble

MIT Wind Ensemble

David Rosado Ortiz, Percussionist

Marcus Santos, Percussionist / Educator

Sara Serpa, Vocalist / Composer and CAST Visiting Artist

Luciana Souza, Vocalist / Composer, 2020–21 Virtual Visiting Artist, MIT

Djuena Tikuna, Vocalist

Maritta R. von Bieberstein Koch-Weser, Founder and President, Earth3000

Miguel Zenón, Saxophonist / Composer

Evan Ziporyn, Kenan Sahin (1963) Distinguished Professor, Music and Theater Arts, MIT; Faculty Director, MIT CAST; and Composer / Arranger / Bass Clarinetist, MIT



The concert also included arrangements of works by Antônio Carlos Jobim, Hermeto Pascoal, and Chiquinha Gonzaga, as well as Evan Ziporyn's bass clarinet concerto, *Drill*, which he wrote for MIT Wind Ensemble in 2002.

Shortly after the concert, nearly 80 musicians from the MIT Wind Ensemble, MIT Festival Jazz Ensemble, and MIT Vocal Jazz Ensemble traveled to the Brazilian Amazon for an immersion program of cultural and scientific exchanges. The program took place in Manaus, home to the National Institute of Amazonian Research, an educational and research institution for international sustainability issues and scientific studies of the region.

Having formed collaborations with local Indigenous musicians and the Amazonas State Jazz Orchestra, the trip concluded with a concert at Teatro Amazonas, the renowned 19th-century opera house in Manaus. The program centered upon a large-scale collaborative performance, *Nós Somos A Floresta—Eware* ("We Are The Forest—Sacred Land"), featuring songs of the Tikuna People composed by musician and Indigenous activist Djuena Tikuna, with *Eware* newly arranged by Nadav Erlich.

Nós Somos A Floresta—Eware was subsequently performed for the inauguration of MIT President Sally Kornbluth, demonstrating the centrality of creativity and responsibility as part of the Institute's mission. The translation from the rainforest to Cambridge expressed the underlying message of *Hearing Amazônia*: like a forest, we are inherently connected, thriving on what is shared, preserved, and replanted.

Images: (previous page, top) Talia Khan '20 performs a new arrangement by Guillermo Klein of *Passarim*, a song composed by Antônio Carlos Jobim. (previous page, bottom) Clarice Assad is accompanied by MIT student musicians conducted by Frederick Harris, Jr. in MIT Kresge Auditorium. (left) Clarice Assad leads the MIT Vocal Jazz Ensemble in *A cappella Explorations*. (right) Evan Ziporyn performs his arrangement of *Corta Jaca*, composed by Chiquinha Gonzaga. Photos: Caroline Alden.

Poppy@88

Pushing the boundaries of live telematic performance

Performance: *88 for 88: A Global Online, Real-Time Celebration of Terry Riley's 88th Birthday*, June 24, 2023



At the stroke of midnight (EDT) on June 24, 2023, a diverse community of 88 individuals—located across 23 countries on 6 continents—gathered online to celebrate Terry Riley's 88th birthday, hosted by *MIT Sounding* and Canada's acclaimed *ContaQt* ensemble. With no pre-recorded material, together they performed *Poppy@88*, a collective composition arranged by Evan Ziporyn, paying homage to Riley's iconic 1967 piece, *Poppy Nogood & The Phantom Band*.

"It felt like the Earth itself was singing."

– Terry Riley

While previous live telematic performances have involved groups of musicians clustered in up to 12 transmitting stations, this performance distinguished itself by originating from a significantly larger number of locations, 60 in all. From Mallacoota in southeast Australia to Raufarhöfn in northeast Iceland, the musicians streamed their performances to Wawken, Saskatchewan, where the composer and sound artist Jeff Morton mixed and retransmitted their sounds in real time.

This creative repurposing of technology aligns with the spirit of Riley's original composition. In the 1960s, Riley utilized tape loops to create distant canonic layers of melody—his so-called "Phantom Band." For this performance, the ensemble leveraged the inherent time lag and the glitch potential of streaming audio to conjure complex layered textures. After watching the performance from Mito, Japan, Terry Riley joined the livestream to greet the musicians, expressing his profound appreciation. The performance was both an expression and an extension of his practice—a legacy played out in real time.

Images: (left) Illustration by Terry Riley. (below) Terry Riley leads a group of musicians.



2022–23 MIT Sounding Series

Jeff Morton,
Composer / Sound Artist

Andrew Noseworthy,
Composer / Sound Artist

Jerry Pergolesi, Founder, ContaQt

Terry Riley, Composer

Evan Ziporyn, Kenan Sahin (1963)
Distinguished Professor, Music and
Theater Arts, MIT, MIT and Faculty
Director, MIT Center for Art, Science
& Technology (CAST); and Composer /
Arranger / Clarinetist, MIT

Machine Learning and Immersive Reality

Artificial intelligence and augmented reality open up new possibilities for artists and designers to create experimental and interactive artworks using computers as creative collaborators.

Two new digital installations, *Doodle Tunes* and *Sounds from the Mouth*, created by coder, interaction designer, and educator Andreas Refsgaard in collaboration with the MIT Libraries' Caleb Hall and Avery Boddie, demonstrate how coding can be a form of creative play. "I'm interested in the ways we can express ourselves through code," Refsgaard explains. "I like to make unconventional connections between inputs and outputs, with the computer serving as a translator—a tool might allow you to play music with your eyes, or it might generate a love poem from a photo of a burrito."

The Swamp Observatory, by Gediminas Urbonas and Nomedas Urbonas, uses augmented reality to reveal invisible and imaginative ecosystems of the planned stormwater ponds for a future Swedish island city in the Baltic Sea. Raising questions about swamps as evocative forms of primordial technology, libraries of different kinds of knowledge, the project supports collaborative experiments for learning and adapting to the imminent, unpredictable effects of climate change.

By blending digital and physical elements, these artists create immersive experiences that transform how we interact with and experience the world around us.

In This Section

Machine Learning and the Arts

The Swamp Observatory

Image: Visiting Artist Andreas Refsgaard demonstrates machine learning software to workshop participants in the MIT Lewis Library. Photo: HErickson/MIT.

Machine Learning and the Arts

Learning through laughter

Installations: *Doodle Tunes* and *Sounds from the Mouth*,
Lewis Music Library, MIT, September 26–December 20, 2022

Workshops: “Art, Algorithms, and Artificial Intelligence,” Lewis Music
Library, MIT, September 29, 2022; “Machine Learning for Interaction
Designers,” Lewis Music Library, MIT, October 5, 2022

Public Artist Talk: “Machine Learning and the Arts,”
The Nexus, Hayden Library, MIT, October 6, 2022

Class Visits: 21M.080 Intro to Music Tech; 21M.380 Music and the
Internet; 21M.470 FaMLE, the MIT laptop ensemble



Artist Andreas Refsgaard is a true maverick of machine learning. As a creative coder, interaction designer, and educator, his goal is to reframe AI as a means of artistic expression and ethical inquiry. For Refsgaard, specialist knowledge is less important than an attitude of curiosity and a sense of humor, revealing the humanity at the heart of the technologies we produce.

The residency was initiated by Avery Boddie, MIT Lewis Music Library department head, who recognized Refsgaard’s alignment with the library’s increasing emphasis on digitization, open-access resources, and music technology. Encompassing workshops, an artist talk, class visits, and an exhibition, the residency centered around two interactive digital installations on display at the MIT Lewis

Music Library, programmed by Refsgaard and featuring a custom set of sounds created by music technology and digital media librarian, Caleb Hall.

The two installations, *Doodle Tunes* and *Sounds from the Mouth*, demonstrate how original compositions can be generated through a mix of spontaneous human gestures and algorithmically produced outputs. In *Doodle Tunes*, a machine learning algorithm is trained on a data set of drawings of different instruments: a piano, drums, bass guitar, or saxophone. When the user sketches one of these images on a touchscreen, a sound is generated; the more instruments added, the more complex the composition. *Sounds from the Mouth* works through facial tracking and self-capturing images. When the participant

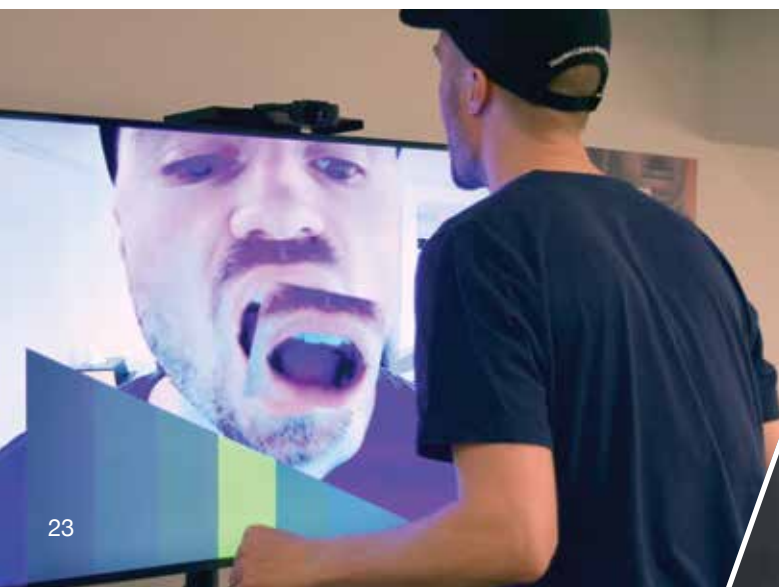
faces a webcam and opens their mouth, an autonomous snapshot is created which bounces off the notes of a piano.

The installations and accompanying programming showed that innovation doesn’t have to be about solving global problems or launching disruptive startups. Refsgaard focuses instead on clearing the pathways for creative possibilities, providing accessible templates to prompt new ideas and applications. At a time when advances in AI are prompting anxiety as much as optimism, Refsgaard’s outlook reveals how emerging technologies can align with human needs and imagination—his method involves learning through laughter.

“The first step of learning is to understand what is being taught—the next is to apply that understanding in ways that the teacher couldn’t have foreseen.”

– Andreas Refsgaard

Images: (left) Andreas Refsgaard demonstrates *Sounds from the Mouth* in the MIT Lewis Music Library. (middle) Refsgaard instructs workshop participants in machine learning principles. (right) Refsgaard trains software to recognize a banana. Photos: HErickson/MIT.



2022–23 Visiting Artist Grant

Avery Boddie, MIT Lewis
Music Library Department
Head, MIT

Eran Egozy, Professor of the
Practice in Music Technology,
Music and Theater Arts, MIT

Caleb Hall, Music Technology and
Digital Media Librarian, MIT

Andreas Refsgaard, 2022–23 MIT
CAST Visiting Artist

The Swamp Observatory

Cohabiting the space between land and water

AR App: *The Swamp Observatory*, the Children's Forest Pavilion, Lithuanian Pavilion, 2023 Venice Architecture Biennale, Venice, Italy, May 20–November 26, 2023

Exhibitions: *The Swamp Observatory*, the Children's Forest Pavilion, Lithuanian Pavilion, 2023 Venice Architecture Biennale, Venice, Italy, May 20–November 26, 2023; *The Swamp Observatory*, Eco-Vision Plan, CAFA Art Museum, Beijing, China, April 1–May 5, 2023; *The Swamp Observatory*, State of the Arts Night, Hirshhorn Museum, Washington, D.C., April 21, 2023; *The Swamp Observatory*, Urbonas Studio Retrospective, National Gallery, Vilnius, Lithuania, 2023; and *The Swamp Observatory*, *Out of the Sky, into the Earth*, Gotland Museum and Visborg Field, Visby, Sweden, August 27–September 11, 2022



The swamp is a potent metaphor for Gediminas and Nomedas Urbonas, co-founders of the interdisciplinary research practice Urbonas Studio. As a generative biosphere of ecological, cultural, and cybernetic knowledge, the swamp has provided a rich seam for the duo's teaching at MIT, as well as the artistic and pedagogical interventions staged by Urbonas Studio.

For the 2018 Venice Architecture Biennale, Urbonas Studio curated *The Swamp Pavilion*, representing their native Lithuania. The pavilion hosted *The Swamp School*, exploring future learning environments informed by the hybrid intelligences of swamp ecology. *The Swamp Observatory* is the latest iteration of the project.

“Swamps can teach us about the ways of co-existence conceived as co-creation.”

– Gediminas Urbonas

Originally commissioned for an urban development in the future city district of Visborg in Gotland Island, Sweden, *The Swamp Observatory* is an augmented reality (AR) experience intended to engage local stakeholders in debate about the reintroduction of wetlands alongside the Baltic Sea. The app was created in collaboration with local schoolchildren, who contributed to designing

a pantheon of AR eco-monsters imagined to inhabit the city's stormwater ponds. Each monster corresponds to a specific ecology—Carbon Coral, Methane Cloud, Atom Ring, Phosphorus Moss, and Sulfur Swarm—and AR interactions with the monsters reveal the abundant wonders of human cohabitation with multiple forms of life.

The app has since been presented at multiple institutions, including CAFA Museum, Beijing; Hirshhorn Museum, Washington, D.C.; and the National Gallery, Vilnius. At the Children's Forest Pavilion, representing Lithuania at the 2023 Venice Architecture Biennale, *The Swamp Observatory* implies the porousness of boundaries between nations, land, and sea. By proposing a new model for public art that engages communities and facilitates emotional investment during the planning process, the project lays the groundwork for a new climate commons.

Contending with the pollution of the Baltic Sea and issues of water shortage, *The Swamp Observatory* resists utopian thinking in favor of a pragmatic

approach to supporting community resiliency at a local level. It also dives deep into the imagination, conjuring fantastical scenarios and creating a visual language informed by history and mythology as well as flora and fauna. Playing by the transitional logic of the swamp, pragmatism becomes a function of imagination, and speculation is a stepping stone to tangible futures.

Images: (left) *The Swamp Observatory* augmented reality experience is enjoyed by users at the Gotland Art Museum and Visborg Field in Visby, Sweden. Photo: Ricard Estay. (above) Rendering of eco-monsters as they appear to users of the app. Credit: Steven Bachelder.

2022–23 International Exhibition Grant

Gediminas Urbonas, Associate Professor of Art, Culture, and Technology, MIT

Nomedas Urbonas, MIT Affiliate

Architectural Futures

Architects conceptualize spaces, structures, and materials that go beyond the present, pushing the boundaries of design to pave the way for a better future. From integrating recycled and sustainable materials into their designs to examining how the design of cities has exacerbated racial inequality, these architectural projects are reimagining how architecture might function in a better world.

The work of Janet Echelman and Jaffer Kolb reimagines new kinds of architectural materials. Combining art, engineering, and computation, Echelman creates massive, fluid, responsive sculptures based on traditional craftsmanship, which transform urban landscapes and engage with their surroundings. Kolb's *Testbeds* breathes new life into the castoffs produced by architectural models by repurposing them into public structures like greenhouses for community gardens.

Several projects addressed the exigencies of ecological crisis. DESIGN EARTH launched *Climate Inheritance*, a speculative publication that envisions how treasured World Heritage sites—from Venice to the Galápagos Islands—will be impacted by climate change. *Proofing: Resistant and Ready*, by Xavi Laida Aguirre, explores the paradoxes of plastic “proofing” materials like rubbers, coatings, gaskets, silicone, foam, cement board, and beveled edges designed to safeguard against loss. Cristina Parreño Alonso's course, The Deep Time Project, challenged MIT students to design as “true planetary stewards” with a knowledge of deep time.

In the *BLACK City Editions*, Yolande Daniels explores spatial justice, racial equity, and the impact of architecture and urban planning on Black communities to “provide an alternative reading of Black settlements and community-building methods through narratives of resistance, resilience, and transcendence.”

Through sustainable practices, technological innovation, and inclusive design, these projects are transforming the way we think about, inhabit, and interact with the built environment and our communities—past, present, and future.

In This Section

The BLACK city

The Deep Time Project

Climate Inheritance

Janet Echelman: CAST
Distinguished Visiting Artist

Testbeds

*Proofing: Resistant
and Ready*

Image: Installation view of *Totem House* by studioSUMO, Crystal Bridges Museum of Art, 2022. Image credit: Ironside Photography

The BLACK city

Giving form and visibility to complex racial histories

Installations: *The Venice Edition: The BLACK City Astrolabe: A Constellation of African Diasporic Women*, 2023 Venice Architecture Biennale, The Arsenale, Venice, Italy, May 20–November 26, 2023; *Totem House*, “Architecture at Home,” Crystal Bridges Museum of American Art, Bentonville, Arkansas, July 9–November 7, 2022

Website: The BLACK city, launched November 4, 2022

Exhibition: *Restrictive Topographies: The BLACK city*, MIT Keller Gallery, November 4–December 2, 2022



The design of any city is underwritten by laws, covenants, and customs—the dynamics that set the scene for architecture and urbanism. In the *BLACK City Editions*, Yolande Daniels explores the socio-spatial phenomena that have affected Black settlements in the United States, from explicit policies of segregation to contemporary practices that reinforce racial discrimination.

As an associate professor of architecture at MIT and co-founder of the architectural practice studioSUMO, Daniels translates empirical observation and historical research into compelling and accessible formats. Through the use of interactive visual and spatial techniques, including timelines, glossaries, games, and installations, she aims to reveal implicit structures of oppression and foster curiosity about the connections between events, people, and places.

With the support of CAST, Daniels has expanded her research for the *Arkansas Edition (Histories of Negation)* into an online database demonstrating how present conditions are produced by the patterns of the past. The *Histories of Negation* project started as an installation for the 2022 Architecture at Home exhibition at Crystal Bridges Museum of American Art, for which Daniels and studioSUMO produced a housing prototype: the *Totem House*. The house is inscribed with a timeline of settlements and expulsions in Northwest Arkansas, communicating the negation of Indigenous Nations and African American settlements from 1750 to the present day—a timeline that became the starting point for the online database mapping complex racial histories.

In 2022, the various elements of the *BLACK City Editions* were exhibited at MIT Keller Gallery, enabling Daniels to see the networked influences between each project. The most recent iteration of the project is *The BLACK City Astrolabe: A Constellation of African Diasporic Women*, presented at the 2023 Venice Architecture Biennale. The installation consists of a timeline, a 3D map, and a video, tracing the lives of women within the African diaspora and the cities and architecture they inhabited. Together, the different components are modeled on a navigational astrolabe, a space-time field of 24 meridians charting 240 years of history.

Ultimately, the *BLACK City Editions* do not intend to define or contain. Instead, they serve as platforms for interaction, prompting audiences to bear witness to historical and

“The project provides an alternative reading of Black settlements and community-building methods through narratives of resistance, resilience, and transcendence.”

– Yolande Daniels

contemporary segregation and erasure. By rejecting received ideologies and seeking out hidden stories, the *BLACK City Editions* invite us all to become investigative urbanists and agents of change.

Images: Installation views of *Totem House* by studioSUMO at Crystal Bridges Museum of American Art, 2022. Photos: Ironside Photography.



2022–23 Fay Chandler Creativity Grant

Yolande Daniels, Associate Professor of Architecture, School of Architecture and Planning, MIT

The Deep Time Project

Long-term thinking for environmental stewardship

Exhibition: “The Deep Time Project: Architecture as Planetary Abstraction,” MIT Wiesner Student Art Gallery, January 20–February 28, 2023

Class: 4.181 Architectural Design Workshop—The Deep Time Project, Fall 2022



Images: (left and center) Critique with participants in the Architectural Design Workshop—The Deep Time Project. Photos: Audrey Chen. (right) Installation view of “The Deep Time Project: Architecture as Planetary Abstraction” exhibition in the MIT Wiesner Student Art Gallery, 2023. Credit: Tim Lemp/MIT.

For Cristina Parreño Alonso, senior lecturer in architecture at MIT, a building is a “material event”—a physical and time-based phenomenon that emerges from geological history and feeds back into the composition of the planet. In her research study, “Transtectonics,” she argues that environmental stewardship depends upon learning to live at multiple time scales, looking back to the deep past and visualizing the future outcomes of contemporary decisions.

These themes were addressed in Parreño’s class, “The Deep Time Project,” offered to master’s students in the MIT School of Architecture and Planning and the Harvard Graduate School of Design. By positioning architecture in relation to geological processes, the class challenges students to reframe the relationship between design and time, developing a mindset Parreño calls “deep time literacy.”

Each week, students were invited to contemplate the ideas of a series of guest speakers working across disciplines, including architecture, journalism, philosophy, geology, and archaeology. Rather than attempting

to identify solutions, the discussions were intended to disrupt patterns of perception and cultivate greater accountability in approaches to design and construction.

“There needs to be a paradigm shift before we can effectively address the enormity of the challenges ahead.”

– Cristina Parreño Alonso

Parreño’s own work as a writer and theorist is complemented by her art installations—or “material essays”—which served as a precedent for the multimedia projects created as part of the class. Presented in an exhibition at the MIT Wiesner Student Art Gallery, the students’ projects took the form of installations, text components, sound, and video. A jagged plastic rock formation predicts a future when plastic is integral to the geological structure of the Earth; a clay tablet inscribed with different writing systems demonstrates the continuity of language and architecture as forms of communication.

These material essays are tools for thinking with. In the epoch of the Anthropocene, in which humans have become the dominant force influencing the geological structure and regulating systems of the planet, deep time literacy provides a conceptual toolkit for creatively navigating uncertain futures.

2022–23 Cross-Disciplinary Class Fund

Azra Akšamija, Director and Associate Professor, Art, Culture, and Technology Program, MIT

Joseph Bagley, City Archaeologist and Director of Archaeology, City of Boston Archaeology Laboratory

Marcia Bjornerud, Walter Schober Professor of Environmental Studies and Professor of Geosciences, Lawrence University

Jimena Canales, Historian of Science

David Farrier, Professor of Literature and the Environment, University of Edinburgh

Richard Fisher, Senior Journalist, BBC

Faries Gray, Sagamore of the Massachusetts Tribe of Ponkapoag

Dietmar Offenhuber, Associate Professor and Chair of the Department of Art + Design, Northeastern University

Cristina Parreño Alonso, Founder, Cristina Parreño Architecture and Senior Lecturer in Architecture, MIT

Polysemic, Design Consultancy

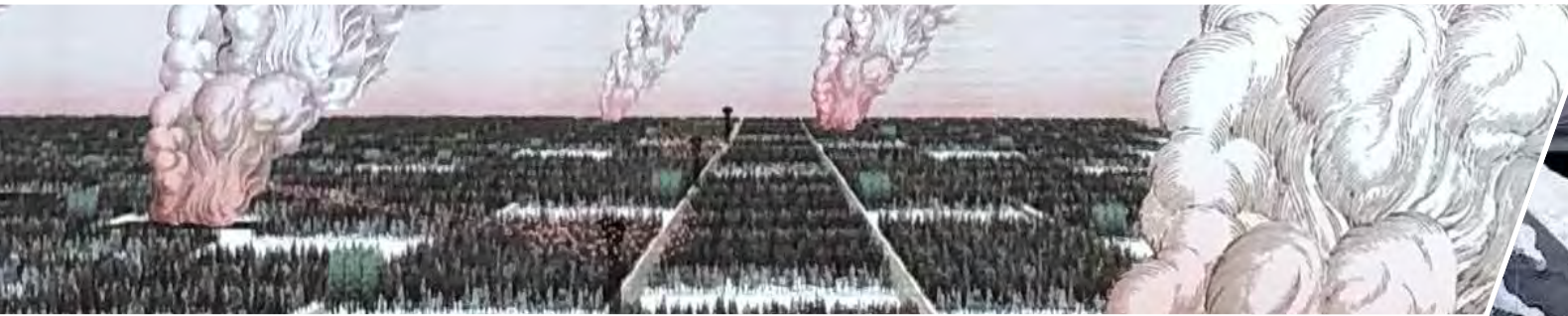
Bina Venkataraman, Journalist

Climate Inheritance

Cultural and ecological heritage intertwined

Publication: *Climate Inheritance*, Actar Publishers, New York | Barcelona, 2023

Installation: *Climate Inheritance*, Bi-City Biennale of Urbanism/Architecture, GDH City · Jinpi Fang, Shenzhen, China, December 18, 2022–March 12, 2023



Stories matter for the Earth. That is the guiding premise of Rania Ghosn and El Hadi Jazairy's design research practice, DESIGN EARTH, which applies techniques of architectural thinking to visualize and narrativize the imminent impact of the climate crisis.

For Ghosn and Jazairy, architecture is both a means of communication and a critical endeavor. Previous projects, including *Geostories: Another Architecture for the Environment* and *The Planet After Geoengineering*, enabled the duo to develop a language of visual storytelling that transforms invisible potentials into compelling scenarios. Once given form, the nebulous unknown is consolidated into a positive outcome or a tangible threat: a future to reach for, or to resist. DESIGN EARTH's approach to communicating

“The aura of heritage becomes a medium for environmental narratives.”

– Rania Ghosn

the facts and entanglements of planetary systems has gained international acclaim, and their work has been featured in major museum shows and global exhibitions. During the 2023 Venice Architecture Biennale, they launched *Climate Inheritance*, a speculative design research publication that aligns two parallel trajectories: the fate of UNESCO World Heritage Sites and the environmental changes wrought

by the climate crisis. By using the media appeal of cultural heritage to reach a broader public, DESIGN EARTH seeks to anchor the abstractions of a changing climate within familiar and symbolically resonant places.

Attempts to mitigate the subsidence and flooding of Venice are imagined as a new “geo-design of the subterranean,” visualized in vivid sectional drawings and isometric projections. The chromatic fluctuations of the Statue of Liberty are interpreted in relation to racial injustices and the long-awaited promise of freedom. The Galápagos Islands are presented as a curio of extinction, a showcase for species endangered by human settlements and mass tourism.

The publication, which includes framing essays by specialists in architectural history, heritage, and archaeology, calls into question the relationship between heritage and inheritance: the world we preserve and the world we project. By fostering a stronger conceptual framework, visual language, and ethos of shared storytelling, DESIGN EARTH lays the groundwork for intervention; the first stage of sustained mobilization is an enriched environmental imagination.

Images: Installation view of *Climate Inheritance* at the Bi-City Biennale of Urbanism/Architecture at GDH City, Jinpi Fang (formerly Kingway Brewery), Luohu District, Shenzhen, China. Photos: Rania Ghosn.



2022–23 Mellon Faculty Grant

Lucia Allais, Associate Professor, Columbia Graduate School of Architecture, Planning, and Preservation

Rania Ghosn, Associate Professor, School of Architecture and Planning, MIT

David Gissen, Professor of Architecture and Urban History, Parsons School of Design

Rodney Harrison, Professor of Heritage Studies, Institute of Archaeology, University College London

El Hadi Jazairy, Assistant Professor of Architecture, University of Michigan and Research Scientist, Norman B. Leventhal Center for Advanced Urbanism, MIT

Colin Sterling, Assistant Professor of Memory and Museums, Amsterdam School for Heritage, Memory and Material Culture, University of Amsterdam

Janet Echelman: CAST Distinguished Visiting Artist

Tensile sculptures choreographed by wind and light

Workshop: "Building Technology: The computational design, engineering, and fabrication of large-scale sculptural rope networks," January 23–26, 2023



Janet Echelman creates soft sculptures at the scale of buildings and cities. Having started her career focusing on traditional craft techniques and textile design in countries including Indonesia, India, and Lithuania, she now applies strategies of materials engineering and computation to produce tensile sculptures that adapt to conditions of light and wind. Rather than objects to look at, they are environments to inhabit—experiences that gently reveal the creativity of change.

At MIT, Echelman is working closely with Associate Professor Caitlin Mueller, CAST Distinguished Visiting Technologist David Feldman, and graduate student Adam Burke to experiment with new ideas at the intersection of art, urbanism, materials science, and computational design. Encompassing studio visits, guest lectures, a symposium, and workshops, the goal of the residency is to establish a knowledge exchange between departments, research groups, and Echelman's own interdisciplinary studio.

Echelman's material palette ranges from atomized water particles to industrial-strength fibers, and the complexity and environmental scale of her work are made possible through collaboration with mathematicians, structural engineers, and computer scientists. This process played out in the classroom context during an IAP workshop in which students built a tensile sculpture inspired by the materials systems and software pioneered by Echelman's studio. Nicole Wang '13, a structural engineer at Skidmore, Owings & Merrill, taught hands-on techniques of rope splicing—a method applied in Echelman's full-scale sculptures—and the process was optimized with custom algorithmic design tools to achieve tensile equilibrium.

"My goal is to collaboratively create new artwork that stretches into uncharted territory."

– Janet Echelman

Through the tuning of tension, Echelman reveals how volumetric forms can be created without relying on heavy solid materials; the resulting structures are lightweight, adaptable, and inherently beautiful. As a way of making, Echelman's sculptures are relevant to disciplines ranging from architecture to dance to chemical engineering. As an experience, they are something simply to dwell with and be changed by.

Images: (left, top) Adam Burke and Janet Echelman inspect the completed sculpture installed in the MIT Museum Studio on the last day of the workshop. (left, bottom) Caitlin Mueller (left) and Nicole Wang (right) discuss the engineering of the installed sculpture. (right) A student works on rope splicing technique. Photos: Sham Sthinkya./MIT.

2022-23 Mellon Distinguished Visiting Artist

Adam Burke, SMArchS BT '24

Janet Echelman, MIT CAST Distinguished Visiting Artist

David Feldman, MIT CAST Distinguished Visiting Technologist

Caitlin Mueller, Associate Professor of Architecture and Associate Professor of Civil and Environmental Engineering, MIT

Gloria Sutton, Associate Professor of Contemporary Art History, Northeastern University

Nicole Wang '13, Structural Engineer, Skidmore, Owings & Merrill

Testbeds

A new life for the byproducts of architectural design

Exhibition: *Testbeds*, “New York: New Publics,” MoMA, New York, February 19–July 29, 2023



Testbeds began with an observation: the process of architectural design produces an excessive amount of underutilized byproducts. As co-principal of the New York design studio New Affiliates, alongside his role as lecturer in architecture at MIT, Jaffer Kolb is keenly aware of the wasted potential of one such byproduct: architectural mock-ups built to scale in order to test aesthetics and performance for high-budget building projects.

Together with New Affiliates co-principal Ivi Diamantopoulou and Samuel Stewart-Halevy, a doctoral candidate in architectural history at Columbia University, Kolb investigated how these mock-ups might have a potential afterlife. Expensive, well crafted, and typically fabricated from the same materials as the buildings they model, these structures are worth recycling—however, their lifespan is typically no longer than a single design review.

After observing the similarity in size between architectural mock-ups and the functional structures found in community gardens, the team considered a potential substitution. What if a greenhouse could be made from the discarded model of an all-glass condo, or a tool shed converted from a fragment of a future skyscraper? The mock-ups would provide much-needed shade and an economical replacement for structures in need of repair. The first iteration of this project has been realized in Edgemere, Queens, and has involved a network of stakeholders, including the New York City Department of Parks and Recreation, community gardeners, and real estate developers.

“Let’s take a symbol of ultra wealth and turn it into a public symbol.”

– Jaffer Kolb

Testbeds was featured as part of “New York: New Publics” at the Museum of Modern Art (MoMA), an exhibition of transformative civic design projects. The installation includes renderings of the Edgemere garden structure—a shelter constructed from a mock-up of a luxury Tribeca condo—and an interactive board game that demonstrates the stakes and challenges of the project. In this context, *Testbeds* is envisioned as a new type of Manhattan transfer; the mock-up becomes a vehicle, carrying the surplus value of New York’s high-rise architecture into neighborhoods that have been historically disinvested.

The goal is to apply this urban experiment to multiple cities across the United States, reseeding the built environment with structures that simultaneously feed and critique the architectural production cycle. By thinking of growth in terms of ecology over economy and community over consumerism, how might financial systems be returned to address public needs?

Images: *Testbeds* Pilot Project, The Garden by the Bay Community Garden in Edgemere, Queens. Photos: Courtesy New Affiliates.

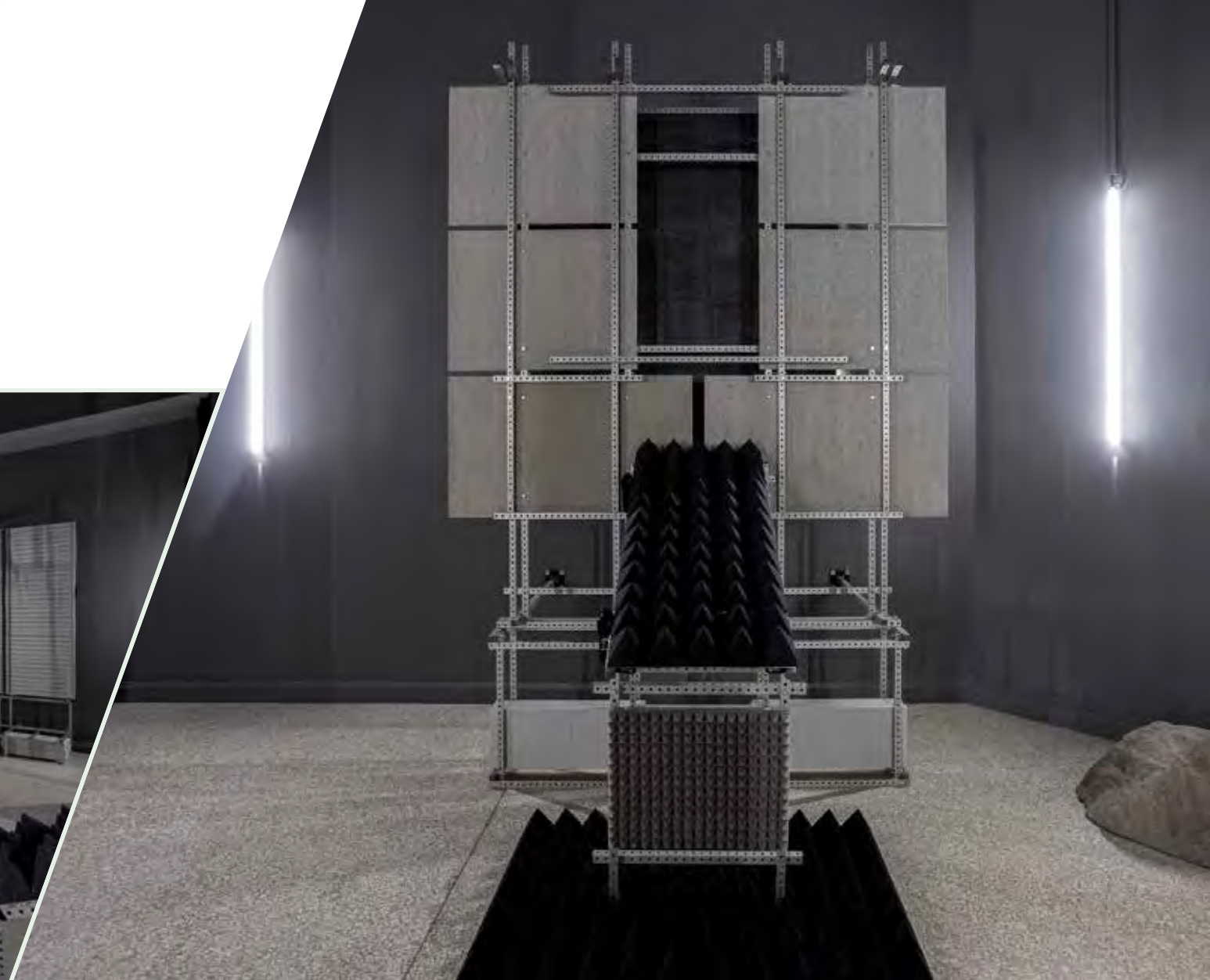
2022–23 Fay Chandler Creativity Grant

Ivi Diamantopoulou, Architect and Co-Principal, New Affiliates
Jaffer Kolb, Architect and Co-Principal, New Affiliates and Lecturer in Architecture, MIT
Samuel Stewart-Halevy, Doctoral Candidate in Architectural History, Columbia University

Proofing: Resistant and Ready

Exploring the pitfalls and promises of plasticity

Installation: *Proofing: Resistant and Ready*, U.S. Pavilion
Everlasting Plastics Exhibition, 2023 Venice Architecture Biennale,
Venice, Italy, May 20–November 26, 2023



Plastic is a paradox. Both durable and hyper-disposable, the engineered material simultaneously supports our world and undermines it. *Everlasting Plastics*, the theme of the U.S. Pavilion at the 2023 Venice Architecture Biennale, channels this anxiety while raising new possibilities. Plastic is presented as a transformative substance with the power to shape and erode contemporary ecologies, economies, and the built environment.

Encompassing two rooms within the pavilion, *Proofing: Resistant and Ready* is an immersive environment created by Xavi Laida Aguirre, assistant professor of architecture at MIT. Visitors are invited to explore a series of

scenographies featuring materials such as rubbers, coatings, gaskets, silicone, foam, cement board, and beveled edges—the plastic-derived “proofing” materials designed to protect and preserve.

The installation also includes video and augmented reality elements, prompting visitors to engage with the creative contradictions of proofing. By serving as environmental buffers against moisture, heat, and other threatening elements, these materials have an instinctive allure and risky tactility, inviting touch while resisting access—a mood that Aguirre translates to a subversive aesthetic inspired by club cultures and sealed-in spaces of desire.

The modular presentation of the installation implies possible reconfiguration, a riff on the metaphor of plastic thinking. As such, plastic is partially restored to its original promise as a wonder material, while retaining the recognition of its polluting presence. By resisting a simplistic categorization of plastic as either positive or negative, the installation introduces a new plasticity to the mind itself: a toolkit for possibilities and an agent of change.

Images: Installation view of *Proofing: Resistant and Ready* at the U.S. Pavilion during the 18th Venice Architecture Biennale. Photos: Report Arch / Andrea Ferro Photography.

2022–23 CAST Mellon Faculty Grant

Xavi Laida Aguirre, Assistant
Professor of Architecture, School of
Architecture and Planning, MIT

Projecting the Past

The preservation of our past is crucial for understanding our roots, learning from our collective history, and fostering a sense of identity and place. As our world is increasingly threatened by the climate crisis, war, erasure, and other forces of change, these artists creatively imagine how to protect the architecture, imagery, and sounds of the past, while at the same time giving these forms new life.

In his works of chamber music, composer Charles Shadle brings together classical music with the place-based musical traditions of the native Choctaw, preserving his cultural heritage while also transforming it. Deborah Garcia, with her tower *RECORDAR*, creates an oscillating object that is at once a sound installation and a device for preserving the sounds of participants.

Digital spaces also present new ways of preserving the histories of underrepresented groups. The augmented reality walking tour, *The AR Museum for the People*, by Damien McDuffie, takes Oakland, California audiences through the storied history of the Black Panthers, offering up rare archival images and videos related to the historical art and landmarks associated with the social movement. Kidus Hailesilassie creates *The Culture Archive*, a digital platform that features over 6,500 fragments from historical records, books, calendars, and paintings of African cultural heritage.

In these projects, artists and architects use digital technology to recreate endangered or vanished buildings. *Ways of Seeing*, directed by Fontini Christia, reconstructs Afghanistan's combat-threatened 16th-century structures through detailed digital imaging, extended reality techniques, hand-drawn architectural renderings, and thousands of on-the-ground photos taken by local residents, while Ana Miljački's *Bootleg Futures: The Pilgrimage* nostalgically recreates post-war monuments in the former Yugoslavia using artificial intelligence.

Art and technology play a pivotal role in ensuring that our historical artifacts, sites, and practices are not lost or forgotten. By utilizing digital documentation, accessible archiving, and reconstructive tools, these projects empower us to safeguard and share our cultural legacy with future generations.

In This Section

Ways of Seeing

The Choctaw Music of Charles Shadle

RECORDAR

Bootleg Futures: The Pilgrimage

The AR Museum for the People

The Culture Archive

Image: Point-cloud of the monastery of Simonos Petra in Athos, Greece by Nikolaos Vlavianos with on-site data collection by the MOBY Group.

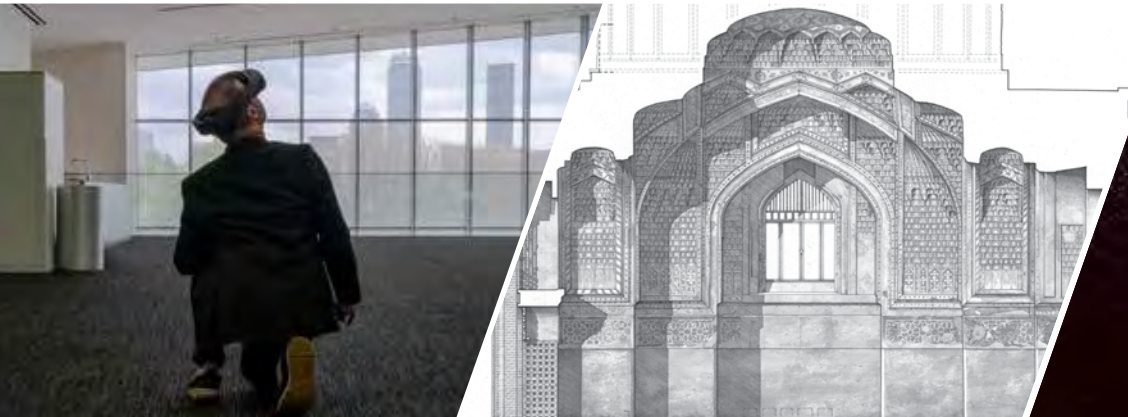
Ways of Seeing

Documenting endangered built heritage in Afghanistan

Panel Discussion and Demonstration: “Ways of Seeing: Documenting Endangered Built Heritage in Afghanistan,” MIT Media Lab, April 27, 2023

Symposium: “Afghanistan—Architectural Heritage and Global Politics,” presented in partnership with the Society of Architectural Historians, October 20, 2022

Extended Reality (XR) Application: *Ways of Seeing: Documenting Endangered Built Heritage in Afghanistan*



Lived experience is a powerful motivation for heritage preservation. But what if those sites are inaccessible? Through the use of digital imaging, extended reality (XR), and handcrafted renderings, the *Ways of Seeing* project recreates an embodied experience of visiting historic architectural sites in Afghanistan.

The project is led by political scientist Fotini Christia who has worked extensively in Afghanistan. Her research centers on ethnicity, conflict, and development in divided societies in the Muslim world, combining experimental, survey, and ethnographic fieldwork with big data analytics and new advances in computation.

Spurred by the U.S. withdrawal from Afghanistan in 2021, Christia convened an international collective of archaeologists, architects, conservationists, digital artists, journalists, and political scientists to investigate new methods for heritage preservation in zones of conflict. Four sites were selected to trial the technology, each representative of multiple religions and building types: the Green Mosque in Balkh, the Parwan Stupa south of Kabul, the mausoleum of Gawhar Shad in Herat, and the Minaret of Jam in the Ghor Province.

To generate the digital imagery, MIT PhD candidate Nikolaos Vlavianos worked remotely with an Afghan digital production team to gather on-site data, using drones to perform a 3D scanning aerial operation. The data was then processed to create immersive digital twins of the monuments, applying techniques developed by the Design and Computation Group in the MIT Department of Architecture. These navigable digital simulations served as a starting point for architect Jelena Pejko to produce meticulous hand-drawn renderings; drafted over the course of several months, the renderings provide a powerful counterpoint to digital craftsmanship. The digital visualizations and renderings were made available to the public via MIT Libraries, providing both a learning resource and a source of wonder.

“Ways of Seeing combines field data, technology, and art to protect heritage sites and serve the world.”

– Fontini Christia

The Afghan digital production team on the ground was led by Shafic Gawhari, the managing director for Afghanistan at the MOBY Group, an international media enterprise; others involved were Mohammad Jan Kamal, Nazifullah Benaam, Warekzai Ghayoor, Rahm Ali Mohebzada, Mohammad Harif Ghobar, and Abdul Musawer Anwari. *Ways of Seeing* has the potential to radically change approaches to heritage preservation—both as an act of archiving in digital space and as an incitement to greater valuation and protection of the physical sites.

In the coming years, the team envisions documenting and reconstructing other sites around the world by using crowdsourcing data, historical material, and satellite imagery and by training local community members in XR techniques. The *Ways of Seeing* model is just the start of new forms of visualization that can be applied to any heritage site at risk from war and environmental disaster.

Images: (left) Nikolaos Vlavianos demonstrates the *Ways of Seeing* extended reality experience at the MIT Media Lab. Photo: HErickson/MIT. (middle) Illustration of the Topdara stupa, an ancient Buddhist shrine located near Kabul, Afghanistan. Credit: Jelena Pejko. (right) Point-cloud model of the monastery of Simonos Petra in Athos, Greece created by Nikolaos Vlavianos with on-site data collection by the MOBY Group.

2022–23 Mellon Faculty Grant

Fotini Christia, Ford International Professor of the Social Sciences, Department of Political Science, MIT and Director, MIT Sociotechnical Systems Research Center (SSRC), MIT Schwarzman College of Computing

Shafic Gawhari, Managing Director, MOBY Group, Afghanistan

MOBY Group, Afghanistan

Jelena Pejko, Architect, MArch '06

Nikolaos Vlavianos, PhD '23 in Design and Computation, School of Architecture and Planning, MIT

The Choctaw Music of Charles Shadle

Studies in musical landscape painting

Album Recording: *Native America: The Choctaw Music of Charles Shadle, A Collection of Four Works of Chamber Music*, London, UK, December 17–19, 2022



Charles Shadle's work as a composer is indebted both to the Western classical tradition and his musical heritage as an enrolled Oklahoma Choctaw. As senior lecturer in music at MIT, Shadle is widely recognized for his classical compositions, and in recent years has been increasingly drawn toward soundscapes remembered from his Choctaw upbringing. Shadle's forthcoming album, *Native America: The Choctaw Music of Charles Shadle, A Collection of Four Works of Chamber Music*, consolidates the recurring elements of practice and marks a watershed moment in his career.

The album includes the "Oklahoma Choctaw Cycle," commissioned and performed by the London-based Lontano group, and "Chahta Aiasha," an oboe quartet commissioned by the Boston-based Radius Ensemble. While the compositions apply formal structures and technical devices that are central to the Western classical tradition, they also evoke what might be described as a distinctly Choctaw aesthetic—a yearning to restore the symbiotic relationship between human beings and a living landscape.

"Limestone Gap," "Red Cedar," and "The Old Place" take inspiration from specific locations, whereas "Chahta Aiasha" evokes a sonic panorama of forests, settlements, mountains, and waterways. When contemplating how to express his musical heritage, Shadle respectfully refrains from quoting directly from Choctaw melodies. Instead, the rhythms and aural patterning of Choctaw culture—including rituals of social dances and the influence of Christian hymn traditions—set the tone for the listening experience.

"The compositions are both an act of preservation and a space where creative growth can happen."

– Charles Shadle

Shadle is keenly aware that the Choctaw connection to the natural world is complicated by the expulsion from their ancestral lands in Mississippi during the notorious Trail of Tears. Shadle's own sense of identity is inseparable from a sense of place, and he considers his work to be a type of landscape painting—both an act of preservation and creative reinterpretation. In the context of MIT, he hopes to raise awareness of the Indigenous practices too often disregarded by mainstream science, tapping into the deep reservoirs of knowledge that can strengthen and sustain contemporary life.

Image: Talimena Drive in Choctaw Country, Oklahoma. © Christian Toews.

2022–23 Fay Chandler Creativity Grant

Odaline de la Martinez, Artistic Director, Lontano

Charles Shadle, Senior Lecturer in Composition and Theory, Music and Theater Arts, MIT

RECORDAR

Sound as a medium for architecture and sociability

Installation: *RECORDAR*, MIT Keller Gallery, April 7–May 12, 2023

All it takes is a moment of stillness to witness the built environment as an instrument and repository for sound. *RECORDAR* marks three years of research, experiments, and pedagogy developed by Deborah Garcia during her appointment as Belluschi Fellow at the MIT Department of Architecture, exploring sound as an architectural medium and a record of histories.

Installed in the MIT Keller Gallery, the throne-like sound tower was conceived as a spatial sound system and network of exchange. A built-in space for sitting and communing at the base of the tower provides an opportunity to experience low-frequency vibrations oscillating through the structure, revealing the crossed wires of what participants hear, the stories they are part of, and what they feed back into the system.

When activated for live performance, the recording mechanism can be engaged and disengaged through a touch-sensor system. When not engaged for live performance, *RECORDAR* processes its store of recordings into a real-time audio experience. The sound tower interiorizes the activities of a constructed environment, while also communicating outwardly by recording and broadcasting itself; a stage, a vessel, and an archive.

“Can intimacy and deep listening be part of our public spaces?”

– Deborah Garcia

Through the process of layering, looping, and remixing sounds from its listening history, *RECORDAR* draws attention to the enmeshed connections between psychic and institutional space—we are always tuning in to a collective consciousness, inextricable from the places where we live, think, and create. By reimagining the structures we inhabit as loudspeakers instead of silent, static forms, Garcia asks participants to take a critical and creative stance toward the broadcasting of the built environment. How might we design differently if every encounter were an act of deep listening?

Images: (left) Deborah Garcia activates the sound tower installed in the MIT Keller Gallery. (right) Installation view of *RECORDAR* at MIT. Photos: Deborah Garcia.



2021–23 Fay Chandler Creativity Grant

Deborah Garcia, Belluschi Fellow,
MIT Department of Architecture

MIT Spatial Sound Lab

Bootleg Futures: The Pilgrimage

Can architects apply AI to hack the future?

Installation: *Bootleg Futures: The Pilgrimage, Time Space Existence*, Palazzo Mora, Venice, Italy, May 20–November 26, 2023

What makes a memory? And how might that memory affect what it is possible for an individual to think, to feel, and to see—subtly guiding the choices and actions that determine the course of our shared future?

These are some of the questions that might flicker through the mind of a visitor to *The Pilgrimage*, a video installation within the group exhibition, *Time Space Existence*, presented by the European Cultural Centre during the 2023 Venice Architecture Biennale. The project is part of the wider concept of *Bootleg Futures* developed by Ana Miljački, associate professor of architecture at MIT and director of the Critical Broadcasting Lab (CBL).

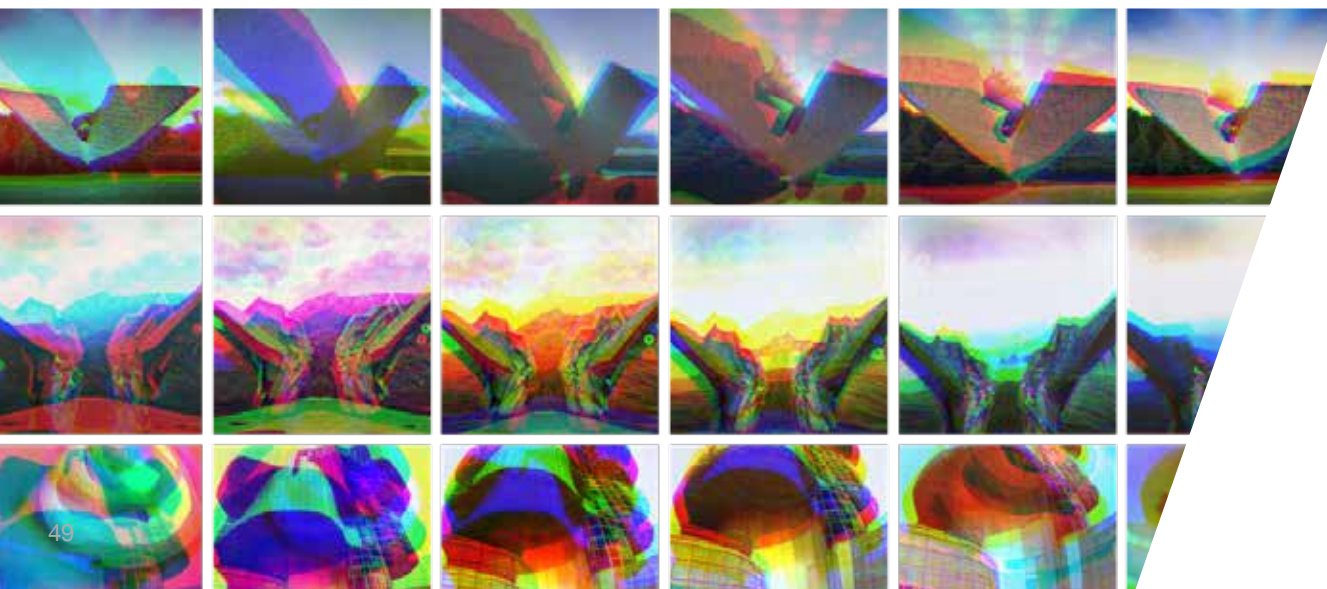
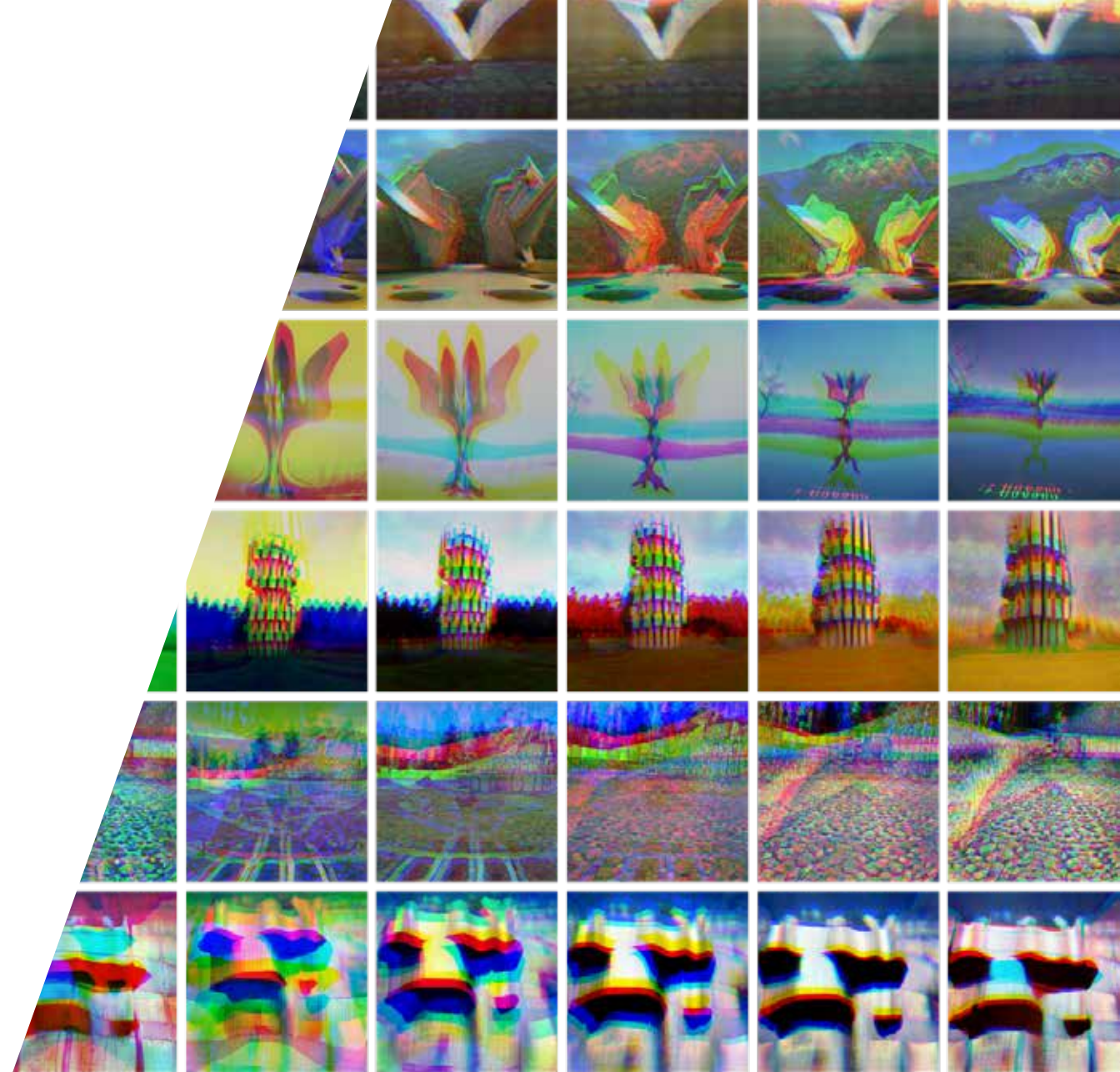
Taking the form of a triptych of AI-generated videos of postwar monuments in the former territories of Yugoslavia, *The Pilgrimage* is an unusually personal project for Miljački, who spent her childhood in Belgrade. *Bootleg Futures* explores how AI technologies might serve as a tool for architectural ideation, and how strategic adjustments of data sets can impact the outcome of predictive algorithms—to positive or negative ends. In the case of *The Pilgrimage*, the images of monuments were intentionally selected to generate a particular attitude of nostalgia, as well as the spatial effects of an in-person visit.

“What if we tweaked, hacked, and strategically added new data into the stream of conversations about architecture?”

– Ana Miljački

Simultaneously eerie and alluring, the dreamlike aesthetic of the videos has an in-built criticality. Miljački remembers the anti-fascist teachings that she received when visiting the monuments as a child, and the appealing narrative of brotherhood and unity associated with the former multiethnic nation. Rather than imposing a dogmatic message, *The Pilgrimage* simply seeks to immerse visitors in a particular atmosphere—one that inspires new questions about the value and future of these monuments.

Images: Grid of stills from six separate video interpolations trained on the archival and individual photo documentation of six key Yugoslavian memorial monuments. Photos: Critical Broadcasting Lab.



2022–23 Mellon Faculty Grant

Critical Broadcasting Lab

Ana Miljački, Associate Professor, School of Architecture and Planning, MIT

The Culture Archive

Architectures of diasporic knowledge

Multimedia digital platform: *The Culture Archive*

In his practice, Kidus Hailesilassie combines spatial design with acts of world building informed by the histories of the African diaspora. With a background in architecture and speculative fiction, his work challenges the structures of existing archives to form counternarratives of Black consciousness.

The MIT & Black Public Media Visiting Artist Program, supported by the MIT Center for Art, Science, and Technology and hosted by the MIT Open Documentary Lab, is intended to empower Black storytellers and media artists working with emerging technologies. As an MIT & Black Public Media Fellow, Hailesilassie will be working on *The Culture Archive*, a liberatory digital platform that reimagines archives as accessible storehouses of collective consciousness.

The data set for the archive draws upon a collection of more than 6,500 fragments of pictographs, ideographs, and syllabaries from historical records, books, calendars,

and paintings. Inspired by the multitude of languages spoken across Africa, the project uses different writing systems to communicate ideas about knowledge transference and technology, while creating a forum for dialogue about colonial histories of erasure and resilience.

“The immersive platform fosters dialogue, knowledge exchange, and a deeper understanding of the power of space and language to bring communities together.”

– Kidus Hailesilassie

One significant extension of the platform is *Uncharted VR*, a 360° film centered upon a performance of Adowa, a traditional dance form practiced by the Ashanti people in Ghana. Viewers are immersed in a story told through choreographed movements and spatialized audio; visually, the dancer is surrounded by a

galactic cluster of written characters that act as conduits between ancestral and diasporic knowledge. Hailesilassie recognizes that human communities are adrift without archives of shared memory—new digital

tools have the potential to engage and open those archives to all.

Images: (left) Filming for *The Culture Archive*. (right) Screenshot of *The Culture Archive*. Credit: Kidus Hailesilassie.



2022–23 MIT & Black Public Media Fellowship

Black Public Media

Kidus Hailesilassie, MIT & Black Public Media Fellow
MIT Open Documentary Lab

Acknowledgments

CAST Executive Committee

Markus J. Buehler

Jerry McAfee (1940) Professor in Engineering, Department of Civil and Environmental Engineering

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Founding Director of MIT.nano, Professor of Electrical Engineering and Computer Science, and Fariborz Maseeh (1990) Chair in Emerging Technology

Peter H. Fisher

Head, Office of Research Computing and Data; Vice Provost and Associate Vice President for Research; and Thomas A. Frank (1977) Professor of Physics

Stefan Helmreich

Elting E. Morison Professor of Anthropology, School of Humanities, Arts, and Social Sciences

Caroline A. Jones

Associate Dean for Strategic Initiatives, School of Architecture + Planning and Professor in the History, Theory, and Criticism Section, Department of Architecture

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Vice Provost for the Arts and Ford International Professor of History

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Executive Director of Arts Initiatives and the MIT Center for Art, Science & Technology

Agustín Rayo

Kenan Sahin Dean of the MIT School of Humanities, Arts, and Social Sciences and Professor of Philosophy

Hashim Sarkis

Dean of the School of Architecture + Planning and Professor of Architecture and Urban Planning

Evan Ziporyn

Kenan Sahin (1963) Distinguished Professor, Music and Theater Arts and Faculty Director of the Center for Art, Science & Technology

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CAST Visiting Artists, Faculty Collaborators, and Program Participants

Program Support and Staff

Lydia Brosnahan, Stacy DeBartolo, Heidi Erickson, Katherine Higgins, Liz Keller-Tripp, Timothy Lemp, Danna Solomon, Leah Talatinian, and Susan Wilson

CAST Selection Committee

Natalie Bell

Curator, MIT List Visual Arts Center

Baptiste Blanc

Postdoctoral Associate, Department of Mechanical Engineering

Ian Condry

Professor of Global Studies and Languages, Comparative Media Studies/Writing and Anthropology, MIT

Audrey Gatta

Undergraduate Student, Class of 2023, MIT

Adam Haar

Research Assistant, Fluid Interfaces, MIT Media Lab

Stefan Helmreich

Elting E. Morison Professor of Anthropology, MIT School of Humanities, Arts, and Social Sciences

Lodovica Illari

Senior Lecturer, Department of Earth, Atmospheric, and Planetary Sciences, MIT

Leila W. Kinney

Executive Director of Arts Initiatives and the MIT Center for Art, Science & Technology

William McKenna

Technical Instructor, MIT Morningside Academy for Design

Alejandro Medina

Masters Candidate, Art, Culture, and Technology Program, MIT

Ana Miljački

Associate Professor of Architecture, MIT

Tobias Putrih

Lecturer, Art, Culture, and Technology Program, MIT

Alexandra Rieger

Research Assistant, Opera of the Future, MIT Media Lab

Jay Scheib

Class of 1949 Professor of Music and Theater Arts, MIT

Evan Ziporyn

Kenan Sahin (1963) Distinguished Professor, Music and Theater Arts and Faculty Director of the MIT Center for Art, Science & Technology

