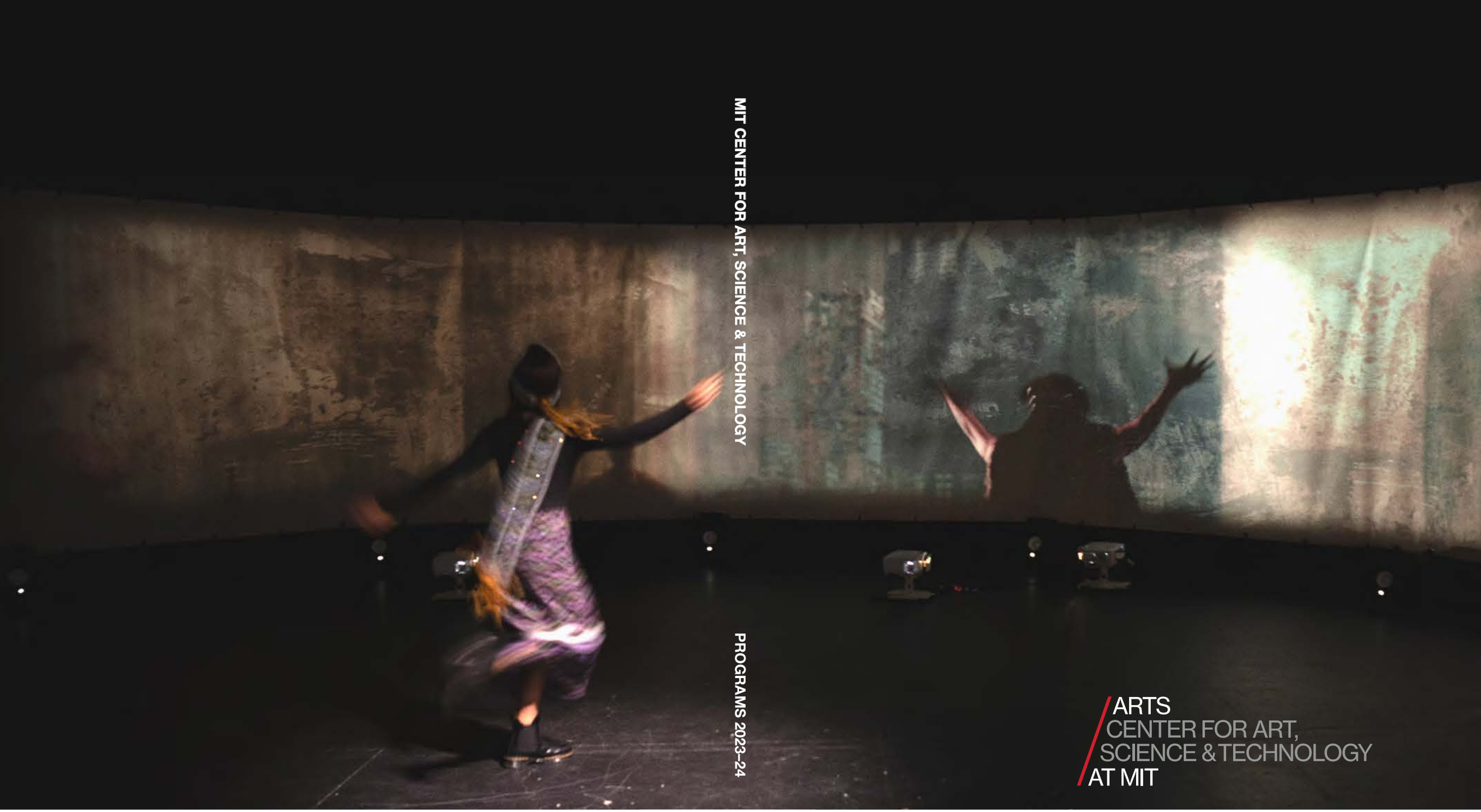

MIT CENTER FOR ART, SCIENCE & TECHNOLOGY

PROGRAMS 2023–24

ARTS
CENTER FOR ART,
SCIENCE & TECHNOLOGY
AT MIT

Massachusetts
Institute of
Technology

Programs 2023–24

MIT Center for Art,
Science & Technology

2023–24 Programs

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

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Cover image: Installation view of *Ne:Kahwistará:ken Kanónhsa'kówa í:se Onkwehonwe* at 2RO MEDIA Festival in Ohsweken, October 2023. Image courtesy of Jackson 2bears.

In This Issue

From the Directors

The MIT arts landscape has undergone a sea change since the founding of CAST in the summer of 2012. The campus itself has been transformed, in both look and feel, with two new buildings on west campus solely dedicated to the performing arts, the MIT Museum expanding into its new home at the Kendall Square gateway, and MIT Architecture soon to move into its own spectacular new facility at the storied Metropolitan Warehouse building. More importantly, there's a palpable sense of presence to the arts at MIT that goes beyond even these once-only-dreamt-of buildings. The campus is buzzing with artistic activity—publicly and privately—tat levels never seen before. Undergraduate enrollments in arts classes have increased significantly. Music and design are among the most popular minors, after computer science and mathematics. More than a dozen new faculty labs or research groups focus on pioneering artistic research or cross-disciplinary innovation in art, science, and engineering. At the risk of hubris or invoking the evil eye, dare we say that we've entered a new era for the Arts at MIT?

At CAST, we're gratified to have contributed to this resurgence. We began in 2012, on the basis of a hunch. The 2011 Festival of Art, Science & Technology (brilliantly curated by Professor Tod Machover) had unlocked something in the collective campus body, bringing in internationally acclaimed artists, but also *evincing* an amazing amount of artistic activity and sensibility from the campus community itself, whether through participating in student art competitions, enrolling in classes, taking workshopt with visiting artists, or being part of performances. It seemed clear that this made MIT a better place, and that this energy and activity could and should be part of MIT's fundamental ethos. With the generous help of the Mellon Foundation, we set up shop and did what we could to make this happen. Our overriding mission statement was to find 'new opportunities for art, science, and technology to thrive as interrelated, mutually informing modes of exploration, knowledge, and discovery.'

From the beginning, our methods were to reach out and listen to the MIT community, and to respond to what individuals and organizations within it aspired to do. We sought to build and nurture partnerships, a strategy that would be key to the number and range of artistic projects we have been able to produce each year. This continues to be our trademark: through our semiannual calls for proposals, most CAST projects begin in the MIT community itself, coming to us—sometimes fully formed, sometimes barely more than an idea—from departments, labs, and centers in all disciplines. Our excellent production, communications, and financial staff facilitates from inception to completion. But even our "top-down" initiatives—for example, the Distinguished Visiting Artist (DVA) program—manifest this ethos: most DVAs are artists who've established a working relationship with MIT. Similarly, our new, ongoing collaboration with the MIT Museum features MIT faculty and artists identified through a prior CAST project. As a result, every CAST project has its own trajectory, outcomes, and means of dissemination, varying as is appropriate from on-campus venues to web pages, from academic journals to board games, from international exhibitions to virtual spaces.

Some of the recently minted components of the current MIT arts landscape have benefited from "kick-starts" that CAST provided. For example, multiple CAST initiatives in Music Technology—a seminar series in 2012, several extended visiting artist residencies, funding for a Digital Instruments class, and MIT Soundings concerts—helped to provide proof-of-concept and momentum for Music Technology. Agnieszka Kurant, a 2017–18 CAST Visiting Artist, came to MIT to work with Boris Katz, Principal Research Scientist and Head of the InfoLab Group at MIT's Computer Science and Artificial Intelligence Laboratory, collaborated with graduate students in the Media Lab to create a "signature hack" for the Hacking Arts Festival, and was later selected by the List Visual Arts Center and MIT Building Committee to create two public artworks for MIT's Open Space. *Visualizing the Proton*, a project by physicists Richard Milner and Rolf Ent, animator James LaPlante, and filmmakers Chris Boebel and Joe McMaster, produced a documentary that has received more than 89,000 views; the team has expanded the work with a new animation, *Visualizing the Nucleus*, and plans more. The hybrid class Vision in Art and Neuroscience, first supported by CAST in 2018, is a regular offering of the curriculum in Brain and Cognitive Sciences.

We believe strongly that this momentum will continue in what Visiting Artist Albert Figurt called the "constant collateral overstimulation" of the MIT environment. Several projects from the past year explore the power of the visual to inform and illuminate scientific knowledge, including the classes The Art and Science of Time Travel, Drawing Human Experience, and Creating Art—Thinking Science, as well as the film *Water Wars* and the graphic novel *A Paradigm Shift in Infectious Diseases*. Whereas these projects diffuse specialist knowledge into public understanding, others—Memory Atlas for Repair, "People's Poetry Archive," and Jackson 2bears' immersive reconstruction of the Haudenosaunee longhouse – gather overlooked examples of collective memory and Indigenous knowledge, bringing forward alternative paradigms from the past that, we hope, will indelibly enhance future innovation.

Yet another trend in the current projects is the pursuit of productive connections between digital cultures and ancient ways of making—whether in Chloe Bensahel's understanding of textiles as the archetypal predecessor of binary computation, Jordan Rudess's real-time improvisation with a musical AI, or Hiroshi Ishi's creation of "compassionate" technologies that invoke the presence of lost loved ones.

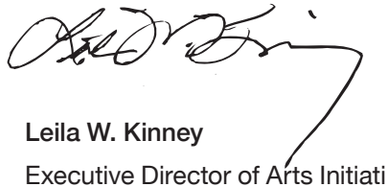
More than a decade ago, we characterized CAST itself as an experiment designed to unleash creativity on campus, recognizing that contemporary art forms are not constrained by discrete disciplines, autonomous media, or singular material processes. The results have far exceeded our expectations, and we can only imagine the possibilities that lie ahead within the expanded field of artistic activity at MIT.

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

About 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.

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.

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.

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.

2012–24 Program Statistics

9,400+ students participated in classes and workshops.

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

475+ visiting artists engaged with students during **420+** class visits.

52,500+ people attended programs in person, and another **159,345** joined via live web streams.

255 collaborative 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

Office of the Provost
List Visual Arts Center
MIT Libraries
MIT Museum

Office of the Vice President for Research
MIT.nano

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

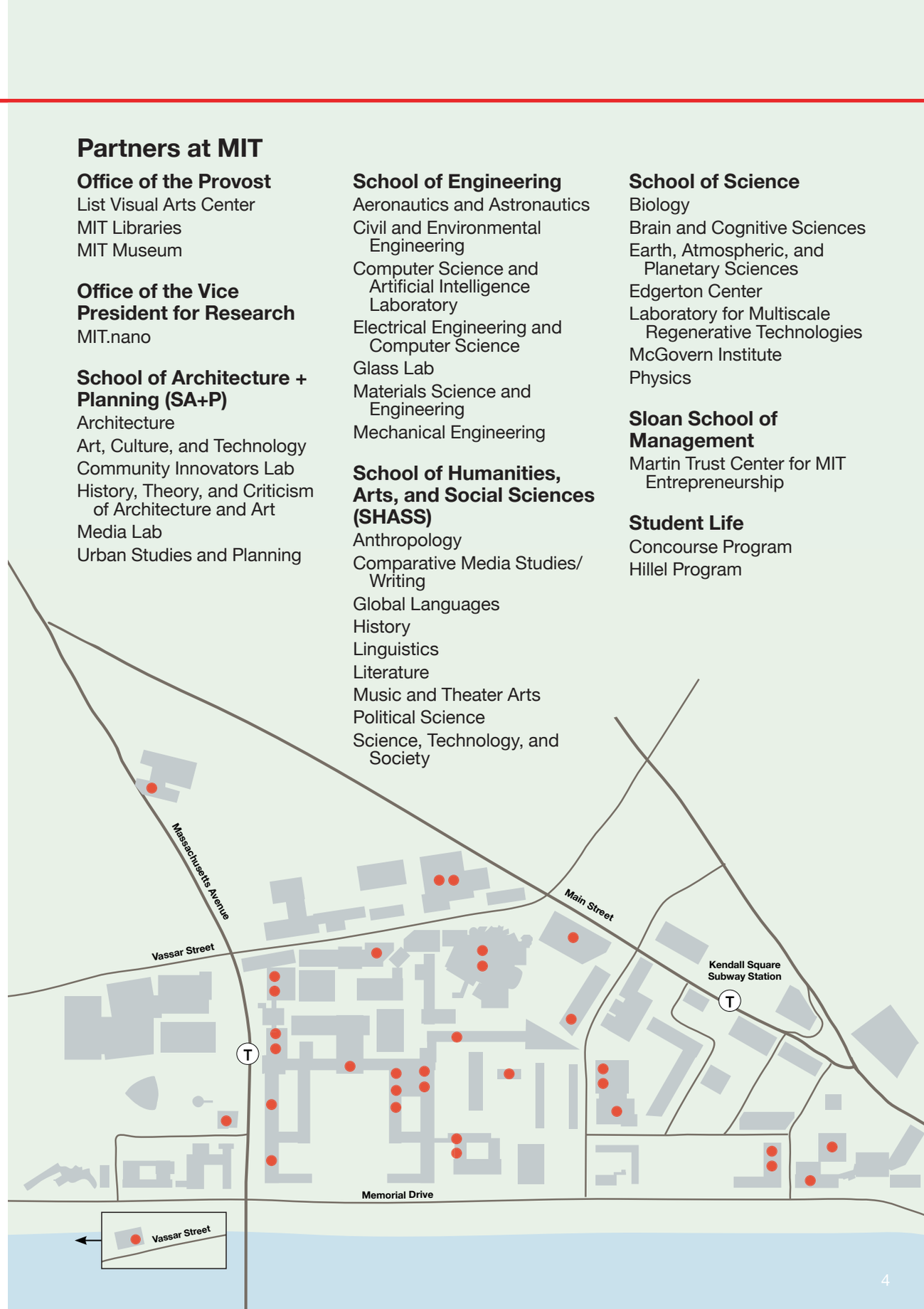
School of Engineering
Aeronautics and Astronautics
Civil and Environmental Engineering
Computer Science and Artificial Intelligence Laboratory
Electrical Engineering and Computer Science
Glass Lab
Materials Science and Engineering
Mechanical Engineering

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 Sciences
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



Past and Future Technology

With its long history of pioneering technological advancements, MIT is home to the most critical conversations that question what it means to live with and alongside machines that are growing increasingly intelligent.

Creative professionals discussed the potential and pitfalls of generative AI, and how it will shape the fields of art and design in the years to come, in a lively panel discussion co-presented by CAST as part of the annual meeting for the Council for the Arts at MIT (CAMIT). In a fascinating collaboration between AI and the human, renowned musician Jordan Rudess worked with MIT professor Joseph Paradiso, director of the Media Lab's Responsive Environments Group, to create an AI model trained on his unique musical style and technique. Both musician and machine performed in an improvised duet, generating new and unique music that interacted in real time.

At the same time, new tech always exists within longer historical lineages, and artists also explored—and revamped—dated technologies. ACT professor, artist, and writer Judith Barry's *HA®DCELL* is a damaged wooden crate full of computer discards that appears to achieve an uncanny sentience. First exhibited in 1994 and now being reimagined for our current moment of artificial intelligence and ubiquitous "smart technology," the work investigates the many lives of technology. Agent provocateur and CAST Visiting Artist Albert Figurt also tested creative uses of technology, new and old. In his work, he transforms the computer screen, the site of endless clicking and scrolling, as the venue for conceptually rigorous "screencast" or "desktop movies," while also collaborating with MIT professor Nick Montfort on the "retroduction," a new screencast using old technology from the late 1990s.

Continually probing both the wonder and complexity of human-computer collaborations, these projects ultimately demonstrate how technology can fuel creativity and innovation in ways that were previously unimaginable.

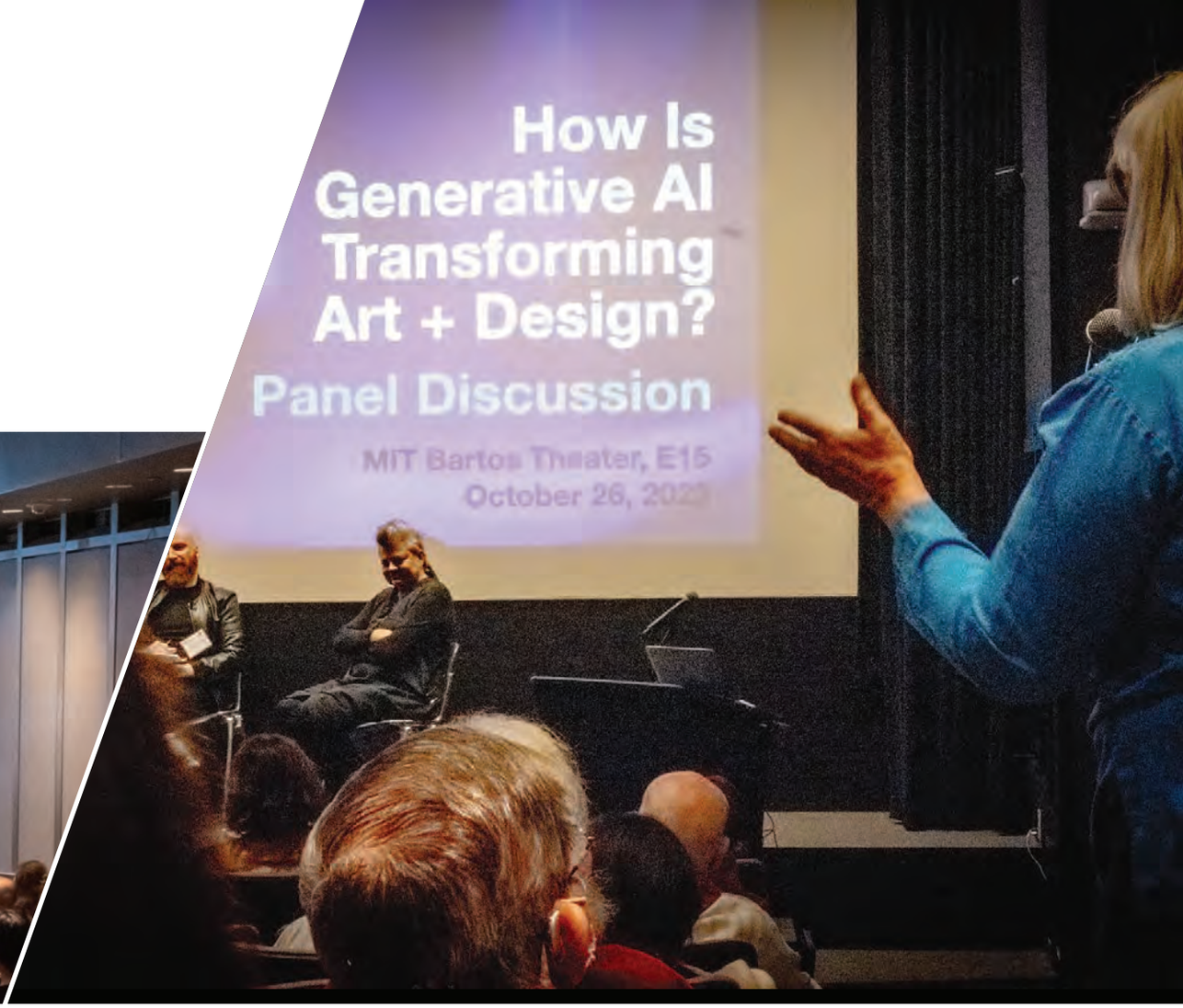
In This Section

Image: Visiting Artist Albert Figurt's "Desktopia" workshop, 2023. Credit: Philana Brown/MIT.

How Is Generative AI Transforming Art + Design?

Is AI an enemy or an ally in the creative process?

Panel Discussion: *How Is Generative AI Transforming Art + Design?*
MIT Bartos Theater, Wiesner Building E15, October 26, 2023



There's no doubt that AI will shape the course of our shared future and that the outcomes will be far beyond our control. However, at this early stage in the technology's history, is it possible to bring intentionality and criticality to what we input—retaining a degree of creative agency and shifting the outputs in the direction of human and planetary flourishing?

Generative AI, the use of algorithms to transform vast amounts of data into new content, poses a unique set of challenges and opportunities for creative professionals. To assess the possibilities and problems posed by the technology, a major panel discussion was co-presented by the Center for Art, Science & Technology (CAST) as part of the annual meeting for the Council for the Arts at MIT (CAMIT), focusing on the future of generative AI and its impact on art and design.

"This is an opportunity for us to think about what it means to be human."

– Ziv Epstein

To tackle this vast subject, the event moderator Onur Yüce Gün proposed three themes to the panel consisting of multimedia artist and social science researcher Ziv Epstein, MIT professor of architecture Ana Miljački, and artist and roboticist Alexander Reben.

The themes of "emergence," "embodiment," and "expectations" were put forward as ways to understand how AI tools might facilitate the first seeds of an artwork, how the technology might interface with human physicality, and ultimately the degree to which generative AI will impact our world, both in terms of greater enablement and existential risk.

The panel served as an exploratory space to give voice to the hopes, concerns, and ideas sparked by this unpredictable competitor, leading to the question of where the human being ends and the machine begins. As the outcomes of algorithms are increasingly indistinguishable from our ways of making, we are prompted to look deeper into the specificity and vitality of the human creative act. Could this be the secret to what defines our species?

Images: Generative AI panel discussion, MIT Bartos Theater, October 2023. Credit: Heidi Erickson/MIT.

2023–24 CAMIT Annual Meeting

Ziv Epstein, SM '19, Postdoctoral Fellow, Stanford Institute for Human-Centered Artificial Intelligence

Onur Yüce Gün, SM '06, PhD '16, Director of Computational Design, New Balance

Ana Miljački, Professor of Architecture, MIT; Director, SMArchS Programs and SMArchS AD Program

Alexander Reben, MAS '10, Artist-in-Residence, OpenAI

Albert Figurt

The desktop cinema of screentime

Lecture: Art, Culture, and Technology (ACT) Artistic Inquiry Luncheon Series, MIT Wiesner Building E15, November 6, 2023

Class: 21W.752 Making Documentary: Audio, Video, and More, The Exchange, MIT Museum, December 5, 2023

Presentation: “Desktop Cinema,” MIT Open Documentary Lab Fellows Campus Retreat, MIT Wiesner Building E15, December 7, 2023

Workshop: “Guerrilla Filmmaking,” MIT Building E38, January 9 and 11, 2024

Workshop: “Desktopia,” MIT Theater Arts Building W97, January 20, 2024

Before you think about cutting down your screen time, it’s worth considering the artistic and socio-anthropological potential of those hours spent lost in online deep dives. Italian video-artisan and new media scholar Albert Figurt (aka Alberto Angelini) has refined the format of the “desktop movie” to a fine art. Alternatively described as a screencast movie, these lo-fi yet conceptually complex mini-films take place within the borders of a computer screen, following the erratic yet lyrical gestures of an unseen user—a protagonist characterized by their style of scrolling and multilayered browser windows.

“My teaching goal was to help students pass through this tunnel of the humanities using the arts to transform STEM into STEAM.”

– Albert Figurt

Figurt first arrived at MIT as a Fulbright Scholar, and previously collaborated with CAST Visiting Artist and MLK Scholar Lupe Fiasco on the music video for *Precious Things*. As a 2023–24 CAST Visiting Artist, he collaborated with MIT professor of digital media Nick Montfort on a screencast movie produced using historical computing technology from the late 1990s. The wit and virtuosity of Figurt’s work brings awareness to the issues of privacy, loneliness, and addiction that arise from living life online; however, his practice is innately social and grounded in the physical world. Living alongside students in MIT’s New Vassar residence hall has been an important source of artistic inspiration, as has teaching in the MIT Comparative Media Studies/Writing program and leading MIT workshops for “guerrilla filmmakers” of all disciplines.

For Figurt, the fact that anyone with a smartphone can make and share a movie is an incitement to ever-greater originality. With the entire content of the internet at your fingertips, the narrative possibilities are technically endless; likewise, the uniquely self-referential format of the screencast movie is ideally suited to representing and deconstructing our enmeshed relationships with technology. Figurt views the “constant collateral overstimulation” of the MIT creative culture as a reflection of his own creative practice, and he has found the ideal intellectual counterpart in Montfort—a fellow obsessive in the creative uses of computing. Figurt’s residency is a reminder that the history of innovation would not be the same without playfulness and a touch of anarchism; at the same time, he proves that techno-disruption can be infused with humanity, humor, and compassion.

Images: “Desktopia” workshop, MIT Theater Arts Building W97, 2024. Credit: Philana Brown/MIT.

2023-24 Visiting Artist Grant

Albert Figurt
2023–24 CAST Visiting Artist

Nick Montfort
Professor of Digital Media, Comparative Media Studies/Writing, MIT

Jordan Rudess

AI-enhanced infinite music making

Class Visits: MAS.837 Principles of Electronic Music Interfaces, 21M.370/21M.570 Digital Instrument Design, 21M.385 Interactive Music Systems, 21M.470/21M.517 MIT Laptop Ensemble, 21M.065 Introduction to Composition, April-May 2024

Demonstration: Redefining Virtuosity: AI musical performance with Jordan Rudess, Media Lab Members Week, MIT Media Lab, April 11, 2024

Student Event: Arts Scholars Demonstration and Dinner, MIT Building 6, May 7, 2024

The Responsive Environments Group at the MIT Media Lab develops sensor networks to augment and mediate human perception, producing heightened forms of interactive experience and expression. Directed by Professor Joseph A. Paradiso—whose side interests include building music synthesizers—the group has a guiding interest in live performance and the sensory feedback loops between musicians, instruments, and audiences.

To sound out the performative possibilities of generative AI, the group partnered with globally renowned keyboard player and technologist Jordan Rudess. Recognized as a master cross-genre improviser, Rudess envisioned an instrument that would enable him to improvise with multiple versions of himself, live on stage. Trained in real time as Rudess plays, an AI model developed by MIT researchers orchestrates the composition and instantaneously predicts how the performance will develop. Connected via wearable interfaces and actuators, Rudess reprograms the machine learning model through continual improvisation, creating a cycle of virtuosity between artist and instrument.

“If you can’t improvise, it’s time to start learning how.”

– Jordan Rudess

During a series of visits to campus, Rudess shares his perspectives on music technology, performance, and technique through workshops, guest lectures, and a collaborative concert. Meanwhile, Rudess has been working closely with Responsive Environments research assistants Lancelot Blanchard and Perry Naseck, whose areas of expertise encompass the orchestration and choreography of large interactive systems, from the engineering of musical instruments to the development of kinetic light sculptures and installations. At a time when the intimacy and immediacy of live performances seems increasingly displaced by technological mediation, the Responsive Environments Group aims to tune a productive symbiosis between the musician and their AI extension, seeking not to replace human agents but to unlock new creative opportunities.

The results of the group’s experiments have profound implications for our experience of live music, whether a jam session at a bar or an arena-scale concert. The process of improvisation actively trains the AI model away from derivation and toward imagination, using the tools of prediction to recompose the future into unknown outcomes. Rather than rendering the performer and audience passive, the concert experience becomes all the more “live”; a form of infinite music making unlike anything yet experienced.

Images: (left, top) Jordan Rudess performs at the MIT Media Lab Members Week. Credit: James Day/MIT. (left, bottom) Jordan Rudess gives a demonstration to Arts Scholars. Credit: Rayna Yun Chou/MIT.

2023–24 CAST Visiting Artist Grant

Jordan Rudess, 2023–24 CAST Visiting Artist

Lancelot Blanchard, Research Assistant, Responsive Environments Group, MIT Media Lab

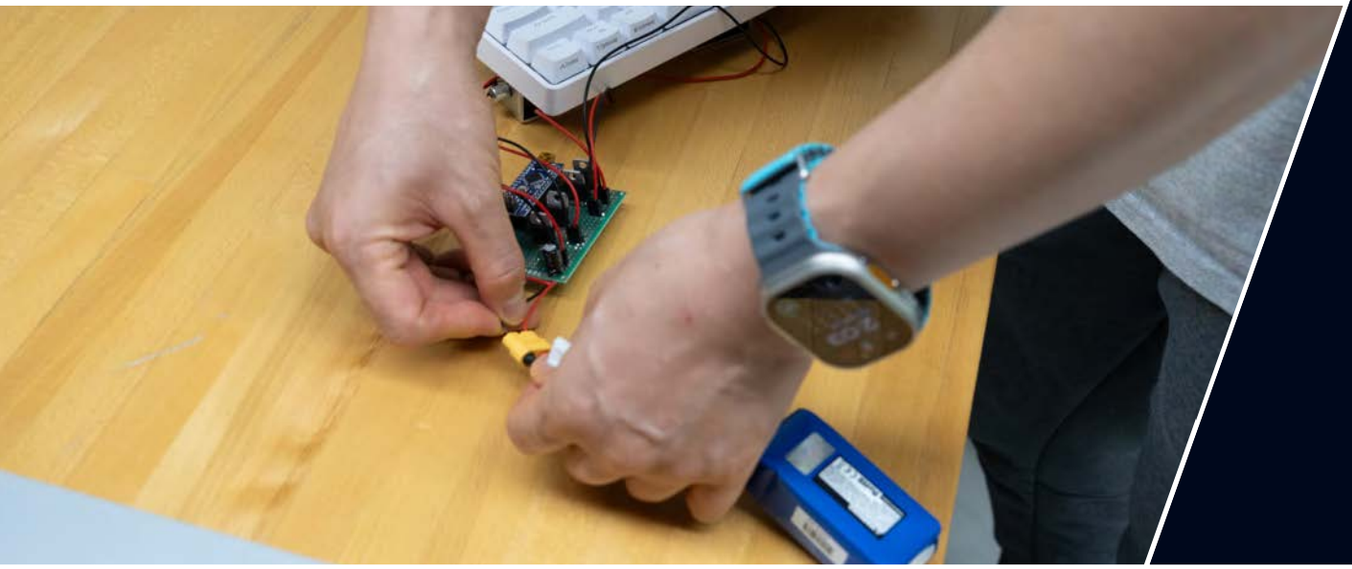
Perry Naseck, Research Assistant, Responsive Environments Group, MIT Media Lab

Joseph A. Paradiso, Alexander W. Dreyfoos (1954) Professor in Media Arts and Sciences; Associate Academic Head, Program in Media Arts and Sciences

HA®DCELL

The animate afterlife of obsolete technology

Research: Redesigning, updating, and fabricating new *HA®DCELL* devices, 2023–24



When *HA®DCELL* first crashed to Earth back in 1994, viewers were accustomed to technology that was heavy, glitchy, and manifestly material. These days, we're more likely to consider technological progress in terms of ever-increasing ephemerality. Data evaporates into the cloud, one device is master of any number of applications, and our bodies become hosts for seamless digital interfaces.

The evolution of Judith Barry's sculptural installation exploring the life, death, and afterlife of technology reflects this exponential shift over the last two decades, but calls into question the tech-utopianism of infinite upgrades. *HA®DCELL* reminds us of what it is to be human: the software of consciousness is continuous with the hardware of our physical bodies.

First exhibited in *Crash: Nostalgia for the Absence of Cyberspace* at Thread Waxing Space in New York, and included in MoMA's 1995 landmark exhibition *Video Spaces: Eight Installations*, *HA®DCELL* consists of a wooden crate containing a tangled mass of computer discards and obsolete devices. How it has arrived in the gallery space is hard to say—but it didn't have a soft landing. Partially broken apart, the damaged crate moves and shifts slightly as you approach; its apparent sentience invites further investigation and the more you spy inside, the more frenetic the interior activity. Inside the crate there seems to be a mind, activated by your presence yet hampered by hardware. This is AI, but not as we know it.

"The machines we make also make us."

– Judith Barry

The animation of *HA®DCELL* was always reliant on an audience, and now the installation—a dormant time capsule waiting to be awakened—has been reimagined for the new era of big tech domination and the race to scrape every last digit of data. For the original *HA®DCELL*, the impression of sentience was achieved through the use of sensors programmed to trigger a "random motion" board which activated several of the 37 mechanical and video devices inside the crate. The new iteration involves redesigning, updating, and adding new devices that are reliant on computation rather than mechanics.

The latest advances in tech are harnessed to activate the lost and forgotten, and the inherent hubris of the project is part of its sense of humor; cutting-edge activation tools soon become as obsolete as the objects in the box. Playful and melancholy, nostalgic and anticipatory, *HA®DCELL* invites us to become aware of our inseparability from the machines we make—and which, in turn, make us.

Images: (left) *HA®DCELL* prototype. Credit: Heidi Erickson/MIT. (right) Judith Barry's *HA®DCELL* in *Video Spaces; Eight Installations* at MoMA in 1995.

2023– Mellon Faculty Grant

Judith Barry, Professor of Art, Culture, and Technology, MIT

Felipe Jannarone, Studio Assistant

Reina Suyeon Mun, Designer and Artist, SMACT '23

Jesus "Chucho" Ocampo, Artist and Architect, SMACT '21

Hyun Parke (Hyun Woo Park), Designer and Artist, SMACT '23

Diego Yanez-Laguna, Research Affiliate and Fabricator, SMACT '24

John Z. Zhang, PhD Candidate, Mechanical Engineering, MIT

Picture This

While scientific knowledge is commonly represented in tables and graphs, charts and data, researchers also see the value in harnessing the power of the visual. Through images, we distill complex concepts into more digestible and engaging forms, making them accessible to the widest possible audience.

In Water Wars, Nobel Prize-winning MIT professor of economics Abhijit Banerjee and CAST Visiting Artist Sarnath Banerjee created an entertaining illustrated public lecture—replete with animation, sound, and drawings—to introduce audiences to the themes of water, greed, and economic growth in South Asia. An ongoing collaboration between MIT engineering professor Lydia Bourouiba and comics artist and former cancer researcher Argha Manna resulted in the graphic work, *A Paradigm Shift in Infectious Diseases*, which explained how airborne pathogens travel.

MIT students also had the chance to put their visual skills to use. Artist and MIT lecturer Tobias Putrih joined forces with Vladimir Bulović, director of MIT.nano, to lead a cross-disciplinary class, Creating Art—Thinking Science, which examined the connections between art inquiry and scientific research through visual thinking strategies and emerging technologies. In the course, Drawing Human Experience, students learned how to use drawing as a tool of anthropology, generating new kinds of cultural insights and sharing individual perceptions.

Whether highlighting important issues like climate change or public health or simply conveying an interior experience, visual storytelling raises public awareness, increases dialogue, and creates a sense of wonder and appreciation for the nuances of a world growing ever-more complex.

In This Section

Water Wars

A Paradigm Shift in Infectious Diseases

Creating Art—Thinking Science

Drawing Human Experience

Image: Participants engage with a student project in the final critique of the class Creating Art—Thinking Science. Credit: Heidi Erickson/MIT.

Water Wars

Economics made uneasy

Films: ***Water Wars: The Eternal Swamp*** **and** ***The Land of Good Intentions***

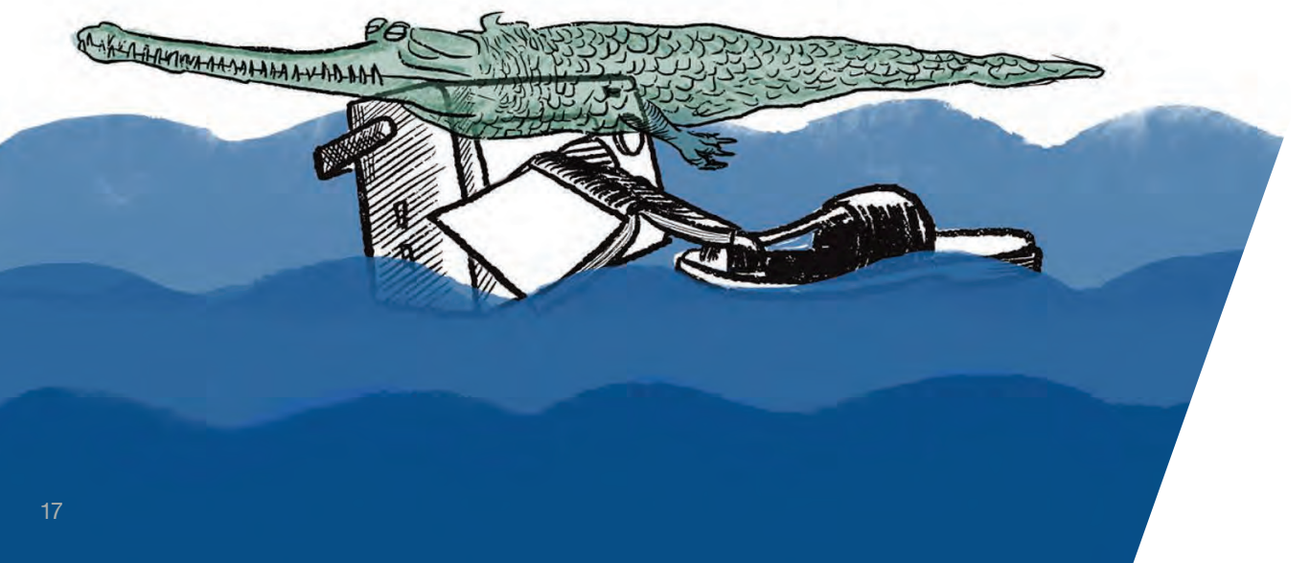
Sarnath Banerjee tells stories through films and graphic novels; MIT professor Abhijit Banerjee is a Nobel Prize-winning economist. Both believe that storytelling is essential for communicating the impact of complex global processes on individual human lives. What would happen if economic principles and statistics were translated into images and anecdotes? Would top-down power structures persist if specialist knowledge was diffused into public understanding?

The artist and the economist decided to find out. *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty* (2011) by Professor Banerjee and the graphic novel *All Quiet in Vikaspuri* (2015) by Sarnath Banerjee share themes of growth, greed, power, and short-termism. The convergence of these research interests sparked a series of conversations between the two men, moving freely between discussion of global issues and personal interests—from strategies for poverty alleviation to the crimes of corrupt politicians to the experience of growing up in Kolkata, India. Now they have translated those conversations into an initiative to develop a more accessible language for the social sciences: *Water Wars*, a series of short films combining scholarship, graphic art, and animation.

“The premise of the project is that economists are too pompous.”

– Sarnath Banerjee

Speaking from the relaxed setting of his home in Kolkata, Abhijit Banerjee guides the viewer through the conditions and policies that underlie a nexus of environmental and political crises in India. Each episode, interwoven with animated parables, contains the shared element of water. *The Land of Good Intentions* explores the ripple effects and protests against the 2020 Farm Bills in the context of the overproduction of rice in the Punjab and the depletion of groundwater; *The Eternal Swamp* addresses the crisis of flooding in Kolkata, exacerbated by corner-cutting property developers. The format is inspired in part by the theatrical scientific lectures that attracted 19th-century audiences, embracing eccentricities and drawing attention to the inherent “fabulation” of economic models.



2019–24 CAST Visiting Artist Grant

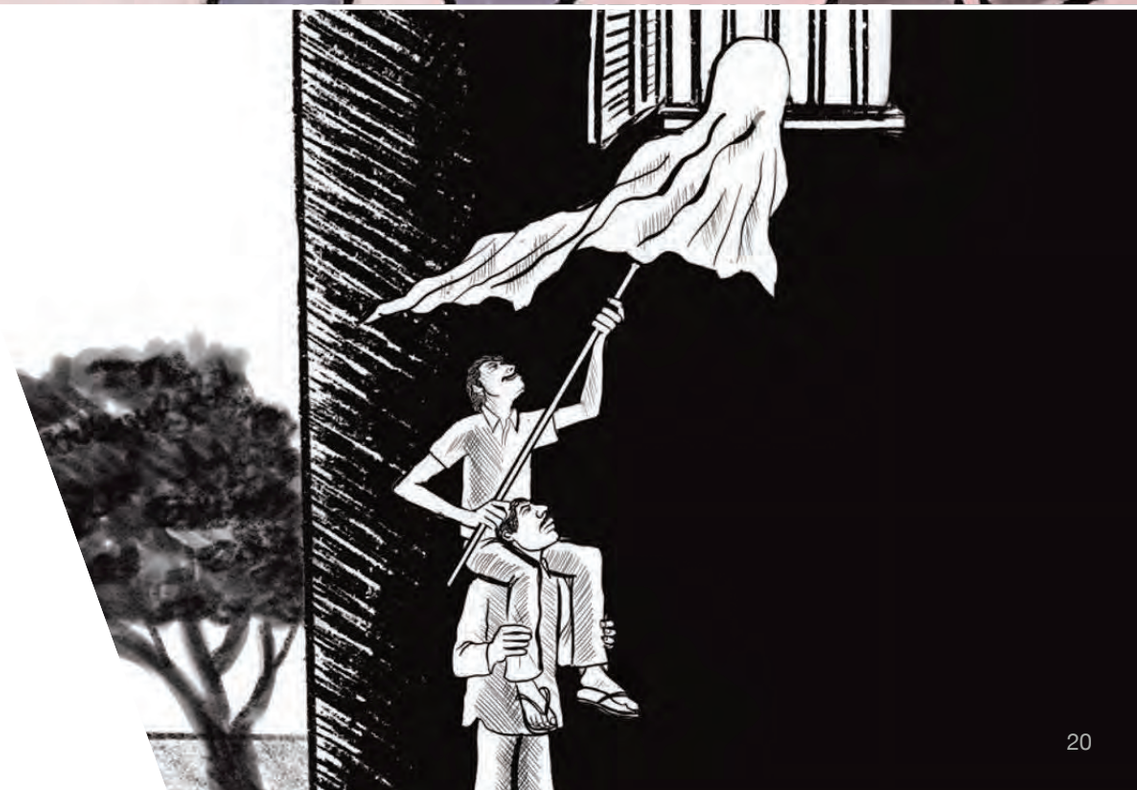
Abhijit Banerjee, Ford Foundation International Professor of Economics, MIT

Sarnath Banerjee, Artist/Filmmaker/Graphic Novelist, 2019–22 CAST Visiting Artist

Niusha Ramzani, Artistic Assistant

By presenting a new perspective on water-related intrigues in rural communities and urban enclaves, the films reveal the impact of transnational forces upon everyday life. Through wit, visual delight, and compelling storytelling, Professor Banerjee and Sarnath Banerjee hope to re-enchant the topic of economic growth—enchantment, however, is not the same as escapism. Once captured by the subject matter, audiences will find it hard to forget the facts of social and economic inequality. By combining the resources of the arts and the social sciences, the lectures have the potential to cut through complacency, generating energy and motivation for targeted policy change.

Images: (previous page, top) Sarnath Banerjee presents the project at a lecture on campus in 2019. Credit: Heidi Erickson/MIT. (previous page, left and all remaining images) Stills from *Water Wars*: *The Eternal Swamp* and *The Land of Good Intentions*. Credit: Sarnath Banerjee.



A Paradigm Shift in Infectious Diseases

The fluid dynamics of comics

Exhibition: ***A Paradigm Shift in Infectious Diseases,*** **Rotch Library Gallery, MIT Building 7, December 4–15, 2023**

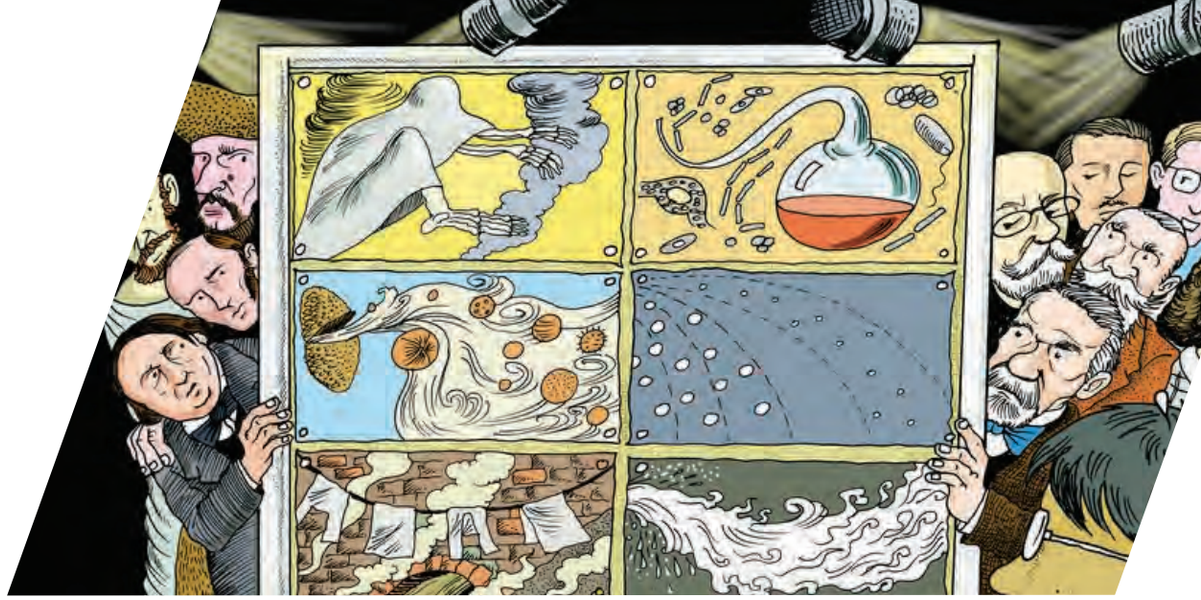
Panel Discussion: ***Exhibition on the Scientific Method and Science Advances via Comics and Illustrations,*** **The Nexus, Hayden Memorial Library, December 5, 2023**

Class: 1.063-1.631/HST.537/2.250 Fluids and Diseases, Spring 2023

At a time when misinformation is rife and we live in anticipation of potential pandemics, the pursuit of scientific objectivity is a source of hope for many. The falsification principle means that the history of science amounts to a series of dramatic shifts in how we understand ourselves and the world—and that's the narrative tension at the heart of a creative new science communication initiative, *A Paradigm Shift in Infectious Diseases*.

When Lydia Bourouiba decided to convey her research to a wider audience, she knew that she needed a language that would resonate beyond the scientific community. The highly visual nature of her work modeling the fluid dynamics of disease transmission, combined with the inherent human interest of the field, led her to the medium of comics as a means of accessible and intelligent communication.

Together with Argha Manna, a comics artist and former cancer researcher from Kolkata, India, Bourouiba has pursued a series of projects translating complex scientific theories into comics. Following the success of *Be Aware of Droplets and Bubbles* (2021), published in *Annals of Internal Medicine, A Paradigm Shift in Infectious Diseases* aims to clarify confusion about the transmission mechanisms of airborne pathogens. The medium itself turns out to be ideally suited to conveying the importance of crossing boundaries between fundamental physical processes, biology, and physiology. The graphic grid provides an ideal framework for these entangled concepts, as well as a clear sense of how theories of disease transmission have progressed over time—an evolution of understanding that is no longer confined to the lab.

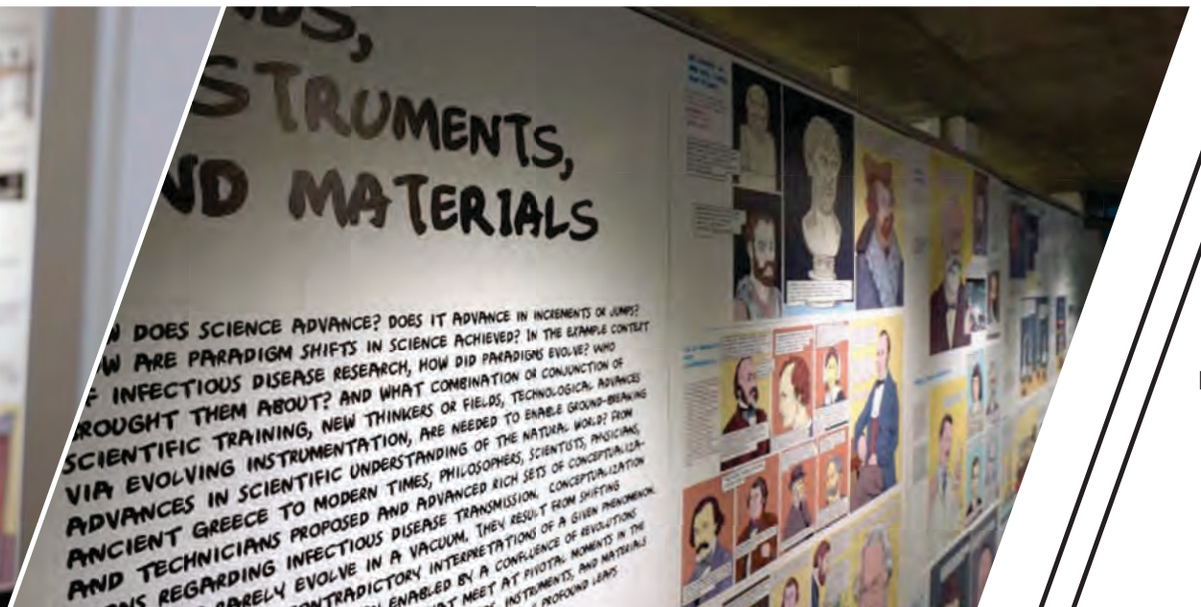


"The evolution of ideas on infectious diseases is far from solely a school of medicine effort."

– Lydia Bourouiba

Images: (left) Argha Manna and Lydia Bourouiba at the exhibition of *A Paradigm Shift in Infectious Diseases.* Credit: Bruce Petschek. (center) Installation view of *A Paradigm Shift in Infectious Diseases* exhibition. Credit: Bruce Petschek. (right) *A Paradigm Shift in Infectious Diseases* Comics. Credit: Argha Manna and Lydia Bourouiba.

By using visual storytelling to communicate how the scientific method and technological advances have enabled breakthroughs in human health, *A Paradigm Shift in Infectious Diseases* seeks to advance public understanding and cultivate curiosity in contemporary research. What would the world look like if scientific data were as compelling as conspiracy theories? Perhaps comics hold the answer.



2022–23 Faculty Grant

Lydia Bourouiba, Associate Professor of Mechanical, Civil, and Environmental Engineering, and Institute for Medical Engineering and Science, MIT

Argha Manna, Comics Artist, Humanities and Social Sciences, IIT Gandhinagar

Creating Art—Thinking Science

What does it really take to cultivate dialogue between disciplines?

Class: 4.373/4.374 Creating Art—Thinking Science, Fall 2023

Images: Students present their projects during the final critique of Creating Art—Thinking Science, 2023. All images credit: Heidi Erickson/MIT.

The Art, Culture, and Technology (ACT) program at MIT exemplifies the Institute's history of productive collaboration between the arts and the sciences, and the class Creating Art—Thinking Science is one of the program's most innovative offerings. Open to undergraduates and master's students of any area of study, the class demonstrates how the relationship between disciplines might play out at a time of exponential technological growth.

The class was initiated by Tobias Putrih, lecturer in ACT, and draws upon the unparalleled resources of MIT.nano—the cross-departmental research facility that grants the MIT community access to the most advanced nanotechnology equipment. The class is co-taught by Vladimir Bulović, founding director of MIT.nano, who invites participating students to take advantage of the facility's dedicated lab space for nanoscale visualization and fabrication. In the hands of artists, devices for discovering nanostructures and manipulating atoms become tools for rendering the invisible visible and deconstructing the dynamics of perception itself.

Now in its third year, Creating Art—Thinking Science has generated a series of artistic projects created in collaboration with MIT.nano research groups and technicians. Artworks ranging from a minimalist silicon wafer to an experimental attempt to make vegetable soup in the cleanroom reveal a creative ethic both rigorous and anarchic. As part of MIT.nano's five-year anniversary celebration, a selection of these works is presented in the exhibition *zero.zerozerozerozerozeozerozerozeroone* (named for the numerical notation for one nanometer).

"Successful collaborations between artists and scientists always happen on a very personal level."

– Tobias Putrih

True to the spirit of the scientific method and artistic iteration, the class is envisioned as a work in progress; a set of propositions and prototypes for productive dialogue between scientists and artists. It's clear that collaboration can serve to advance and humanize new technologies, and this takes some fine-tuning in practice. Combining high-flying imagination with the grounding of pragmatism, Creating Art—Thinking Science provides a model for training the next generation of creative technologists.

2023 CAST Cross-Disciplinary Class Grant

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

Aubrie R.M. James, SMACT '24, Teaching Assistant

Tobias Putrih, Lecturer in Art, Culture, and Technology, MIT

Ardalan SadeghiKivi, MArch '23, Artist, Designer, and Programmer

Drawing Human Experience

Mining the self with mind and hand

Class: 21A.513 Drawing Human Experience, Fall 2023

Public Presentation: Lynda Barry, MIT Museum, November 3, 2023

We tend to think of drawing as a means of creative expression or technical visualization—but might it also be understood as a mode of research? Co-presented by MIT Anthropology and the MIT Museum Studio and Compton Gallery, the class Drawing Human Experience introduces fundamental drawing techniques as tools of anthropological inquiry.

In addition to the guidance of MIT professor of anthropology Graham M. Jones and visual artist and MIT Museum Studio founder and manager Seth Riskin, students received a masterclass in intuitive drawing from award-winning author and artist Lynda Barry, whose hybrid graphic memoir and manual, *Picture This*, was featured as a central text on the syllabus.

Through exercises in conjuring images from life and imagination, students investigated the human instinct for drawing and what it reveals about connections between mind, hand, and eye. The MIT motto of *mens et manus*, mind and hand, is typically associated with meticulous technical proficiency—but in this case, students were invited to discard expertise and focus solely on cultivating openness of mind.

As Barry sees it, the capacity to let go of preconceptions and be led by innermost instincts is a skill that most people put aside after childhood. The risks, she affirms, are worth it. By trusting the images hidden in the recesses of personal experience and allowing the creative process to be infused with a sense of humor, it's possible to achieve exceptional feats of visualization with the most basic tools: a pencil and paper.

"Watching people draw with their eyes closed is fantastic. It's like being in the room with everyone dreaming."

– Lynda Barry

From freeform imaginative drawing to investigations into the complex schematics of technical diagrams, students sharpened their skill sets for converting abstract ideas into compelling representations that could be shared and developed in collaboration with others—the essential skill of the scientist or designer. It turns out that the artist's aptitude for imaginative projection is equally shared by the technical innovator, connected in one gesture by hand and mind. Could this be a clue to the most fundamental anthropological question: what does it mean to be human?

Images: Students present their work during the final critique of the Drawing Human Experience class. All images credit: Philana Brown/MIT.

2023 CAST Cross-Disciplinary Class

Lynda Barry, Cartoonist and Associate Professor of Interdisciplinary Creativity, Art Department, University of Wisconsin–Madison

Graham M. Jones, Professor of Anthropology, MIT

Seth Riskin, Senior Manager, MIT Museum Studio and Compton Gallery

Public Memory

Landscapes, music, bodies, photographs, and written documents all tell stories about the past. How do we preserve and commemorate our shared histories?

Many of these works illuminate painful pasts, with an eye toward collective healing and a more just future. *Memory Atlas for Repair* by Delia Duong Ba Wendel, MIT Spaulding Career Development Assistant Professor of Urban Studies and International Development, revisits a 1968 MLK Jr. Memorial Exhibition at MIT that commemorated the civil rights work of Dr. Martin Luther King Jr. after his assassination, as a way of reckoning with ongoing displacement and oppression enacted by urban design and planning. *From Wetlands to Waste*, produced by MIT professor of anthropology Christine J. Walley, filmmaker Chris Boebel, and media artist Jeff Soyk, is a new documentary on environmental activism spearheaded by Latina leaders, highlighting objects preserved by residents of a steel mill community in Chicago. Anne Whiston Spirn, MIT Distinguished Professor of Landscape Architecture and Planning, and urban designer and filmmaker John Moody collaborate on *Making Change: In Place Over Time*, a film that documents how design thinking can impact issues of pollution, poverty, and racism in West Philadelphia.

Other projects preserve important artifacts of culture, the artworks that left an indelible imprint on the hearts and minds of generations. “The People’s Poetry Archive” was inspired by the Black feminist poet and educator June Jordan’s vision of “a people’s poetry.” Initiated by MIT professor and Distinguished Chair of the Humanities Joshua Bennett, the archive digitally preserves canonical and contemporary poems from across the African diaspora. In MIT music professor Evan Ziporyn’s solo concert *Moondog, Riley, Glass*, the composer reinterpreted canonical pop songs for solo clarinet, testing the conventional distinctions between the avant-garde and the mainstream.

Remembering the past is vital for shaping our identities, addressing injustices, and inspiring new generations. In these projects, scholars, poets, musicians, filmmakers, architects, and urban planners come together to celebrate and mark history, recognizing that part of inventing the future lies in acknowledging the past.

In This Section

Image: Installation view of *Memory Atlas for Repair*. Credit: Melissa Isidor.

“The People’s Poetry Archive”

A living archive of African diaspora poetry

Performance: “The Life of the Spoken Word,” Cambridge Science Festival, MIT Museum, September 29, 2023

Performance: “The People’s Poetry Archive with Terrance Hayes,” Killian Hall, MIT, March 29, 2024

“The People’s Poetry Archive” is a public humanities project to digitally preserve canonical and contemporary poems from the global African diaspora, as well as historically under-theorized works in the realm of spoken word performance. Spearheaded by poet and scholar Joshua Bennett, Distinguished Chair of the Humanities at MIT, the initiative combines archival research with live events and contemporary work to create an unprecedented database that will continue to expand over time.

The idea for the project has its roots in the vision of “a people’s poetry” proposed by Black feminist poet and educator June Jordan, building upon the democratic ideals associated with the poet Walt Whitman. Through this lineage of poets, both radical and canonical, “The People’s Poetry Archive” takes the next step in ensuring that diasporic literature can be preserved and accessed by all.

While the foundation of the archive is a collection of the written word, gathering material in collaboration with university libraries, the project also encompasses multiple media, including video footage, interviews, and spoken word recordings. The process of collecting historical material is simultaneous with the selection of contemporary submissions, as well as live event programming which challenges the notion of the archive as a storehouse for the past.

As a resource for the people, both present and future, the creation of the archive represents an opportunity to address modern questions about the vitality and utility of poetry through cross-pollination between institutions and social scenes. Alongside collaborators including the renowned poets Terrance Hayes and John Murillo, Bennett is creating one of the most capacious living archives of the literary arts—setting a precedent for the digital humanities and uniting diasporic voices across time and place.

“Digital tools are an important way of taking up this ancient art form and getting it out to people who need it across the world.”

– Joshua Bennett

Image: *America Will Be* performance. Credit: Christian Padron, courtesy of The Strivers Row.

2023–24 Mellon Faculty Grant

Joshua Bennett, Professor of Literature; Distinguished Chair of the Humanities, MIT

Terrance Hayes, Professor of Creative Writing, New York University

John Murillo, Associate Professor of English, Wesleyan University

Making Change: In Place Over Time

Documenting the process of social and ecological restoration

Film: *Making Change: In Place Over Time*, Spring 2024

Anne Whiston Spirn has been working with neighborhoods in the Mill Creek watershed area of West Philadelphia since 1987, engaging generations of MIT students and faculty in a form of "action research" involving strategic design, planning, and education.

The West Philadelphia Landscape Project puts forward the imperative that ecological restoration cannot be addressed separately from the repair of low-income communities subjected to systemic racial injustice. Nearing a decade in incubation, the documentary film *Making Change: In Place Over Time* is a testament to the fact that it is possible to tackle these different factors simultaneously and synergistically—an approach that is all the more necessary as we face the exacerbation of social inequity due to climate change.

From its inception, the goal of the West Philadelphia Landscape Project has been to manage the Mill Creek watershed, both in terms of addressing water quality and sewage overflow and as a strategy to secure funds to rebuild neighborhoods. The initial phases of the project involved building community gardens and developing proposals for impactful reuse of vacant urban land. The project later evolved to include a longstanding education program for local middle schools, with a curriculum ranging from lessons in landscape literacy to learning technical skills in coding. Since then, the project has taken many different forms. Over time, its ideas and actions have been newly interpreted and brought forward by community leaders, students, teachers, and policymakers.

Whiston Spirn has documented these experiences through video interviews, as well as recording her own reflections. What started as a method to collect material for a book became an extraordinary collection of valuable footage; in collaboration with students and with the feedback of the MIT community, the interviews have been combined into a 60-minute documentary encompassing multiple voices speaking from across the decades.

"How do you restore the natural environment, repair inner-city communities, and empower youth?"

– Anne Whiston Spirn

2022 Fay Chandler Creativity Grant

John Moody, Urban Designer and Filmmaker

Ryan Saunders, Filmmaker

Anne Whiston Spirn, Cecil and Ida Green Distinguished Professor of Landscape Architecture and Planning, MIT

The film is as much about setbacks as success—by taking the long view, the ups and downs of the project cohere into a powerful narrative that proves what is possible. Interviews with MIT students, local educators, activists, and young people who have been shaped by the project reveal that the large-scale impact of any complex, multiyear project is slow, durational, and cumulative; time, as the title indicates, is an active ingredient in any landscape project. By documenting the wisdom gained through working in Mill Creek, Whiston Spirn and her team present a prototype of how to restore human settlements, both socially and ecologically—a process that requires patience, grit, and imagination.

Images: (previous page, top) *Holding Ground, Preventing Displacement from Gentrification.* (previous page, bottom) *When Learning Is Real, From School to Community.* (left) *The West Philadelphia Landscape Plan*, *A framework for Action.* (right) *In Search of the Buried River.* All images credit: Melissa Isidor.

Memory Atlas for Repair

Reparative action to build new futures

Installation: *Memory Atlas for Repair*, Building 9, MIT, March 2024

As an exhibition that is simultaneously a form of placemaking, *Memory Atlas for Repair* proposes a future for urban planning centered upon restorative racial justice.

The exhibition builds upon the legacy of the 1968 MIT exhibition that commemorated the civil rights work of Dr. Martin Luther King Jr., and enacts what Assistant Professor Delia Duong Ba Wendel describes as "memory justice": the process of reckoning with painful pasts for the purpose of civic reconstruction and long-term resilience.

At one level is an extension of Wendel's research examining how cities in the United States are managing reparation strategies in acknowledgment of racial harms, such as redlining and displacement through urban renewal. The installation revolves around three display "chandeliers" that communicate the history of unjust planning practices in the cities of Asherville, IN; Evanston, MA; and Providence, RI, documenting ongoing work conducted by students in the Planning for Peace research group.

As an exhibition that is simultaneously a form of placemaking, *Memory Atlas for Repair* proposes a future for urban planning centered upon restorative racial justice.

The interior walls of the installation present intersecting narratives of racial advocacy at the MIT Department of Urban Studies and Planning (DUSP). Carefully designed murals of images and quotations commemorate the activism and legacy of two recently passed DUSP faculty members, Mel King and Tunney Lee, while a parallel wall displays the 2020 Black DUSP Thesis—a student-led manifesto calling for a radicalized reappraisal of responsible planning practices, as well as a transformation of department culture to better represent communities of color.

The fixed elements of the exhibition are combined with temporary presentations of student artwork, including a film about the multi-city Civil Rights Immersion Trip that took place during IAP 2023. The exhibition's location in Building 9 at MIT is also conceptually relevant. By activating an otherwise underused common space, *Memory Atlas for Repair* draws attention to the process of placemaking and raises awareness of the role of student activism in bringing about change. Ultimately, the exhibition is about dialogue as much as documentation; by providing a platform for acknowledging traumatic pasts, it is an argument for the power of memory to shape reparative action.

Images: Installation view of *Memory Atlas for Repair* exhibition. All images credit: Ben Gebo.

"This is about affective placemaking—it's not just didactic. It's a place of community that speaks to urban futures."

– Delia Duong Ba Wendel

2022–23 Fay Chandler Creativity Grant

Delia Duong Ba Wendel, Spaulding Career Development Assistant Professor of Urban Studies and International Development, MIT

Planning for Peace research group, Department of Urban Studies and Planning, MIT

Evan Ziporyn Solo: *Moondog, Riley, Glass*

Channeling the connections between pop music and minimalism

Performance: Evan Ziporyn Solo: *Moondog, Riley, Glass*, Killian Hall, MIT, March 10, 2024

As a composer, musician, educator, and curator, Evan Ziporyn has long blended different styles and genres to critical acclaim, while also celebrating the work of other musicians. This ethos defines his curation of the *MIT Sounding* annual performance series, which launched this year's season with a solo clarinet performance celebrating the work of seminal American minimalist composers alongside selections from Ziporyn's 2022 album, *Pop Channel.*

"There has always been a porous, molecular relationship between pop music and high-end culture."

– Evan Ziporyn

Each section of the program has its own story. *Best Out of Three* (1968/2022) by Philip Glass was discovered by the composer's archivist in 2021. An exquisitely difficult series of seemingly infinite melodic and harmonic variations, it is perhaps unsurprising that the score remained unperformed until Ziporyn's decision to give the piece its premieres at Big Ears in 2022 and *MIT Sounding* in 2024—made playable as a clarinet solo through the use of multitrack recordings.

Multimedia composer Christine Southworth added another sensory layer to the performance with interpretative video, capturing the wildly expressive visual elements of Terry Riley's hand-drawn score: *Ki for Evan Ziporyn* (2022). As the title suggests, the piece was created to be premiered by Ziporyn, exemplifying the mutuality of the composer-performer relationship that has been a hallmark of Riley's career.

The self-portraits and dreamlike landscapes of Riley's visual imagination are starkly contrasted with the scores written by Louis B. Hardin (aka Moondog). The legendary blind composer, who gained a cult following in New York's avant-garde music scene in the 1940s and 1950s, wrote music in Braille. Ziporyn's new interpretation of Moondog's tribute to Benny Goodman, *Symphonique #6* (1969), is accompanied by Southworth's experimental graphics unfolding the minimalist score line by line.

Testing the conventional distinctions between the avant-garde and the mainstream, Ziporyn's arrangements of American pop music have more in common with minimalism than you might think. In *Pop Channel*, Ziporyn reworks songs by the likes of Joni Mitchell and Jimi Hendrix into virtuoso clarinet recordings that reveal the cross-connections of the American musical landscape over the last 50 years. Ultimately, the performance challenged the very idea of what it is to perform a "solo"—the singular musician on stage is expressive of the multitude.

Images: Evan Ziporyn performs with projections in MIT Killian Hall, March 2024. Credit: Caroline Alden.

2023–24 *MIT Sounding* Series

Dave Cook, Audio Engineer; Founder, Area 52 Studios

Nick Joliat, '10, MEng '12, Sound Designer

Christine Southworth, '02, Multimedia Composer

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

Southeast Chicago Archive and Storytelling Project: *From Wetlands to Waste*

History told digitally through material culture

Digital Archive: Southeast Chicago Archive and Storytelling Project: *From Wetlands to Waste*

History is often told from the viewpoint of the powerful. For most of us, however, history is bound up with everyday objects and the stories we tell that give them meaning. That is the premise of the online Southeast Chicago Archive and Storytelling Project, a collaboration between the Southeast Chicago Historical Museum and an MIT team led by professor of anthropology Christine J. Walley, filmmaker Chris Boebel, and media artist Jeff Soyk.

Home to a remarkable collection of materials donated by local residents, the all-volunteer museum is intended as a shared resource for the people of Southeast Chicago to explore their own history. The human practice of storytelling through material culture has collective resonance, and the digitization of the museum's archive has expanded its reach far beyond the city. With the guidance of Southeast Chicago community members and local media makers, the MIT team is creating a series of interactive documentaries or "storylines" that leverage the nonlinear format of the web platform to explore a new method of communicating history.

"We're using the non-linear possibilities of online environments to create immersive stories about objects that were donated by ordinary people. We're asking: what kinds of windows onto history might this offer?"

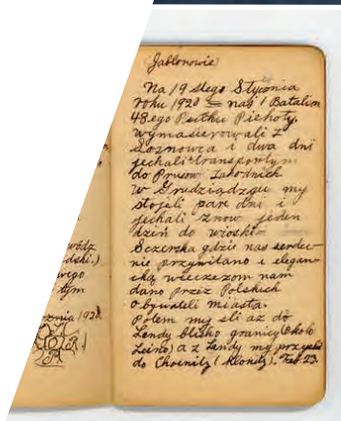
– Christine J. Walley

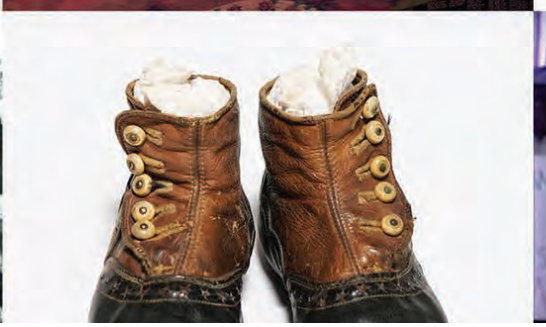
Weaving together text and image, oral histories, and archival film, each storyline opens a network of online pathways that invite the viewer to follow their own curiosity. The most recent storyline, *From Wetlands to Waste*, traces the environmental history of the former steel mill region through materials gathered and preserved by residents as the industry fell into decline. Told through objects ranging from protest signs to a jar of the pollutant "petcoke," the narrative circles around the post-industrial environmental activism spearheaded by Latina women.

The chronology of the storyline tracks back in time to the turn of the 20th century when the area was still dominated by wetlands, and forward to the contemporary activism against the new industry polluters that replaced the steel mills. Scrolling the narrative or moving laterally to learn about a specific object, the viewer gains a felt experience of daily life in this multiracial industrial community, including aspects that residents found both difficult and valuable.

The storyline ends by asking what new generations might hope for in an era of climate change—could the "wetlands to waste" trajectory be reversed, with ecological diversity restored and the region reactivated by new sources of employment? Whatever the future might hold, a greater understanding of the area's history is empowering. Through immersive and interactive storytelling, anchored by the meaning and intimacy of material objects, this method of storytelling is not about what is wasted, but what is saved.

Images: Stills from Southeast Chicago Archive and Storytelling project, Courtesy of the artists.





2022–23 Fay Chandler Creativity Grant

Chris Boebel, Filmmaker; Manager, Multimedia Development, MIT Open Learning; Producer, MIT Video Productions; Instructor and Co-Developer, MIT Documentary Video (DV) Lab

Jeff Soyk, Media Artist

Christine J. Walley, SHASS Dean's Distinguished Professor of Anthropology, MIT

Reinventing Storytelling

Image: Visiting Artist Chloe Bensahel works on a loom at the Advanced Functional Fabrics of America. Credit: Heidi Erickson/MIT.

In This Section

Ne:Kahwistará:ken Kanónhsa'kówa í:se Onkwehonwe

Parsifal

Deconstructed Anthems: Massachusetts

Chloe Bensahel

Certain myths, stories, and songs are told and retold over time as part of our shared cultural DNA, as a creative way societies make sense of themselves. But this isn't to say that these stories, while familiar, can't be told in new ways—reinvented for contemporary audiences and refashioned for the needs of the present.

Ne:Kahwistará:ken Kanónhsa'kówa í:se Onkwehonwe, an immersive multimedia experience by artist Jackson 2bears, reimagined a Haudenosaunee creation story, which has long been part of his community's oral tradition. MIT Class of 1949 Professor of Music and Theater Arts Jay Scheib recasts Richard Wagner's 1882 opera *Parsifal*, depicting an Arthurian legend, as an apocalyptic AR-enhanced dystopia that resonates with the anxieties of our contemporary era. *Deconstructed Anthems: Massachusetts* was a site-specific composition and performance by Ekene Ijeoma, founder of the Poetic Justice Group at the MIT Media Lab. Using data about incarceration rates from the Department of Justice, the artist reinterpreted "The Star Spangled Banner" to reflect racial disparities in the United States. CAST Visiting Artist Chloe Bensahel, in collaboration with the Future Sketches group at the MIT Media Lab, creates conductive thread technologies to program textiles that "speak" their own stories through sound and light.

At MIT, old stories are given vibrant new forms—leveraging new technological tools and perspectives—to revolutionize the ways our most oft-told tales are created, shared, experienced, and reinterpreted for audiences today.

Ne:Kahwistará:ken Kanónhsa'kówa í:se Onkwehonwe

Indigenous knowledge and immersive technologies

Conference: ISO Indigenous Immersive Incubator, MIT, April 26–27, 2023

Installation: *Ne:Kahwistará:ken Kanónhsa'kówa í:se Onkwehonwe*, 2RO MEDIA Festival, Thru the RedDoor, Six Nations of the Grand River, October 2023

Public Presentation: *Ne:Kahwistará:ken Kanónhsa'kówa í:se Onkwehonwe*, MIT Bartos Theater, February 12, 2024

The structure of the Haudenosaunee longhouse has deep significance for the Kanien'kehà:ka (Mohawk) artist and scholar Jackson 2bears also known as Tékeniyáhsen Ohkwá:ri. As a space of council, ceremony, and daily sociability, the longhouse enshrines the values of his Kanien'kehà:ka community and provides a forum for dialogue and new creative expression—a site for culture making as much as the preservation of custom.

Together with the Co-Creation Studio at the MIT Open Documentary Lab, 2bears has been working on a multimedia installation that interweaves traditional Onkwehonwe (Indigenous) cultural practices with emerging technologies. Drawing upon the spirit and sensorial staging of the longhouse, *Ne:Kahwistará:ken Kanónhsa'kówa í:se Onkwehonwe* (Virtual Longhouse) consists of a 34-foot panorama screen, multiple video projectors, and 14-channel surround audio. Visitors become contributors to the Haudenosaunee creation story unfolding around them, a cyclical narrative that weaves through the past, present, and future.

The installation, created in collaboration with 2RO MEDIA and produced at Thru the RedDoor in Six Nations of the Grand River, is an experiment in communal virtual experience without the use of headsets. Heightened by the use of immersive technology, the senses become the primary point of access for imaginative projection and connection with the natural world—a capacity for awareness further amplified by collective experience and shared tradition.

The power of collective envisioning was also played out at the 2023 ISO Indigenous Immersive Incubator at MIT, attended by 2bears who participated in the inaugural event in 2020. Conceived as an incubator for projects that combine Indigenous knowledge and immersive technologies, the event was led by the Indigenous Screen Office (ISO) of Canada and hosted by the Co-Creation Studio at the MIT Open Documentary Lab.

"The longhouse signifies a way of living together as a League of Nations under the Great Law of Peace—the Kayanereh'kowa."

– Jackson 2bears

During the four-day program, 10 Indigenous delegates developed their own immersive media projects, toured MIT labs, and met with Indigenous leaders from MIT and across the territory. The event could be understood as a conceptual longhouse of sorts, dispersed across space and time but encompassing the same framework of community, care, and the continuum between contemporary and ancient making. The thinking and techniques of creative practitioners such as 2bears and the 2023 delegates demonstrate how new media can be enriched by alternative paradigms: the integration of Indigenous knowledge is vital to our adaptation as technological beings.

Images: (left) *Ne:Kahwistará:ken Kanónhsa'kówa í:se Onkwehonwe*, 2RO MEDIA Festival. Courtesy of Jackson 2bears. (right) Jackson 2bears at the Live! Biennale Performance Art Festival, Vancouver BC, 2017. Courtesy of the artist.

2022–24 Ida Ely Rubin Artist in Residence

Jackson 2bears, 2022–24 Ida Ely Rubin Artist in Residence

Vivek Bald, Associate Professor of Comparative Media Studies/Writing, MIT

Katerina Cizek, Artistic Director and Co-Founder; Co-Creation Studio, MIT Open Documentary Lab

Gary Joseph, Studio Owner, Thru the RedDoor, Six Nations of the Grand River

Sarah Wolozin, Director, MIT Open Documentary Lab

Parsifal

Opera, augmented

Performance: *Parsifal*, Bayreuther Festspiele/Bayreuth Festival, Bayreuth, Germany, July 25–August 27, 2023; July 27–August 24, 2024

Richard Wagner's 1882 opera *Parsifal* has long inspired spectacular staging and radical reinterpretations. However, it's fair to say that the international audience at the 2023 Bayreuth Festival had never seen anything quite like the AR-enhanced, techno-dystopian staging directed by MIT Class of 1949 Professor of Music and Theater Arts Jay Scheib.

Known for genre-defying works integrating emerging technologies in live performance, Scheib's version of Parsifal brought the archetypal opera hurtling into the future. Departing from the medieval setting of Arthurian legend, the production transports the perennial psychodrama of unhealed wounds to a post-human landscape of partially excavated mines. Layered atop the physical staging designed by Tony Award-winner Mimi Lien is an AR superstructure developed by a team led by MIT Professor of the Practice of Theater Joshua Higgason. Headset-wearing audience members experience a digital environment encompassing the entire auditorium; trees emerge between the aisles, virtual smoke billows from an onstage fire, and a boulder gleaming with rare minerals appears to levitate directly overhead.

The AR component was custom-made for the specifications of the Bayreuth Festival Theatre, the site where the opera premiered in 1882. With the encouragement of Katharina Wagner, Bayreuth Festival artistic director and the great-granddaughter of Richard Wagner, Scheib and his global team had the freedom to test and extend the festival's tradition of innovation. Implicit within the sensational staging is a critical subtext that reflects upon the human impulse to invent and extract. The setting of the opera is a projection of a future unchecked by technological ethics or the preservation of natural resources; it is also a counterpart to the history of extraction that contextualizes the opera's original composition. While Wagner dramatized the myth of a wounded king, European politicians were racing to colonize Africa and reap the rewards of the continent's resources—not least, the minerals that are essential to today's electronic devices. The conceptual implications are as dizzying as the sensorial experience itself, demonstrating a level of artistic ambition in keeping with the Wagnerian spirit that has forever changed international opera.

"Innovation is the tradition at Bayreuth."

– Jay Scheib

Images: (left) Performance of *Parsifal* at Bayreuth Festival. Credit: Enrico Nawrath. (right) Rendering of augmented digital environment. Courtesy of Jay Scheib and Joshua Higgason.

Parsifal 2023 Creative Team: Pablo Heras-Casado, Conductor; Eberhard Friedrich, Choral Director; Mimi Lien, Stage Design; Meentje Nielsen, Costume Design; Rainer Casper, Lighting Design; Joshua Higgason, Video and AR Design; Marlene Schleicher, Dramaturge; and Jay Scheib, Director.

2022–23 Mellon Faculty Grant

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

With AR Design and Development by Joshua Higgason with additional lead development and design by Mike Mandel, Orsolya Szánthó, Gloria Schulz and the Studio für unendliche Möglichkeiten, and Studio Dave Tenent

Deconstructed Anthems: Massachusetts

The sound of the scale of racial injustice

Performance: *Deconstructed Anthems: Massachusetts,*
Boston Center for the Arts Cyclorama, February 13–16, 2024

To Ekene Ijeoma, "The Star-Spangled Banner"—the sonic representation of the United States of America—has always sounded dissonant. As an assistant professor at MIT and director of Poetic Justice, the first artist-led group at the MIT Media Lab, he researches how social and political systems perpetuate racial oppression. The collected data of these studies is translated into software-generated multimedia works that are typically staged across multiple sites. Through works of performance, sculpture, installation, and digital design, Ijeoma and his research group are engaged in an ongoing inquiry: how to create art at the scale of injustice, poetically exposing inequalities and inspiring action for change.

The Boston premiere of Ijeoma's sound work, *Deconstructed Anthems: Massachusetts*, is a case in point. Performed at the Boston Center for the Arts Cyclorama, originally built in 1884 to display a panoramic painting of the Battle of Gettysburg, the algorithmic composition is a radical deconstruction of the national anthem.

The familiar melody becomes increasingly discordant as the keys of the pre-programmed piano are mechanically held down, evoking the increasing incarceration rates that disproportionately affect Black communities.

"I'm using the code to manipulate data as a material, with music as a system."

– Ekene Ijeoma

To develop the custom software, Ijeoma learned how to read and write music and partnered with the Vera Institute of Justice to gather data on the growing reliance on the prison system as a means of social control. More than 1.5 million individuals incarcerated over the last century are identified as people of color—the rate of increase is reflected in *Deconstructed Anthems: Massachusetts* by the number of keys withdrawn from the composition, compelling the pianist to improvise and transform the anthem into jazz.

The artwork is spatial as much as sonic; local musicians perform within an installation of more than a thousand copies of the software-generated sheet music, and the experience expands outward as part of a tour of multiple cities in the United States.

While the improvisatory nature of jazz is a guiding principle for the project as a whole, the programming of the piano suggests a rigged system. The contested freedom of the artist can be understood as a wider comment on the paradoxes of national rights in a country founded on slavery. Imposed compositional rules become provocations for play, producing a sonic strangeness that refuses easy melodies and reframes the national anthem as a call for justice.

Images: Installation and performance of *Deconstructed Anthems: Houston*, Day For Night Festival, Houston, Texas, 2017. Credit: Katrina Barber, courtesy of Day for Night Festival.

2024 Fay Chandler Faculty Creativity Grant

Kris Bowers, Composer, Pianist, and Documentary Director

Angel Bat Dawid, Composer, Musician, and Educator

Jeremy Dutton, Drummer and Composer

James Francies, Pianist and Producer

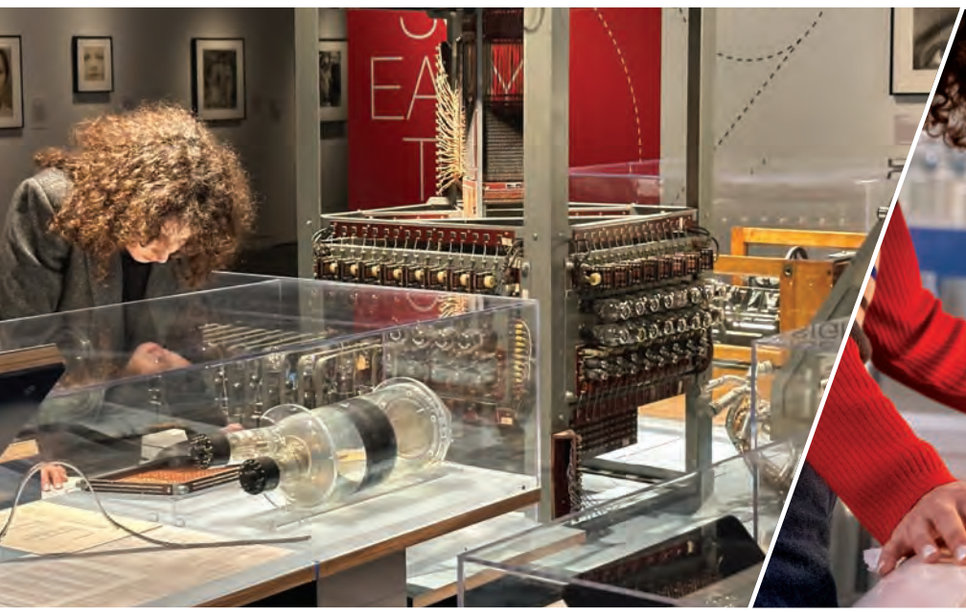
Ekene Ijeoma, ABC Career Development Assistant Professor of Media Arts and Sciences, MIT; Director, Poetic Justice, MIT Media Lab

William Mabuza, Bassist

Chloe Bensahel

Technologically advanced textiles that tell stories through touch

Public Presentation: *After Dark: Threads,* MIT Museum, March 14, 2024



As a textile artist, technologist, and storyteller, much of Chloe Bensahel's work explores how tangible materials can store and communicate information in meaningful ways. In collaboration with the Future Sketches Group at the MIT Media Lab, she demonstrates how historical and hands-on practices can interinform digital tools and computation.

Future Sketches develops new tools for artistic expression, exploring the essence of code as a creative medium. Rather than forging blindly into the future, the group looks to traditional craft techniques as a foundation for technological innovation—from Bensahel's perspective, textiles are an archetypal example of binary code. Working closely with Future Sketches research assistant Vera van de Seyp, Bensahel is engaged in a highly ambitious experiment: a project to create a touch-responsive textile with its own interwoven magnetic field.

Actuating a fabric using magnets is a complex process, but Bensahel has an important precedent. The Whirlwind, MIT's first digital computer, was developed in the early 1950s with the breakthrough technology of magnetic core memory. Standing nearly two meters high and able to operate in real time, the Whirlwind is a testament to the presence of craft in computation—each wire of the machine was carefully tied by hand, making visible the connection between binary code and textile design.

"Textiles are a potent historical form of binary code"

– Chloe Bensahel

As she designs her own responsive materials, Bensahel considers the overlooked lives of the engineers who first developed magnetic core memory, raising awareness of the histories of labor, loss, and human ingenuity latent within every new technological development. Likewise, creating a shape-shifting fabric actuated by a magnetic field requires time, attention, and diverse expertise, generating a conversation between disciplines that opens new paradigms of making for artists and engineers.

For Bensahel, the central presence of human touch in the project has both an emotional resonance and potential applications in fields ranging from astronautics to biomedicine. Her work at MIT reveals that binary forms are a starting point for infinite extrapolation—distinctions between art and science, human being and machine, are less clear-cut than they might seem.

Images: (left) Chloe Bensahel observes magnetic core memory of the Whirlwind computer in the MIT Museum. (center) Bensahel weaves magnetizable fibers on a loom at the Advanced Functional Fabrics of America. (right) Bensahel works with Vera van de Seyp in the MIT Media Lab. All images credit: Heidi Erickson/MIT.

2023–24 Ida Ely Rubin Artist Residency

Azra Akšamija, Director and Associate Professor, Art, Culture, and Technology Program, MIT; Director, MIT Future Heritage Lab

Chloe Bensahel, 2023–24 Ida Ely Rubin Artist in Residence

Zach Lieberman, Adjunct Associate Professor of Media Arts and Sciences, MIT; Director, Future Sketches Group, MIT Media Lab

Vera van de Seyp, Research Assistant, Future Sketches Group, MIT Media Lab

Time Travel

From science fiction to philosophy to theoretical physics, the idea of time travel has long held sway over the imagination. These projects explore the consequences of altering or accessing past events, creating alternate timelines, or experiencing the future.

The course The Art and Science of Time Travel, co-taught by MIT scientists and mechanical engineers Seth Lloyd and Michele Reilly, surveyed time travel and other physical paradoxes—black holes, wormholes, and the multiverse. Grounded in a scientific understanding of quantum mechanics, students delved into classic time travel stories in art and film, while also creating their own. The speculative design project *TeleAbsence*, produced by Hiroshi Ishii, founder of the MIT Media Lab's Tangible Media Group, sought to communicate with the people of the past, the loved ones who are no longer with us.

Through both these initiatives, artists and researchers probed the edges of the known, exploring the physical, sensory, philosophical, and emotional aspects of accessing other dimensions beyond the limitations of linear time.

In This Section

Image: *AmbientPhoneBooth* by Daniel Pillis, part of the *TeleAbsence* project, 2023. Credit: Leah Talatinian/MIT.

The Art and Science of Time Travel

Storytelling with quantum teleportation

Class: 2.984/CMS.343 The Art and Science of Time Travel, Comparative Media Studies/Writing, Fall 2023

Anyone who has spent time observing the night sky or investigating the mysterious movement of subatomic particles will know that reality is stranger than fiction. That's why the most compelling science fiction is typically written by those with a strong understanding of the scientific principles of their subject matter—equally, the most innovative scientists are often those with an aptitude for imagination.

This back-and-forth between fact and imagination was cultivated in a new class, The Art and Science of Time Travel, co-taught by Seth Lloyd, professor of mechanical engineering, and Michele Reilly, scientist-in-residence in quantum mechanical engineering. For over a decade, Lloyd and Reilly have collaborated on fundamental questions—including the possibility of time travel—and the class is a testament to their open-minded and cross-disciplinary approach. By equipping students with a firm grounding in relativity and quantum mechanics, as well as a clear idea of the conceptual context of time travel within the scope of human history and storytelling, the two researchers hope to untangle some of the most intractable paradoxes in theoretical physics.

The first half of the course offered a wealth of lectures and readings interweaving science and science fiction. The last century has seen a radical transformation in the scientific concept of time travel, beginning with Einstein's theories of special and general relativity and making way for quantum mechanics-informed proposals for how time travel could theoretically occur. This comparatively recent scientific history is dwarfed by the long cultural history of the concept—an ancient idea that has appeared in Hindu, Jewish, Christian, Islamic, and folkloric tradition.

"What if a blend of general relativity and quantum mechanics were the solution that made time travel possible?"

– Seth Lloyd

Though perennial in scope, time travel continues to give rise to fresh new forms—not least the scripts and short fictions developed by the students during the second half of the semester. For the final class project, the instructors asked students to collaborate on a screenplay for a short film about time travel that Reilly and Lloyd shot later in 2024, following the success of *Steeplechase* (2022), their previous award-winning film about time travel. Whether the creative outputs of the class will become part of the distinguished history of time travel narratives has yet to be seen—only a time traveler could know…

Images: (left) Seth Lloyd and Michelle Reilly in the *The Art and Science of Time Travel* class final table reading. (right) Students participate in a final table reading. All images credit: Heidi Erickson/MIT.

2023-24 CAST Cross-Disciplinary Class

Seth Lloyd, Professor of Mechanical Engineering, MIT; Director, W.M. Keck Foundation Center for Extreme Quantum Information Theory (xQIT) at MIT

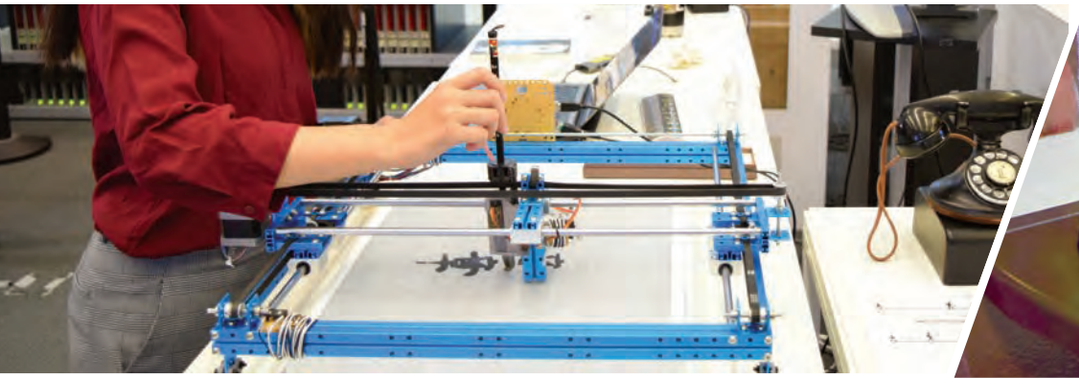
Michele Reilly, Lecturer in Quantum Mechanical Engineering, MIT

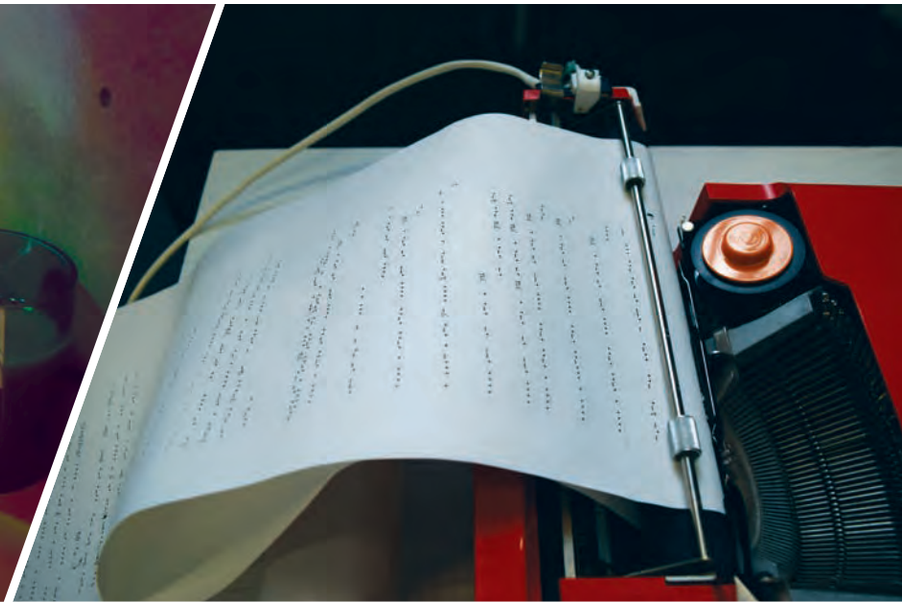
TeleAbsence

Compassionate technology for alleviating bereavement

Demonstration: *TeleAbsence*, Members Spring Meeting, MIT Media Lab, April 3–4, 2023

Presentation: *TeleAbsence*, "Body x Materials: A Workshop Exploring the Role of Material-Enabled Body-Based Multisensory Experiences," Association for Computing Machinery (ACM) CHI Conference on Human Factors in Computing Systems, Hamburg, Germany, April 28, 2023





The void opened up by the loss of a loved one is a distance that cannot be breached—but might the emotional rupture be alleviated through the compassionate use of new technology?

This was a question posed by Hiroshi Ishii, Jerome B. Wiesner Professor of Media Arts and Sciences and Associate Director of the MIT Media Lab and founder and director of the Tangible Media Group. Ishii has long been preoccupied by the possibilities of giving physical form to digital information and computation, and the group's *TelePresence* initiative—introducing sensory elements for more embodied teleconferencing—became all the more relevant during the social distancing necessitated by the COVID-19 pandemic.

TeleAbsence takes the next conceptual leap, exploring how interaction with physical objects might connect us with memories of a lost loved one—even creating the illusion of mutual communication in the present moment. Through the use of abstract ambient media and mnemonically resonant artifacts such as typewriters, telephones, bottles, brushes, and pianos, *TeleAbsence* evokes the sensation of "ghostly telepresence."

Originating from the trauma of bereavement, the project has evolved to address other forms of loss and emotional distance, from homesickness to nostalgia for past selves.

"The purpose of *TelePresence* is to connect people who are alive. But what about communicating with people who are no longer with us?"

– Hiroshi Ishii

Among the *TeleAbsence* projects is the *AmbientPhoneBooth*, an immersive media environment that creates the headspace of a remote time and place by dialing a number on an old-fashioned rotary phone. Surrounded by a volumetric video projection and a spatial soundscape, the participant enters a mixed-reality experience generated from home movies and archive imagery. Research assistants in the Tangible Media Group have further extended the concept of *TeleAbsence,* with projects including an automated typewriter that translates speech into Morse code to mimic the dislocation of bilingualism and a three-dimensional digital plotter that recreates the intimate tactility of calligraphy.

By integrating traditional forms of communication with the latest developments in computation and immersive media, *TeleAbsence* bridges our past and present technological selves, healing the underlying disorientation of rapid transition to digital living. As a means of researching the ways that humans process emotions and how objects and environments create identity and preserve memory, the project proposes a new way of sculpting and sharing our deepest personal experiences.

Images: (left) *ColloGraphy III—Blue Plotter* by Mengying "Cathy" Fang. (center) *AmbientPhoneBooth* by Daniel Pillis. (right) *The Stranger—Red Typewriter* by Kyung Yun Choi. All images credit: Leah Talatinian/MIT.

2022–23 CAST Mellon Faculty Grant

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FLUID INTERFACES GROUP

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TANGIBLE MEDIA GROUP

Özgün Kılıç Afsar, Research Assistant

Paula Aguilera, Multimedia Producer

Kyung Yun Choi, Research Assistant

Rébecca Kleinberger, Former Postdoctoral Associate

Jean-Baptiste Labrune, Research Affiliate

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Special Thanks

CAST Visiting Artists, Faculty Collaborators, and Program Participants

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