

Art in America

SYMBIOTIC ART

By *Claire Pentecost* March 2, 2022 1:31 PM



Mary Maggic extracting hormones from urine using a mobile suitcase lab as part of the project *Estroferm! Lab*, 2021. PHOTO ANNA BREIT

“HOW BIG IS HERE?” is a question the artist duo Helen Mayer Harrison and Newton Harrison have asked themselves repeatedly over the course of their sixty-year career. It’s an ecologist’s question, one that reminds us that the living world is made up of numerous nested ecosystems. Where does one system end and another begin? Asking this question became routine for the Harrisons after they decided, at some point in the 1970s, that they would undertake only those art projects that benefit the environment. “Environment,” they discovered, is tricky to define. They started with agriculture—first making topsoil, then growing crops in it—before constructing fish farms in museums, producing portable orchards, and serving museum-grown food to art crowds. Since then, they have envisioned the restoration of rivers and watersheds in practical detail from California to Yugoslavia. They have consulted on urban planning projects in the United States, Europe, and elsewhere. When global warming was barely a mote in the public eye, they produced maps and other artifacts reflecting its likely effects. In all their work, they found that defining the relevant “environment”—the here of the question—was part of the creative task.



Harrisons: *Survival Piece #3: Portable Fish Farm*, 1971, six tanks of catfish, brine shrimp, oysters, and lobsters, and a performance involving a seafood feast at the Hayward Gallery, London. COURTESY VARIOUS SMALL FIRES, LOS ANGELES

Interviewing Newton Harrison in 2018, I asked him to give me an example of how-big-is-here thinking. At the time, I was researching the Mississippi River, so we used that waterway as an example. I asked if the environment included melting snowpacks and their runoff carrying elements of soil throughout the watershed. “Keep going,” said Newton. The tributaries, the confluences with other large rivers, the delta, the Gulf of Mexico? “Keep going.” He meant the connected oceans, the respiring trees, the clouds, the rain, but also the toxins in the water, the dams and levees, all the human interventions, in fact, the whole hydrological system from the molecular scale to the weather and back again.

The Harrison Studio espouses systems thinking, an artistic trend the critic Jack Burnham identified in his 1968 *Artforum* essay “Systems Esthetics.” Systems thinking has become a major conceptual tool in the biological sciences, and Burnham proposed applying it to art. A system is a set of parts that interact, typically through feedback. A cell is the archetypal biological system; Gaia, a name for the planetary-scale system of life on Earth, is the largest system known to biology. In the years since Burnham published his essay, **bio art**—art that involves living beings and biological processes—has become a meeting ground for scientific and artistic ecosystemic thinking.

When I wrote about bio art in the early years of this century, the Brazilian-American artist Eduardo Kac had just reportedly commissioned a French laboratory to genetically engineer a rabbit, *Alba* (2000), to glow by expressing a green fluorescent protein (GFP) extracted from a jellyfish. At the time, the GFP bunny, seen publicly only in photographs, more or less defined the artistic genre we call bio art, a name Kac himself is thought to have coined in 1997.

Kac wrote extensively about the relationship he intended to develop with his transgenic pet (ultimately, the lab wouldn’t let him take Alba home), anticipating other artists’ interest in interspecies kinships, but something was missing: Kac was focused on the object of synthetic biology rather than its means of production; his GFP bunny project missed an opportunity to illuminate an emerging biocultural ecology. Put differently, How big is the here of bio art?



Eduardo Kac: *GFP Bunny*, 2000,
green fluorescent rabbit.
COURTESY EDUARDO KAC

OVER THE LAST FEW decades, bio art has gone forth and multiplied, enlarging its purview from synthetic biology to incorporate the Harrisons’ environmental concerns, their recognition that symbiotic systems govern both biological and cultural realities. Artists have been taking cues from the evolving field of biology itself, which has been upturning some of our cherished ideas about the ways that organisms exist, evolve, and cohabit in a dynamic earth system now threatened with irreversible anthropogenic disruptions.

One of those artists is the New York–based [Anicka Yi](#), who has become known for bottling biological cultures and deploying them as fragrances. The work she showed in her breakout 2015 exhibition, “You Can Call Me F” at the Kitchen in New York—bacterial blooms and a fragrance made using swabs from the bodies of 100 art world women—offered visitors a physical confrontation with the invisible but highly potent world of microscopic organisms, a world we associate with disease and have been conditioned to fear.

Yi’s 2017 exhibition at the Guggenheim Museum, “Life Is Cheap,” highlighted her collaboration with molecular biologists and forensic chemists. Hanging in the air was *Immigrant Caucus*, a scent created from chemical compounds derived from Asian American women and carpenter ants. Displayed in the gallery were two dioramas: *Force Majeure*, a climate-controlled chamber lined with framed silk flowers and agar plates mottled by amorphous constellations in reds and russets, moldy greens and bruise purples that were, in fact, vigorous growths of bacteria collected from sites in New York City’s Chinatown and Koreatown; and *Lifestyle Wars*, a transparent case containing a network of transparent tubes inhabited by live ants and tangled with ethernet cables to suggest a motherboard.

Yi’s artworks may involve capturing molecules, but they are not about isolating single objects; there is no rabbit in the hat. Instead, they gather and cultivate bacterial signatures of environments, whether the territory in question is an urban enclave populated by working-class immigrants or elite galleries and museums populated by art professionals (or a motherboard populated by ants, which interested Yi in part for their use of scent trails). Her work brings us into a world of living effluvia that, even when it’s derived from a human body, feels disturbingly foreign. Yi is one of many artists rendering visible our embeddedness in the microbial realm.



Anicka Yi: *Force Majeure*, 2017, plexiglass, aluminum, agar, bacteria, refrigeration system, LED lights, glass, epoxy resin, powder coated stainless steel, light bulbs, digital clocks, silicone, and silk flowers.
COURTESY GUGGENHEIM MUSEUM, NEW YORK

Human bodies, as biologists increasingly emphasize, are on a continuum with our environments, a continuum mediated by the microbial mesh. In turn, bio art and eco art are converging, insisting that living beings exist in complex webs of interrelations.

Central to that confluence are the ideas of the late evolutionary biologist Lynn Margulis (1938–2011), who contended that understanding symbiotic relationships is key to understanding the past and present biosphere. Symbiosis refers to any of several living arrangements between members of two different species. There are three types of symbiotic relationship: mutualistic, in which both partners benefit; parasitic, where one organism benefits at the expense of the other; and commensal, in which one organism benefits while the other is unaffected.

Human symbionts—residents of the gut, the orifices, the skin—enable omnivorous dietary habits, regulate the immune system, protect against pathogenic bacteria, and produce a range of essential vitamins, to name just a few of their known functions. About half the cells in the human body are those of microbial symbionts. Margulis—now something of a cult figure among many bio artists—championed the theory of endosymbiotic evolution, which describes what was perhaps the biggest leap for life on Earth—the one from cells without nuclei (prokaryotic) to cells with nuclei (eukaryotic). This change led from a world populated solely by bacteria to one whose inhabitants included bacteria plus diverse other life-forms. Margulis spent her life proving that endosymbiosis was the secret to that leap. Put simply, she proposed that one single-celled creature engulfed another, but didn't digest it; the engulfed organism continued to function inside the host, and eventually became what we now know as the nucleus. The most dramatic development in the evolutionary history of life, Margulis argued, came about not through competition between species, but through cooperation. Perhaps not surprisingly, she was at one time accused of being a communist.

NEW FORMS OF COOPERATION have opened up the whole field of biology, especially for artists. Along with the GFP bunny, the year 2000 also saw the launch of SymbioticA, a visionary research lab dedicated to artistic inquiry in the life sciences. Hosted by the University of Western Australia, the lab is the brainchild of artist-researchers Oron Catts and Ionat Zurr. It was the first of numerous similar ventures that render the methods and technology of biologic study transparent and accessible. Most subsequent examples are likewise affiliated with educational institutions: the Coalesce BioArt Lab at SUNY Buffalo, Biofilia at Aalto University in Finland, Suzanne Anker's Bio Art Lab at the School of Visual Arts in New York, and New York University's WetLab. The past decade has also seen a proliferation of DIY open access labs, like Genspace in Brooklyn; Counter Culture Labs in Oakland, California; Incubator Art Lab at the University of Windsor, in Canada; and Baltimore Underground Science Space (BUGSS), to name just a few. The trend extends online: Hackteria.org is a global network of open-source community platforms connecting individuals who share an interest in hacking living systems. All these undertakings are intensively transdisciplinary, encompassing scientists, artists, technology buffs, and people from many other walks of life. In addition to providing access to equipment,

specialized knowledge, and the opportunity to experiment, they are alive with the ethical debates inherent to any endeavor that involves living tissue and DNA.



Mary Maggic extracting hormones from urine using a mobile suitcase lab as part of the project *Estrofem! Lab*, 2021.
PHOTO ANNA BREIT

One of the main tenets of science and technology studies is that labs are cultural spaces. Community biology facilities are deliberately and self consciously social. Participants are hacking the exclusivity of expertise. Individual artists, too, have taken up “workshopology,” as Hackteria calls it. Mary Maggic, for instance, has built an accessible sphere around biohacking estrogen, and has also made work concerning hormone disrupting chemicals in the environment. In videos and lectures, the nonbinary Chinese-American artist will teach you to extract estrogen from urine to use in hormone replacement therapy, as soon as you get

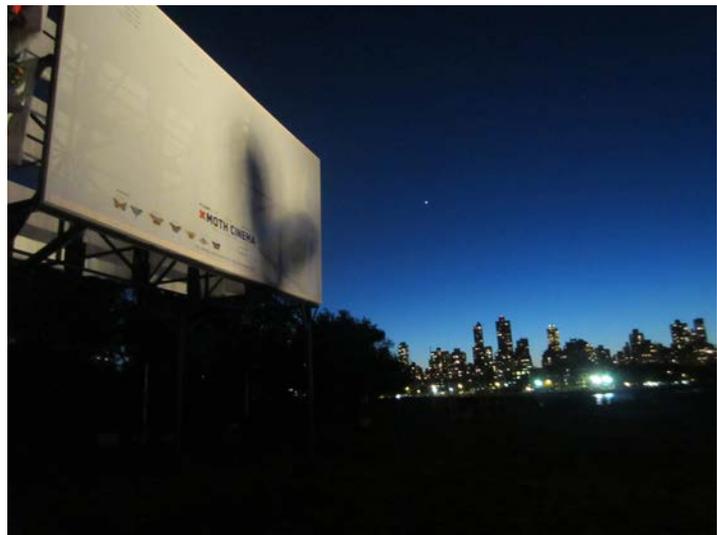
your hands on some unusual but obtainable equipment and materials—things like a vacuum pump for solid phase extraction, cigarette filters, smashed silica gel, broken glass bottles, and methanol. Maggic disrupts the biopolitical subjugation of female and trans bodies that currently results from managed access to hormones. The artist’s system of DIY lay scientific protocols aims at what they call “the emancipation of the estrogen biomolecule.” Although Maggic has produced curious and seductive paraphernalia, the autonomous art object is, appropriately, nowhere in sight.

Looming large in Maggic’s artistic genealogy is the 30-year-old art collective Critical Art Ensemble (CAE), which seeks to empower individuals to understand and control the biochemicals in their own bodies and environments. CAE’s systems-oriented bio art projects almost always include a related publication (all the group’s books are available for download from its website) presenting concise details of its members’ research and analysis. In *Free Range Grains* (2003–04), produced in collaboration with the late artist Beatriz da Costa and molecular biologist Shyh-shiun Shyu and presented in Germany and Austria, anyone could bring a box of breakfast cereal to have it tested for traces of genetic modification. The products were tested in a live, performative demonstration of public science, using the sort of mobile laboratory that anyone can put together for a modest price. Part of the point was to demystify a process surrounded by misunderstanding and rhetoric. Simultaneously, the work drew attention to the global food system, showing that, even though the EU forbids the production and sale of GMOs, it is impossible to avoid contamination. The performances allowed for open-ended conversation about GMO crops and the environmental risks they pose, as well as corporate control of agriculture.

CAE projects went a long way in exposing and intervening in corporate agricultural systems, but their artistic successors are going even further, proposing alternatives to the known harms of corporate expertise. Brooke Singer is addressing the ecological malfeasance of industrial agriculture—such as nitrogen pollution, carbon emissions, and soil degradation—by developing tools for her audience to analyze and influence the biochemical makeup of soil. She launched “Carbon Sponge” in 2018, a site for ongoing workshops dedicated to understanding and implementing methods to sequester carbon in urban agricultural projects. Since conceiving the idea during a residency at the New York Hall of Science in Queens, Singer has entered into partnerships with an impressive list of institutional collaborators and funders, including universities, farms, and museums.

“Carbon Sponge” bridges art and science in a transparent, participatory theater of processes by taking a deep dive into the biological microcosmos of healthy living soils, where bacteria, fungi, nematodes, and protozoa exchange nutrients for the carbohydrates plants produce photosynthetically. The project has fostered an interdisciplinary community around two questions: What are the methods of cultivating soils that can counteract dangerous levels of CO₂ in the atmosphere by sequestering significant amounts of carbon in soil? And, can any nonspecialist learn to test those methods by tracking quantities of carbon sequestered in or lost from soil over time?

One of the latent implications of Singer’s work is the ecological truth that our bodies are only as healthy as the environment we inhabit. For artist Natalie Jeremijenko, this means considering health as a collective issue and as a de facto proxy for the public good. She runs an environmental health clinic at New York University called xClinic, whose logo includes a red cross tilted slightly to read as an X. The clinic creates designs for interventions into everyday life, like the *Farmacy AgBag* (2011), a sack of live plants in good soil in a Tyvek envelope that can be hung off railings, windows, or parapets. Tyvek retains moisture and protects the soil from airborne pollutants. The plants do their part by extending through slits in the bag, raising the local leaf area index, and helping remove toxins from the air. Jeremijenko calls this “mutualistic infrastructure.”



Natalie Jeremijenko: *Moth Cinema* at Socrates Sculpture Park, New York, 2012.
COURTESY SOCRATES SCULPTURE PARK, NEW YORK.

Under the umbrella of mutualism, Jeremijenko has also made art that engages nonhuman species. Her outdoor installation *Moth Cinema* (2012) shines a bright light on a blank projection screen at night, attracting moths to create an open-air movie. Viewers can watch the action as moths cluster in the beam, while their shadows play their doubles on the screen. But there is something for the moths, too: when they flock to the light, they find a flowering pollinator garden planted all around the outdoor cinema. The audio component features two tracks playing different forms of a commissioned anthem: one track is detectable to humans; the other runs a subsonic translation of the music, which “blinds” the radar system of the moths’ predators, bats. This creates a safe zone for moths which, as pollinators, are second only to bees and, like them, are endangered by agrochemicals and habitat destruction.

Kathy High explores a very particular kind of mutualism—trans-species solidarity. She works with transgenic animals (those into which one or more genes of another species have been incorporated) to contrast two systems: the highly technologized laboratory procedures that produce and instrumentalize such animals, and the infrastructure of empathy between different species bound by common maladies. High had to overcome a rat phobia in order to live with and care for retired lab rats, hoping both to give them a better life and express gratitude for the role they played in her own treatment for an autoimmune disease. These genetically engineered rats had been used in medical experiments testing treatments for rheumatoid arthritis, inflammatory bowel disease, and other afflictions. For a project called *Embracing Animal* (2004–06), High treated three of them with the same alternative therapies she was using to treat her own Crohn’s disease, at the same time providing them an expansive and enriching environment where they could experience different foods, spaces, and each other in ways that a laboratory prohibits. This setup—allowing the rats plenty of room to roam, hide, scurry through tunnels, and generally play with each other—was on view for ten months in the 2005 exhibition “Becoming Animal: Art in the Animal Kingdom” at MASS MoCA in North Adams, Massachusetts, where an estimated 10,000 visitors a month could commune with the creatures and learn about transgenic lab specimens.

Such projects are a welcome sign that we as human beings are growing increasingly aware of all the life-forms we depend on, even as we face the endangerment and extinction that come with climate change. Simultaneously, Indigenous scholars are drawing attention to peoples who know what it means to see life as infinitely connected, not in a hierarchy with human “stewards” at the top in the earthly realm, but in interlocking cycles of reciprocity. A world of relations is being certified as the biological truth of our planetary system. These artists are making sure we recognize it.