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The Biotechnological Body

From the beginning, ecological art has sought to both spark empathy for and educate people about the empirical reality of climate change, playing a line between nostalgic naturalism and cutting-edge science. This dualism has only intensified in recent years, with ecological art at once reacting to humanity's deepening estrangement from the natural world¹ and pressing for pragmatic technological solutions to the climate crisis. In her "Cyborg Manifesto," Donna Haraway uses technological imagery to conceptualize humans as hybrid entities, so entwined with our technologies that they become a part of us.² One might think this aligns well with modern western culture's unprecedented estrangement from the natural world.³ We cocoon ourselves in technological abstraction, ignoring the warming world outside. But then, underneath it all, we do still live in bodies. In her later writing, "Tentacular Thinking," Haraway echoes the portrait of humanity as hybrid or mutant, but uses purely organic imagery, calling for humans to extend plantlike out of the boxes we have made for ourselves.⁴ In fact, these two contrasting aesthetics, the technological body versus the biological body, are theoretically harmonious.

Certain contemporary ecological artists engage with Haraway's concept of embodied familiarity not just with biology or technology, but with both. Adham Faramawy uses animation

¹Claudia Mesch, *Environmental Art*, in *Art and Politics: A Small History of Art for Social Change Since 1945*, London: I. B. Tauris, 2014, 148.

² Donna Haraway, "A Cyborg Manifesto: Science, technology, and Socialist-Feminism in the Late Twentieth Century," *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York: Routledge, 1991), 149-150.

³ David Chang, "Separation and Unity: Zen Koan in Environmental Theory and Education." *Australian Journal of Environmental Education* 37, no. 1 (03, 2021): 19-28. doi:<https://doi.org/10.1017/ae.2020.20>.
<https://login.ezproxy.library.tufts.edu/login?url=https://www.proquest.com/scholarly-journals/separation-unity-zen-k-oan-environmental-theory/docview/2575743393/se-2>.

⁴ Donna Haraway, "Tentacular Thinking: Anthropocene, Capitalocene, Cthulucene," *e-flux Journal* 75 (2016).

to entwine their own body with nature. Christine and Maragret Wertheim facilitate projects where whole communities create natural shapes through applied mathematics. Fujiko Nakaya immerses revelers in engineered fog banks. Each of these works connects the human body with nature in ways that are facilitated by the technologies they use.

If you lived in a screen, you could be permeated like the earth.

Adham Faramawy makes art that is very body-forward. All of their recent video work includes human bodies interacting with biological agents. In their 2019 film “Skin Flick,” Faramawy appears as a humanoid, horned being who narrates stories of sexuality and entrapment while models smear creams and liquids on themselves and each other. At times, the videos include plants, and animated molds and mushrooms often encroach on the screen.⁵

“Skin Flick” situates human bodies largely in the frame, often cutting them off at the elbows or knees. On the screen, Faramawy exists merely as a head and shoulders, wearing a white shirt that blends into the background so all of the focus is drawn to their skin; their face; the organic bits of them. As Faramawy speaks, their face is further distorted by animated effects which make their cheeks stretch and sprout mushrooms.⁶ Bodies take up visual space in “Skin Flick,” but being truncated, also reach out past the borders of the scene. This theoretical extension is compounded by the bodily reaction elicited by the visceral images in the film. Although the artwork is viewed at a distance, whether on the internet or a screen in a gallery, the viewer’s body is engaged using the technologies of video and animation.

⁵ Adham Faramawy, “Skin Flick,” Video Works, Work, Adham Faramawy, accessed November 16, 2022, <https://adhamfaramawy.com/work/videos/>.

⁶ Faramawy, “Skin Flick.”



Still from 3:25 of *Skin Flick*, B3 Biennial of the Moving Image 2019.

Photo © Nathan Geyer

And with this engagement, Faramawy brings nature to the forefront of the viewer's consciousness. The viscous substances and bulging, distorted skin peppered with molds invoke an air of discomfort, although this is offset by Faramawy's narrative, which speaks longingly about the levels of connection and mutability that organic entities possess. In an artist talk, Faramawy explained that they wanted to convey the concept of a "porous body," literally opening themselves up to foreign bodies.⁷ This works on both biological and technological levels. Organic elements spring from within their skin, emphasizing an internal connection with nature. At the same time, Faramawy's face is changing at the hands of incredibly nuanced computer technology, suggesting that this technology is a device which encourages growth and expansion.

Jamie Sutcliffe wrote that Faramawy's specific animation technique "illustrat[es] something of the porous boundary between 'intimate space' and 'media space'."⁸ By breaking the image of bodily boundaries, Faramawy builds a bridge into the technosphere. Especially for those viewing the film on the internet, this can be interpreted as a bridge directly to the viewer. The limit of this artform is that viewers are not participants: they experience the work reflectively, not constructively. Other artists use the bodies of their audiences to teach more intrinsically the connections between biology and technology.

If your fingers danced like polyps do, you could make impossible shapes.

Catherine and Margaret Wertheim bring technology directly into the hands of the community. In 2005, the Wertheim sisters began crocheting coral reefs. Their goal was to raise awareness for the degradation of the Great Barrier Reef, and after the first exhibition was

⁷ Adham Faramawy, "Queer Ecologies: Adham Faramawy," Coulter Institute, May 2022, <https://www.youtube.com/watch?v=Smjxjk4ioJ0>.

⁸ Jamie Sutcliffe, "On Animatics: FREEDOM FREEDOM FREEDOM," *Art Monthly* no. 436 (05, 2020): 11, <https://login.ezproxy.library.tufts.edu/login?url=https://www.proquest.com/scholarly-journals/on-animatics-freedom/docview/2398189145/se-2>.

completed, they posted a call for anyone who was interested to contribute their own crocheted corals. The response was astronomical.⁹ Made up of many grassroots “Satellite Reefs” in addition to the original “Core Collection,” by the sisters, the current Crochet Coral Reef (CCR) is “a condensation of human labor, particularly female labor; hundreds of thousands of hours of stitching quietly performed.”¹⁰ The crocheters themselves become the technology—a many-fingered machine creating items according to algorithmic patterns—that makes the reef.

The technique the Wertheims use and pass on to willing participants was first developed to demonstrate hyperbolic space, which is both a revolutionary mathematical concept and a basic fact of many natural shapes. Mathematically defined as negative curvature, hyperbolic space essentially entails scrunching up a flat plane in a way that maximizes its surface area, but is incompatible with the dominant Euclidean geometric system. In order to crochet a model of a hyperbolic shape, you add one stitch at regular intervals. This technique, developed by Dr. Daina Taimina, can be used to justify arguments for the way that hyperbolic geometry works.¹¹ The proof is literally in the knitting.

The reason why the hyperbolic shapes look so organic is because they are good models for the shapes of many organisms that benefit from large surface areas. The Wertheims flip the script by proposing that nature is better at building technologies than we are. According to the CCR website, the Wertheims hold that the act of creating hyperbolic shapes is a type of mathematical knowledge.¹² And the process of crocheting is uniquely suited to teaching this

⁹ Margaret Wertheim, “Community Artist Talk: Crochet Coral Reef with Margaret Wertheim,” North Carolina Museum of Art, August 11, 2021, <https://www.youtube.com/watch?v=ERSsqQEep1Y>.

¹⁰ “About the Project,” Crochet Coral Reef, accessed November 15, 2022, <https://crochetcoralreef.org/about/theproject/>.

¹¹ “Hyperbolic Space,” Art+Science, Crochet Coral Reef, accessed November 17, 2022, <https://crochetcoralreef.org/artscience/hyperbolicspace/>.

¹² “About the Project”



Pod Worlds and wall text
Photo © Institute for Figuring



Baden-Baden Satellite Reef, Spotted Island
Photo © Institute for Figuring

knowledge. Leslie Dick defines crocheting as a state of “reverie,” where, through the repetition of a simple task, the mind can wander while the hands learn, facilitating a kind of open ingenuity completely unlike typical book learning.¹³ While crocheting these patterns for the CCR, crafters acquire wisdom that is shared among theoretical mathematicians and coral-forming polyps.

Perhaps those that choose to pick up a crochet hook can build some empathy and respect with the evolutionary body-logic of sea creatures through this task, but once again, in this case, people are only interacting with the ideas of organisms. The attachment to nature is filtered through the distance of an object. Participants may tactilely experience the technology of the Reef system, but the only corals they actually come into contact with are human-made constructions.

If you played in a sculpture of fog, you could be touching a machine made of life.

Across 5,000 square meters of Showa Kinen Park outside of Tokyo, Fujiko Nakaya constructed “Foggy Forest.” In a clearing ringed by bushy trees, the ground has been shaped into regular mounds with square tops. Fog billows between and around the mounds flowing from a depression in the ground named “Fog Pond” and a huge metal cylinder on a hill called “Fog Fall.” The landscape is a children’s park, and small bodies traverse the area, chaperones in tow, following the same paths as the fog.¹⁴ The effect is ethereal but orderly: a fantastical, obviously constructed landscape made of basic, biological elements. This is the kind of dualism that Nakaya specializes in.

Unlike “Skin Flick” and the “Crochet Coral Reef,” “Foggy Forest” has no distinct borders. Aesthetically, the bounds are mutable, as Faramawy’s animated body was.

¹³ Leslie Dick, “Hyperbolic Crochet Coral Reefs,” *X-tra (Los Angeles, Calif.)* 11, no. 4 (2009): 18.

¹⁴ Nakaya, Fujiko, Anne-Marie Duguet, *Fog = 霧 = Brouillard*, Edited by Anne-Marie Duguet, Paris: Éditions Anarchive, 2012, 198-200.

Mathematically, the shapes are turbulent, as difficult to quantify as were the hyperbolic coral structures. But there is a third layer of boundlessness that “Foggy Forest” engages in: there is no border between the art and the viewer. In fact, while interacting with the piece, the human becomes an intrinsic part of the artwork, shifting it with their movements even as it wraps and obscures their body and vision. Theater and technology scholar Yuji Sone interprets this work as an embodied performance where the human body and the fog bank both have agency.¹⁵ A person displaces the fog as they move through it while the fog obscures their vision and changes their experience of the world. The participant can at once recognize that they are living in a body separate from the environment and also feel entwined: ensconced in fog, breathing it in, connected with it intimately.

This intense nature-to-nature connection is facilitated by specific and nuanced technology. Nakaya was an early and active member of Experiments in Art and Technology (EAT), an organization which sought to connect the sciences and arts starting in the 1960s.¹⁶ It was through EAT that Nakaya connected with the engineers that helped her develop the nozzles that make the fog sculptures possible.

Nakaya does not attempt to hide the technological nature of her fog creations. Sone notes their audible hissing every half hour at “Foggy Forest” when the fog is deployed.¹⁷ In an essay on the construction of the fog sculpture, Yuji Morioka writes that “The historical binary opposition of artificial/natural are synthesized by this artificial fog.”¹⁸ The acknowledgement of an artificial creative device is layered with the fog/human interface as another duality. The fog is made of water, a universal symbol of life. It is a natural, biological entity that the body interacts with.

¹⁵ Yuji Sone, “Fujiko Nakaya’s Fog Performance and Embodied ‘Nature,’” *Studies in theatre and performance* 39, no. 2 (2019): 173.

¹⁶ Julie Martin, “A Brief History of Experiments in Art and Technology,” *IEEE potentials* 34, no. 6 (2015): 13–14.

¹⁷ Sone, “Fog Performance,” 170.

¹⁸ Yuji Morioka, “Interactive Landscape,” *Fog = 霧 = Brouillard*, 16-17.



"Children in Mist," *Foggy Forest*
Photo © The New York Times Company

At the same time, the fog exists in its billowing form because of a specific technology, so it is a technological entity, too. Wafting around each person, the fog is biological and technological, the body is immersed and separate, the human element is active in creating and passive in subsumption.

These three artists probe the boundary between the technological and the biological. Adham Faramawy proffers their own body, situated in technology but interacting with biology. Catherine and Margaret Wertheim offer a method for the body to act as technology that mimics biology, and Fujiko Nakaya facilitates the physical permeation of the body by biotechnological air. These artworks demonstrate a myriad of different ways the body can enact and interact with technology and biology both. Perhaps a way forward lies in merging the two sentiments. After all, multiple dimensions of being do not have to result in opposition; instead they can signal an endless, mixing-and-matching, cyborg fungus smorgasbord of possibility.

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