Biofloc and the Dynamic Self

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A drop of water can tell us so much about ourselves. It is, like us, a composite of moving parts. It is atoms which bond together, and minerals picked up along the way. It is the story of every rock encountered and every bend passed. It is a tear, a bead of sweat, a drop of rain on someone's neck. With every second that goes by, this water droplet changes. So do we.

Practically speaking, the "self" is defined intuitively; more easily identifiable than described. As we may experience a blue hue in the sky, but cannot give it a numerical value on the spectrum (say, 420nm), a mirror reflection suggests *this is me* even when one isn't sure what *me* is. At times, this lack of definition can create space for arbitrary guidelines and false boundaries. We may say: *I am a single unit*, *contained in my skin*, or *I am my thoughts*. The accompanying experimental documentary to this essay, presently titled *Drops of Water*, attempts to melt such boundaries. Melt these boundaries with some help from shrimp.

In the early 1990s, my grandfather developed a technique for improving water quality in fish and shrimp ponds, and this system was later dubbed Biofloc Technology. Aquatic animals, that is fish and shrimp, are grown not in clear water, but in an environment rich with bacteria and other microorganisms. These biological media bond, or flocculate, creating symbiotic clusters in the water. These clusters are important to the pond environment in many ways, the most significant being their transformation of toxic compounds into nutritional matter. That is to say, the bacteria

convert dangerous things into vital materials, which means more food for the animals and less frequent water replacement.[1]

Diving deeper into the research, I found this technique fascinating for increasing reasons, headed by environmental and philosophical interests. Environmentally speaking, aquaculture is the fastest growing sector for major food production,[2] and so it is worth paying attention to more sustainable systems. In typical fisheries, those which have yet to employ Biofloc or similar techniques, there is a heavy rotation of water, in which fresh water is brought in, and polluted water is released. That is to say, not only is a precious resource wasted, but the neighboring environment and its water bodies become compromised.

And so, my collaborators and I found ourselves in Kentucky, with Dr. Andrew Ray.

The origin of the trip was a practical one. Dr. Ray is a former graduate student of my grandfather's, back from the early days of Biofloc Technology. He is currently the head of a research lab at Kentucky State University, where he works almost exclusively on innovations in shrimp farming. In the process of filming this piece, shadowing Dr. Ray, we discovered in Kentucky a community of sustainable food producers, including farmers, educators, and restaurateurs.

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[1] Yoram Avnimelech, *Biofloc Technology - A Practical Guidebook*, 2nd ed. (WAS - World Aquaculture Society, 2014).

[2] FAO (Food and Agricultural Organization of the United Nations), *The State of World Fisheries and Aquaculture 2018 - Meeting the sustainable development goals*, Rome, 2018, http://www.fao.org/3/i9540en/I9540EN.pdf?segid=d3f80bd4-a1b4-4773-b948-2d4aaf6d794b, 5.

Kentucky was tobacco country. Air filled with an unmistakable musk. The route between Lexington and Frankfurt is ornamented with tobacco drying barns, stagnant as summer wind, yet charged by a violent past. As smoking has lost favor (or perhaps just moved overseas), these barns had been left mostly unattended. But one barn stands out.

Jason Whitis and Shrimp at Rolling Blue Farm, Lexington, KY
Film stills from *Drops of Water*, 2020-

Jason Whitis was a produce farmer for years before adding shrimp to his repertoire. He was wondering what to do with the decommissioned tobacco barn on his land, when he stumbled upon new research on shrimp farming, and the use of bacteria in water conservation. Then he found Dr. Ray. For over two years now, Whitis has been farming shrimp alongside his produce, while maintaining a constant relationship with Dr. Ray and his team. Whitis implements methods introduced to him by researchers from the university, and, in turn, offers feedback stemming from real world experience. The beauty of Whitis' Rolling Blue Farm is evident both experientially, in the misty interior which diffuses yellow light, as well as in what it stands for. The barn-turned-sustainable-shrimp-farm, particularly in a red state, in a place with a history of slavery and crops of disease, represents the peak of transformation. Everything is dynamic; and novel connections -- such as that of Dr. Ray and Whitis -- birth striking change.

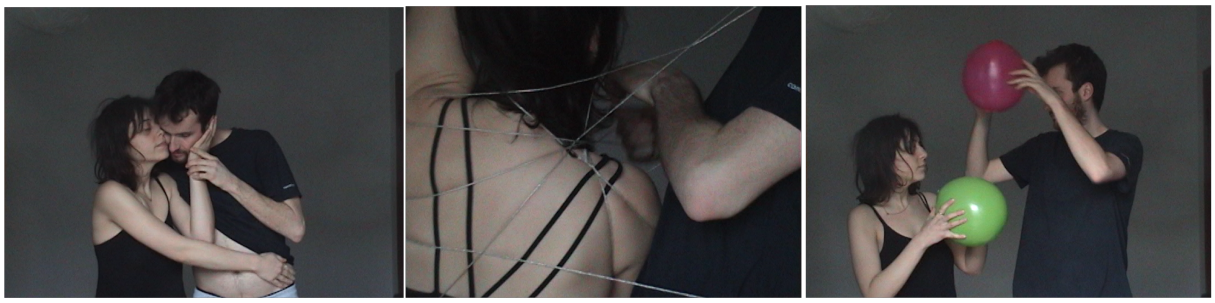
My philosophical interest in Biofloc Technology lies in what the clusters can suggest about ourselves. I see the interrelationships of bacteria within the clusters, as well as their symbiotic nature, as a window into an expanded idea of self. The clusters are energetic bonds that are in constant transformation. A typical floc (bacterial cluster) in a fish tank is separated and reconfigured about twice a day, transforming with the flow of water. What if we think of ourselves in this way?

We are every experience we have ever had. The drops of water on a tent above us, our mother's perfume that she doesn't even wear anymore. Cultivated, collected moments that are the fabric of our being, which we may call our perspective. And this perspective is contingent upon our matter, that is to say the physical material of which we are composed and makes up our likeness. As such, we are also our neurons and blood cells, our guttural bacteria and the oxygen flowing through our body. We exist in the binds of our perception and matter, in the energetic arms that connect all our parts. And this, like the bacteria in Biofloc, is dynamic and endlessly in transformation.

I think of a line in Lewis Carroll's *Alice in Wonderland*, from a conversation with a gryphon and mock turtle; one that involves talks of lobster, and shrimp, and, naturally, fish. The gryphon demands of Alice to hear of her adventures. Timidly, she replies, "I could tell you my adventures -- beginning from this morning, (...) but it's no use going back to yesterday, because I was a different person then."[3] Whether referring to a time outside Wonderland, or yesterdays in general, Alice suggests that she has changed so radically, that she is almost an entirely different

[3] Lewis Carroll, *Alice's Adventures in Wonderland* and *Through the Looking Glass* (Barnes & Noble Classics Series, 2004).

creature. But, at the same time, she has remained Alice. The self is so dynamic, that at times it's hard to recognize that it is still the same, and this is true, in relative respects, both for bacterial clusters and humans.



Becoming Bacterial Bonds performance (with Tom Claudon)
Film stills from *Drops of Water*, 2020-

Every scientific discovery, each technological development, alters how we may understand ourselves. Learning about the way the world functions is an introduction of new lenses. The discovery of neurons solidified the connection of mind and body, and new research on bacteria is dissolving what we have considered inherent parts of our being. In their paper, "How the microbiome challenges our concept of self," Tobias Rees, Thomas Bosch, and Angela E. Douglas argue that new research on microbiology should modify our understanding of what it is to be human. We put much emphasis on our brain and DNA as determinations of one's selfhood, yet in recent years, it has been discovered that microbes, which are free roaming travelers, have a significant effect on both.[4] This, then, must mean that human selves are far more dynamic than previously thought. We are a diverse "internal" environment (our guts, our cells), and are affected by an external one (the food we eat, the bacteria we touch), and thus may think of ourselves as expandable beyond the boundaries of skin.

[4] Tobias Rees, Thomas Bosch, and Angela E. Douglas, "How the microbiome challenges our concept of self," *PLOS Biology*, 16(2) (February 2018).

Bacterial foam at Kentucky State University Aquaculture Center
Film still from *Drops of Water*, 2020-

Contemporary scientists and philosophers are joined by artists, in the quest to transform ideas of self through the lens of the natural world. Anicka Yi, for one, has used human bacteria as stand-ins for people in her giant petri dish at The Kitchen (NYC),[5] and Heather Dewey-Hagborg reconstructs people through their DNA traces left in gum and cigarettes.[6] What is particularly interesting in regards to these contemporary works is that they do not turn to anthropomorphism in the diffusion of human and nature, but rather address their material in nonhuman terms. That is to say, algae is algae, cells are cells: they are not given human qualities as a means to assimilate what is regarded as "human," and that which is called "nature." Thinking about our selfhood through other organisms means letting go of humanity as distinct, and looking at

[5] Anicka Yi, *You Can Call Me F*, 2015, The Kitchen, New York, NY.
[6] Heather Dewey-Hagborg, *Stranger Visions* (2012–).

ourselves in alternative fashions. While F. T. Marinetti and I part ways on many ideas, not limited to my pacifism and his love of war and fascism, I find beautiful insight in his manifesto on syntax: "Instead of humanizing animals, vegetables, and minerals (an outmoded system), we will be able to *animalize*, *vegetize*, *mineralize*, *electrify*, or *liquify* our style, making it live the life of material. For example, to represent the life of a blade of grass, I say, 'Tomorrow I'll be greener.'"[7] To think differently is to identify novel syntaxes through which ideas may be processed.

This approach is recognizable in the practice of artist and writer Agnieszka Kurant. For one of her more prominent series, Kurant creates sculptures together with termites.[89] After finding abandoned colonies, she uses them as casts for moldings, which result in complex pieces. In this process, Kurant works through comparisons between structures in the natural world and those of humans, thereby dissolving distinctions between the two. Kurant's idea is not reserved exclusively for her sculptures. The amalgamation of human and nature is prevalent also in her writing, such as in a 2016 piece for *Cabinet* magazine. In "UNCOMPUTABLES," Kurant makes a similar comparison to that of termites and humans, though this time using slime mold. "Slime mold is an example of an emergent structure, a behavior also found in other animal groups, including ants, termites, bees, fish, and birds," she writes. "Left to regulate themselves, groups of human beings also tend to produce spontaneous order out of which something new emerges: a pattern, a decision, a structure, or a change in direction."[10] Such assimilation is useful for

[7] F. T. Marinetti, "Destruction of Syntax -- Imagination Without Strings -- Words-in-Freedom 1913," in *Futurist Manifestos*, ed. Umbro Apollonio (MFA Publications, 2001), 95-106.
[8] Arguably, Kurant has taken advantage of termite colonies in order to support her own artistic practice, for which she is paid a significant amount of money.
[9] Agnieska Kurant, *Artificial Artificial Intelligence* (2014-).
[10] Agnieszka Kurant, "UNCOMPUTABLES," *Cabinet Magazine*, issue 61 (Spring–Summer 2016): 51-59.

expanding an idea of self through lenses of the natural world, and highlights the disadvantages of distinguishing humans from other creatures. Other creatures, such as bacteria.

If we are to reconsider our selfhood in light of Biofloc Technology, we may think, then, in what ways is our self dynamic? How do shifts within our bodies change who we are? In what ways do relationships, with other people, with the environment, alter our sense of self? These questions are given life in the film in the form of performances, in which human bodies interpret the dynamism of biofloc. Dancers become bacteria. Lovers try to bind. In these performances, the expanded self, which is prevalent in nature, is offered to the rigidly defined "human."

The performances also allude to the collaborative nature of this piece. They feature myself and collaborators, working through different bacterial traits. In one video, my partner, Tom Claudon, and I try to bond with each other, as Biofloc microorganisms would, by sticking to each other, tying ourselves up, and using static electricity. Another performance (*Dynamic Self*), made with a movement instructor, Miguel Solano, interprets the dynamism of bacterial clusters as human-to-human connection. The performers in *Dynamic Self* connect and disconnect with each other, each time creating new structures, novel selves.

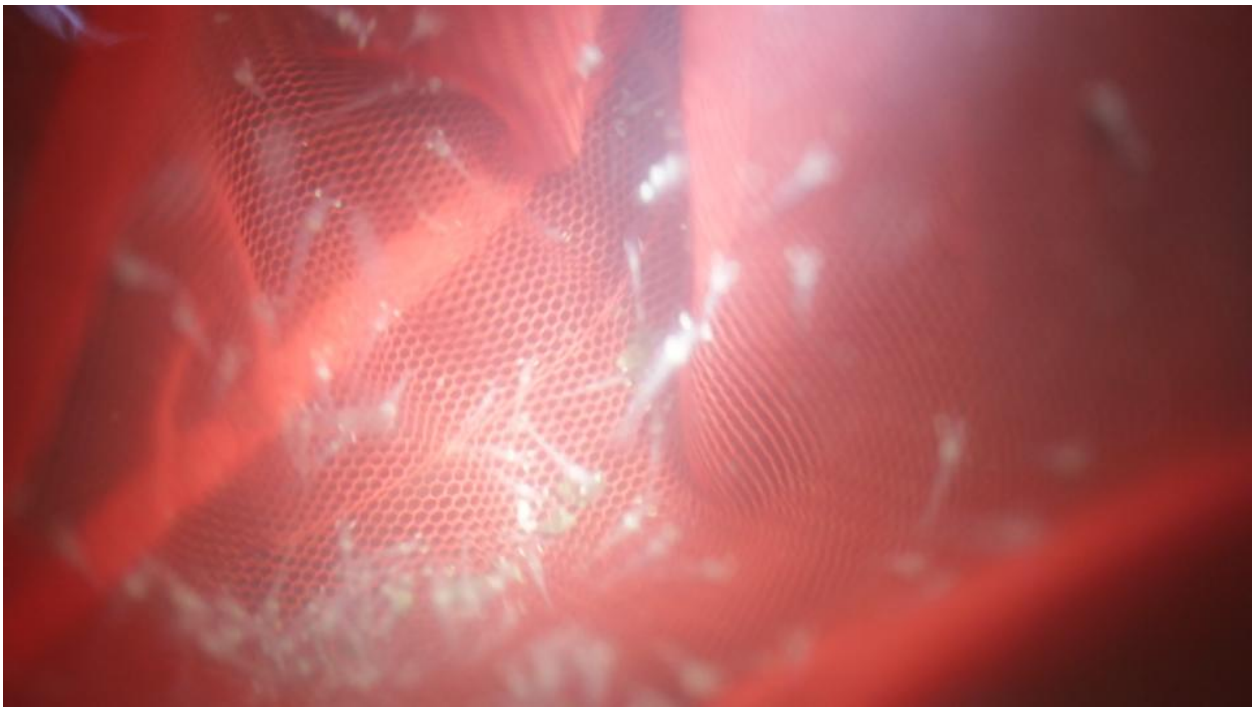
The collaborations in the film extend to the cameras used, of different formats and ways of seeing. The Mini DV, its delicate tapes and digital zoom, experiences the world like none other. Water turns into abstract patterns, and human skin becomes grains of sand. On the other hand, the DSLR is able to freeze motion, to slow down time in its sharp sensor and frame rate. Together they provide a clustered or expanded experience of moments captured. The film has

been shot, thus far, by four distinct cameras, as well as eight people: myself, Adrian David, Priscilla J Gaona (Pejota), Ercik Tuto D., Kendall Jacob, Miguel Solano, Kylie Bryant, and Sarah Binetsch. In Kentucky, Adrian David filmed alongside me, and in *Dynamic Self*, the on-camera participants also captured moments as they saw fit, passing the cameras to each other as they moved their bodies. Just as shrimp farms in Kentucky and bacterial clusters suggest a dynamic notion of self, so does the artistic collaboration in this film. Every hand which touched this work expands the notion of what it may be.

Dynamic Self performance (L to R): Miguel Solano with a camera, Passing the Camera
Film stills from *Drops of Water*, 2020-

This experimental documentary is a cluster in and of itself, born of interspersed material and collaborative making. Documentary footage, conversations, and performances are woven together, threaded by the bodies and perspectives of collaborators. I find this significant not only in respect to the subject matters at hand, but to my relationship with art in general. In R. G. Collingwood's *The Principles of Art*, he defines art as a conscious activity, of experience and expression. For him, the artist and viewer, the author and collaborator, are one of the same. "The aesthetic activity (...) is a corporate activity belonging not to any one human being but to a

community."[11] This piece tries to be just that: to belong not to one person, but to a community of people, of cameras, and of bacteria.



Baby shrimp at Kentucky State University Aquaculture Center
Film still from *Drops of Water*, 2020-

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[11] Robin George Collingwood, *The Principles of Art* (Oxford University Press, 1958), 324.

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