

Talking Through Tubes: Molecular Ecologies of Place

Dr. Clarissa Ribeiro, Dr. Rute Anacé

Affiliation (s): Roy Ascott Studio, DeTao at SIVA and The University of Fortaleza; Universidad de Salamanca.

Location, Country: Shanghai, China; Fortaleza, Brazil; Salamanca, Spain

Contact Emails: cr@clarissaribeiro.com, ruteredes@gmail.com

Abstract

This paper dialogues with the sub-theme Ecologies of Place considering exploring the interplay of physical, digital, and ecological elements from cross-scale perspectives that have the potential to shape our understanding and experience of place. Presenting and discussing aspects of the interactive installation ‘Talking Through Tubes’ (2023-2024) the artist explores and interprets these layered ecologies, considering the interactions of human, non-human, and technological actors in shaping sustainable and interconnected places in the digital age. Foregrounding the ‘semantic aspect of shamanism’ in the technoetic context, the work revisits the term ‘shamantic’ introduced by Roy Ascott in 1996, related to all that transcends macroscale. Placed on city trees in gardens, squares, and sidewalks, the ‘*relational system*’ (more than a *relational object*) that belongs to the series “Inhaling Consciousness” — a tree branch (tree) to which is attached a flexible tube hose/prosthesis, flexible PVC pipe, Arduino, dust sensor, LCD — is a cross-scale creative and critical exploration of manifestations of ‘tube’ as both object and concept, relating these to the body. The audience/pedestrians are invited to play with the tube, holding and moving freely, blowing air through the tube (an extension from the tree’s body, extending the or to the human body) or inhaling from its interior promoting microbial exchange between humans and trees microbiota —helping heal broken biotic conversations in anthropogenic contexts.

Keywords

Human and Non-human Agents, Tubes, Shamanic, Technoetic Aesthetics, Relational System, Amazonian Tucano People’s Cosmology, Ecology-as-Cosmology, Ecological Consciousness, Microbial Trades, Dysbiosis, Gut-Lung Axis, Anthropogenic Landscapes, Inhaling Consciousness, Cosmopolitics.

Introduction

Considering microorganisms as ‘mediums’ — from a ‘shamantic’ [1] perspective, from the term introduced by Roy Ascott in his “Technoetic Aesthetics: 100 terms glossary”, originally published in Japan in 1996, this paper places an invitation to explore, through the work “Inhaling Consciousness: Talking Through Tubes” (2023-2024), bio-eco-psychological aspects of the vital molecular trades between the human body and biodiverse environments that include trees and other plants. The invitation includes meditating on how the awareness of the synchronicities between the trees’ microbial complexity and humans’ gut-lung axis can potentially impact the search for climate solutions.



Figure 1. ‘Inhaling Consciousness: ‘Talking Through Tubes’ (2023-2024) —The audience is invited to ‘blow through the flexible tube (prosthesis) that connects her digesting and respiratory systems (the gut-lung axis) to the tree’s branch’s microbiota allowing ‘molecular trades’ to take place. Image by the author.

From Christine [2] and Stephen [3] Hugh-Jones recent and past anthropological incursions that express their perspectives and understandings of aspects of the Amazonian Tucano Peoples’ mythologies and cosmologies, I explore in the conception of the installation, how ‘Shamantic spells

‘ — when the audience gets involved in a cross-scale experience invited to blow breath through a tube connected to a tree’s branch and Arduino, sensor and LCD displaying the number of circulating particles —, can draw analogies between flows of air and various tangible and intangible flows of substances such as blood, breath, and sound that flow from tubes as the indices of vitality, energy, and generative capacity [2] [3] [4]. When someone from the audience ‘blow breath through the tube-prosthesis’ — the evoked ‘shamantic’ draws analogies between bacteria, fungi, water droplets, bodily fluids, and sound, “that flow from tubes as the indices of vitality, energy, and generative capacity” [4] — feeding, in this case, real microbial and molecular trades, integrations, wars, entanglements.

In his experimental essay “Thinking through Tubes: Flowing H/air and Synaesthesia” published in 2019 [4] Stephen Hugh-Jones brings together allusions to tubes that appear throughout Amazonian ethnography in an effort to consider these tubes more systematically. What emerges from this intent is the *tube* as an implicit conceptual category and way of thinking, acting, and ordering the world where the tubes of the body, tubular artifacts, and tubular features in the environment as transformations of one another, and where bodily processes of respiration, digestion, excretion, bleeding, hair growth, sex, gestation, and birth merge into one another.

In the installation (figure 1) ‘Inhaling Consciousness: Talking Through Tubes’ (2023-2024), the tube and Arduino-centered-system for ‘performative data visualization’, is a cross-scale prosthesis, a ‘relational system’ (more-than-object), ‘a vehicle but an analogy’, ‘an object but a media’ — *evoking tube as* “an implicit conceptual category and way of thinking, acting, and ordering the world.” [4]

Stephen Hugh-Jones observes that, in the Amazonian ecology-as-cosmology, the *tube can be understood*

“a shorthand for what are simultaneously a set of objects; processes or flows that these objects make possible; procedures that allow people to direct and control these flows for personal, social, and cosmic ends; and a set of understandings about the roles, positions, and relative standings of men and women.”[4]

According to Hugh-Jones [4], analogies between different tubes and the ‘fungibility of that which flows through them, can also mean that, “[...] in musical ritual, flute players become one with their instruments, ornaments take on the character of bodily flow, and sound fuses with color in synesthetic play.”[4] In a paper in which he explores the personhood of objects about a story about ‘a spirit with no anus’, Hugh-Jones [5] traces links between the story and various pottery trumpets, suggesting that the philosophy of *body-tubes* that Lévi-Strauss sees as characteristic of Amerindian pottery mythology is possibly best exemplified in the story of Jurupary.

Ecology-as-Cosmology

Considering a convolutional perspective that entangles ecology and cosmology, Philippe Descola [6] revisits the late Colombian anthropologist Gerardo Reichel-Dolmatoff’s considerations in the 1970s in which he argues that some of the Amazonian people’s ‘[...] cosmologies

could be considered as a form of ecological knowledge, as a metaphorical model describing the intricate network of interactions between living beings within their habitat.”[6]

Descola mentions that Reichel-Dolmatoff sees these beliefs from the Amazonian indigenous people as “[...] implemented in such a way, through cultural prescriptions and prohibitions, that they played a crucial role in maintaining local ecosystems in a desired state of homeostasis. “ [6] This perspective can lead to an understanding of such the Amazonian cosmologies as nothing less than symbolic transpositions of the objective properties of a very specific environment and, ‘[...] in their internal architecture, at least, they would be both a reflection and a product of a long and successful adaptation to a highly complex milieu characterized by a high rate of biodiversity.” [7]

Descola highlights that [7], many Amazonian cosmologies indeed offer a representation of the great web of life which echoes the type of complex ‘entangled feedback-loop processes’ involving organisms that are a part of the Amazonian rain forest biodiversity. By contrast with a dualist perspective in which humans and non-humans (or more-than-humans — all ‘anthropocentric terms) tend to be distributed in two distinct ontological domains, Amazonian indigenous peoples tend to treat, as highlighted by Descola [7] the discontinuities between humans, animals, and plants as mere differences of degree, not of kind.

Descola [7] considers that Amazonian relativism goes much further than Western counterparts, being characteristically non-anthropocentric due to the fact that,

“[...] social existence and cultural institutions attributed to non-humans are mostly modeled on the type of behavior that is deemed proper among the indigenous people what admits that multiple visions of the world can cohabit without entering into contradiction and that humans are not granted any special privilege in terms of knowledge, morality or preordained mastery over the destiny of other species.”[7]

From Descola [7] we can understand that, for the Amazonian indigenous communities, the anthropocentric perspective is only more encompassing as it can account for all the adjustments required by interactions between an entangled complexity of organisms that —from a human understanding of the sensorium, as I can observe, are not considered to be aware of the particularities of their perception of the other/others and the environment they are related to, directly or indirectly. In that sense, “[...] these cosmologies could indeed be likened to the type of ecological knowledge produced by a team of biologists who would consider themselves as a minor component of the environment they study.”[7]

At one point, Descola [7] questions if this systemic conception of the biosphere common to many native peoples in Amazonia can be traced as a consequence of the properties of their environment since ecologists define the tropical rain forest as a generalized ecosystem that means, characterized by the combination of an extremely high diversity of species with a very low density and a high dispersion of the individual members of each species. in synesthetic play.”[4]

A convolutional molecular ecology

It is a matter of fact that, this ecological biodiversity is being increasingly linked to human health issues related to microbiome diversity. Relevant studies point to a relationship between gut microbiome health and mental health having, as an example, linking dysbiosis and inflammation of the gut as the cause [8] of several mental illnesses including anxiety and depression, which are prevalent in contemporary industrialized societies. This is due to the fact [8] hormones, neurotransmitters, and immunological factors released from the gut are known to send signals to the brain either directly or via autonomic neurons.

Evidence confirming the existence of the ‘gut-brain axis’ (GBA) [8] was offered in a study by Nobuyuki Sudo and his team from the Department of Psychosomatic Medicine, Kyushu University in Japan [9] and, in subsequent studies, the GBA is considered to extend even beyond these two systems into the endocrine, neural, and immune pathways.

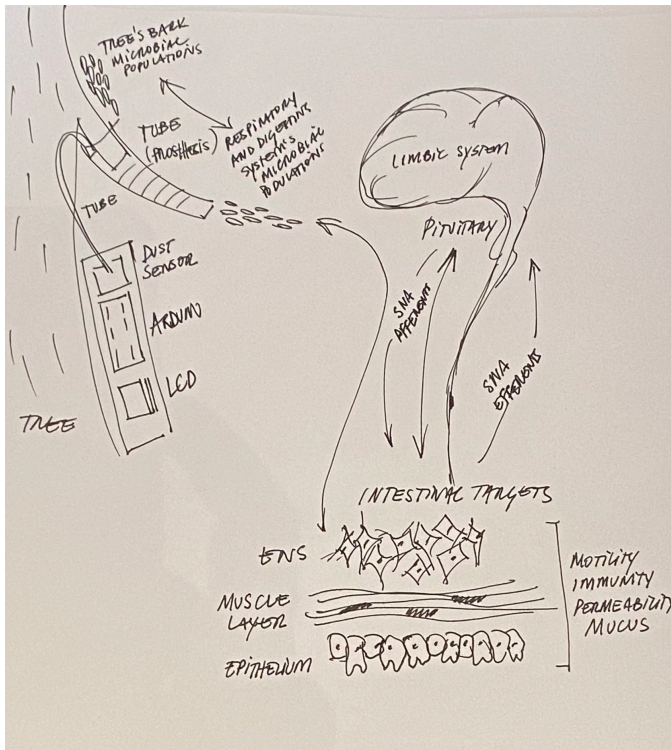


Figure 2. In “Inhaling Consciousness: Talking Through Tubes” (2023-2024) the ‘relational system’ can be extended into a ‘relational polysystem’ — understood from a cross-scale perspective — as including both the humans and tree’s biological-molecular systems. Image by the author.

In “Inhaling Consciousness: Talking Through Tubes” (2023-2024) the ‘relational system’ (more than a relational object) can be extended into a ‘relational polysystem’ that integrates the human body’s GBA and the tree’s bark microbial population in a ‘convolutional molecular ecology’ that entangles the humans and tree’s biological-molecular systems (figure 2).

The prosthetic apparatus that extends the tree branch, comprising of a flexible tube hose/prosthesis, flexible PVC pipe, Arduino, dust sensor, LCD — is intended as part of a cross-scale creative and critical exploration of manifestations of ‘tube’ as both object and concept, relating to possible efforts in linking ecology and cosmology — *ecology-as-cosmology* —, that implies reframing our understanding of the human body — from its objective isolation to a more integrative, cross-scale perspective gestated from a technoetic point of view in which art, science, technology and the mind play critical roles.

The mechanisms underlying GBA [10] communications involve neuro-immuno-endocrine mediators considering this bidirectional communication includes the central nervous system (CNS), comprising the brain and spinal cord, the autonomic nervous system (ANS), the enteric nervous system (ENS), and the hypothalamic pituitary adrenal (HPA) axis.

Ecological Entanglements: Ecosystems’ complexity and human health

Ana Paula Schaan and her team [11] from the Human and Medical Genetics Laboratory Program at the Federal University of Pará, Brazil, report the results of research focused on exploring how gut microbiome metagenomic characterizations across multiple human populations have helped to understand the impact of a complex ecosystem in human health, by comparing individuals living in rural and, or traditional societies and the ones living in urban areas in the Amazon. The majority of studies confirm that the individuals of populations living in rural areas that are complex biodiverse areas including plants in this biodiversity — have highly diverse microbiomes when compared to those from industrialized areas.

The researchers used [11] 16S ribosomal RNA sequencing to characterize the gut microbiome of 114 rural individuals, namely Xikrin, Suruí, and Tupaiú, comparing with the samples from urban individuals from Belém city, in the Brazilian Amazon. The results [11] point to a certain degree of potential urbanization affecting the gut microbiome complexity of rural Amazonian communities that are characterized by “[...] the gradual loss and substitution of taxa associated with rural lifestyles, such as *Treponema*. “[11]

Among the Amazon people, the Yanomami [12] were originally mountain people who were first contacted in the mid-1960s, and still nowadays, despite struggling to survive [13] [14], live seminomadic hunter-gatherer lifestyles in the Amazon forest. In Venezuela, they inhabit a region protected from development, and many still inhabit uncharted villages in the vast mountainous Yanomami territory [12]. These remote populations have lifestyles similar to those of human ancestors and have been forced to be exposed to modern practices known to exert antimicrobial effects that can sadly lead to their decimation [13] [14]. Jose Clemente and his team at the Department of Genetics and Genomic Sciences, Icahn School of Medicine at Mount Sinai, New York, sequenced [12] the V4 region of the 16S *rRNA* gene from fecal, oral, and skin samples and compared the data with those from previous studies in the field.

The microbiome of the uncontacted Yanomami exhibited “the highest diversity ever reported in any human group.” [12] The diversity in feces and skin was significantly higher in Yanomami when compared with the one of the U.S. subjects. It must be related to the fact that according to the researchers [12], the consumption of highly plant-based diets such as those followed by traditional hunter-gatherers and rural agriculturalists “[...] promote gut colonization by fiber-degrading microbes, such as those from the *Spirochaetes* phylum and *Prevotella* genus.” [12] The Yanomami people — as exhibit unprecedented levels of bacterial diversity — have been regarded as a “window into the past” by researchers in the field, considering that these hosts adopt a lifestyle comparable to that of ancient pre-industrialized human societies. Comparatively [11] gut microbial communities of industrialized societies seem to have been altered and are increasingly enriched for mucus-degrading and antibiotic-resistant taxa, which may trigger pro-inflammatory responses and gut dysbiosis. Urbanization and shifts in dietary habits are likely the cause of gut microbial extinctions across generations [11], disrupting the human host.

A formidable diversity of life forms

As envisioned by Philipp Descola [7], immersed in a “formidable diversity of life forms seldom observable in homogeneous sets” [7], Amazonian indigenous populations can be seen as having the opportunity of embracing ‘as a totality’, “the heterogeneous conglomerate of interacting animals and plants permanently soliciting their attention.” [7] From the cross-scale informational complexity of being immersed in such biological diversity, navigating truly ‘moist media’ [16] — all media before and beyond bits and computer technology that can, by surpassing present from the past, propel us all into the future,— ‘yielding to the mirage of diversity’ [7], they might have been “[...] incapable of disentangling themselves from their environment, prevented from discerning the profound unity of nature behind the multiplicity of its particular manifestations.” [7]

These nondualist cosmologies, ecologies-as-cosmologies, in which or from which humans are not the hegemonic forces and perspectives that force all ‘else to their desires or needs, are perceived, considered, placed, or, better, ‘entangled’ in an ‘everywhen’ in which they are participants in an “[...] all-embracing chain of energy exchange and identity-building.” [7] This can be seen as a sort of ‘perfect homeostasis’ in which, undoubtedly, the shaman, is a key ‘force’ — intervening in subsistence activities to ensure that they will not endanger the regeneration of non-humans. In the perspective offered by Descola,

‘[...] shamans will control the quantity and dilution of the vegetal fish poison used in fishing parties; likewise, they will indicate the exact number of peccaries that may be killed when a herd has been spotted. But it is above all in the rituals related to subsistence activities that the shamans reputedly play the most important role in this regulating process;

Considering exploring humans, such as shamans, as forces that can play a key role in regulating awareness of our

ecosystemic entanglements, “Inhaling Consciousness: Talking Through Tubes” (2023-2024) — and ‘relational system’ that can be extended into a ‘relational polysystem’ — the effort is to promote and simultaneously feeds from a cosmopolitical perspective, not in the sense advocated and promoted by names such as Bruno Latour but from the understanding of Philippe Descola, which uses cosmopolitics in a sense “[...] (which is perhaps more down to earth and certainly more faithful to the etymology of the term), which is as the name for the operators that relate worlds and manage to bring together and to articulate things and beings that otherwise would seem to exist on different ontological planes.” [7] Cosmopolitics can be seen as the forms these associations take, each constituting a world of its own that can allow all to be viable.

Shamantic Relational Systems (more than ‘relational objects’)

“It is as if, through our bio-telematic art, we are weaving what I would call a “shamantic” web, combining the sense of shamanic and semantic, the navigation of consciousness and the construction of meaning.” [17]

When Roy Ascott in 1998, after an immersive experience in Brazil with Kuikuru pagés (shamans), and his initiation into the Santo Daime community [17] — taking part in an Ayahuasca ceremony, wrote the essay “Weaving the Shamantic Web: Art and Technoetics in the Bio-Telematic Domain” [17], from his perspective, the term ‘shamantic’ foregrounds “[...] the semantic aspect of shamanism in the technoetic context,” as highlighted by Edward A. Shanken [18] and mentioned above.

Shanken [18] observes that, in Roy Ascott’s perspective, science and technology can contribute to expanding global consciousness, but only with the help of alternative systems of knowledge, such as the I Ching the Taoist Book of Changes, “[...] parapsychology, Hopi and Gnostic cosmologies, and other modes of holistic thought that the artist has recognized as complementary to Western epistemological models.” [18] Ascott’s composite and associative way of thinking can be seen [18] as challenging conventional systems of knowledge to welcome together in cooperative mode, global East and West, science, and mysticism, having the concept of “technoetics” acknowledging the complementarity of “technological and ritualistic methods for expanding consciousness and creating meaning.” [17]

Considering Ascott’s theories can be interpreted as aesthetic models for reordering cultural values and recreating the world, it is important to understand that he recognized the paradoxical nature of knowledge and the contradictions inherent in formal epistemologies. When talking about the Scanning Tunneling Microscope STM, Roy Ascott [17] sees it as a ‘prosthesis of vision’ that can be at the same time instrumental in constructing what is envisioned. The prosthesis in “Inhaling Consciousness: Talking Through Tubes” (2023-2024) is not intended to be technologically potent as the STM to reveal molecular level reliefs but can invite, as metaphorical cross-scale prosthesis, to realize there are ‘microbial trades, molecular trades, taking place across the tube, via tube, facilitated by the ‘tube’ — an actual physical prosthesis as an extension of the tree’s branch.

Talking Through Tubes: Molecular Conversations

In “Inhaling Consciousness: Talking Through Tubes” (2023-2024), the molecular traits across the tube are not fictional but real and the invitation placed by the ‘relational system’ to blow air/breath through the tube is intended to raise awareness about the importance of these trades — informational trades — for (public) mental and ecosystems health-related issues. If part of this ‘relational system’ can work as an extension of the ‘naked eyes’ — similarly to the STM, it is the inclusion of a dust sensor and LCD showing the live collected data related to the ‘amount of particles in transit’. This ‘relational system’ can be seen as a ‘low-tech’ ‘prosthesis of vision’ and, even so, following RoyAscott’s considerations, “[...] can be at one and the same time instrumental in constructing what is envisioned.”[17]

Sharp’s GP2Y1010AU0F is an optical air quality sensor, an optical dust sensor designed to ‘sense’ dust particles since having an infrared emitting diode and a phototransistor diagonally arranged to allow it to detect the reflected light of dust in the air.



Figure 3. “Inhaling Consciousness: Talking Through Tubes” (2023-2024) — tube (tree’s branch prosthesis to blow the breath through) and secondary tube that enters the detection area of the GP2Y1010AU0F sensor that sends input (data) to the Arduino and attached LCD for ‘performative data-visualization’. Image by the author.

The GP2Y1010AU0F is especially effective in detecting very fine particles and is frequently used in air purifier systems, detecting particles larger than $0.8\mu\text{m}$ in diameter, mounting holes size of 2.0mm , and air hole size of 9.0mm .

In the installation “Inhaling Consciousness: Talking Through Tubes” (2023-2024) when the breath is blown inside the tube (tree’s branch prosthesis) and enters the detection area of the GP2Y1010AU0F sensor, the light inside the sensor gets reflected from the dust or smoke, as a result, the current generated by the photodiode varies by the amount of the detected light and, by converting and amplifying the current value to voltage value with proper circuitry, it is possible to get the output and the data can be shown on the LCD attached to the Arduino.



Figure 4. A student participating in one class of the course ‘Moistmedia’ (2023), led by Professor Clarissa Ribeiro, Roy Ascott Advanced Program in Technoetic Arts (2023) was invited to ‘blow through the flexible tube (prosthesis) that connects her digesting and respiratory systems (the gut-lung axis) to the tree’s branch’s microbiota allowing ‘molecular trades’ to take place. Image by the author.

Formerly regarded as small ‘containers’ of nucleic acids [19] with randomly diffusing enzymes, bacteria are organized by sophisticated and tightly regulated molecular machinery. Depending on the growth conditions and other factors, the volume of a bacteria such as *E. coli* considerably varies from $0.22\mu\text{m}^3$ ($1\mu\text{m}$ length, $0.6\mu\text{m}$ diameter) to $3.27\mu\text{m}^3$ ($4.5\mu\text{m}$ length, $1\mu\text{m}$ diameter) [19] The smallest bacterium, *Mycoplasma*, is roughly the same size as the largest viruses (0.2 to $0.3\mu\text{m}$), whereas the largest bacteria in the world, *Thiomargarita magnifica* [20], may reach lengths of up to 2cm and be seen with the naked eye.

The importance of the climate of the microorganisms goes far from their size and organic complexity and the atmospheric dynamics in which they get involved, through breath, can influence the local transit of microbial population between humans and between humans and the environment. A team of researchers from the Singapore Centre for Environmental Life Sciences Engineering (SCELSE) at Nanyang Technological University (NTU) led by Stephan Schuster, reported that tropical air had a microbial diversity from bioaerosol communities (airborne particles of biological origin) have a high number of bacterial and fungal species, following a diel cycle (a 24-hour day and night cycle) which is believed to be influenced by [21] environmental conditions such as humidity, rain, solar irradiance and carbon dioxide levels.

Relational Breathing

“In manipulating the “relational object,” the subject lives out a pre-verbal image. The “relational object” directly touches the subject’s nucleus (emphasis added).” [25]

Considering inviting the audience to gain awareness about these connections and microbiological and molecular entanglements between humans and the environment, the installation “Inhaling Consciousness: Talking Through Tubes” (2023-2024) places a more specific invitation — in the design of the ‘relational system’ (more than a relational object taking its cross-scale relational essence)—to explore the synchronicities between trees’ microbial complexity and humans gut-lung axis and the potential contribution of the awareness about these relations in the search for climate solutions. Fungi and bacteria inhabit biodiverse ecosystems that include trees being present in the bark surface, roots, and the rhizosphere. The complexity of this microbial biodiversity is essential to understanding bio-eco-psychological aspects that can inform a meditation on how anthropogenic landscapes drive dysbiotic lifestyles promoting a disconnection that can influence climate crisis but can also include eco-psychological imbalances that can lead to conflicts.

Considering that [21] humans breathe in approximately 11 cubic meters of air daily that can contain some 50 thousand organism cells in the tropics during the day time, but 30 to 100 times that amount at night [21], it is suggested by recent studies that [21] air microbial communities play a central role on the environment and human health, with impacts on respiratory conditions to agriculture.

Exhaled breath condensate (EBC) is used as a non-invasive method for disease diagnosis and environmental exposure assessment [22] that can help understand — visualizing — how, through talking, coughing, sneezing or even singing the microorganisms can be exhaled and spread into the ambient environment [22]. The transit and interchanging of microbial populations help bridge the environment and the human body. Similar investigations are helping to understand how [23] both locally and systemically, the immune system depends on the microbiota for growth, education, and proper function.

Recent research and epidemiological data point to an important “gut-lung axis” (GLA)—a cross-talk between the lungs and the intestinal flora. Altered immune responses and airway homeostasis are connected to changes in the gut microbiome’s contents brought about by illness, nutrition, or pharmacological interventions (such as antibiotics).

Unveiling the dynamics of metabolites and components generated from gut microbes [23], including short-chain fatty acids (SCFAs), as important mediators for regulating the tone of the immune system, the significance of the gut-lung axis has grown. A weakened ability to develop sufficient local and systemic immune responses is linked to disruptions in the composition of the gut microbiota, which can be caused by hereditary or external factors such as specific diets and exposure to anthropogenic or biodiverse environments — in rura and urbanized areas.

Both inflammatory diseases of the gastrointestinal tract and the airways, including asthma and chronic obstructive pulmonary disease [23], have been connected to this gut dysbiosis in humans.



Figure 5. LYGIA CLARK, *PEDRA E AR [STONE AND AIR]*, 1966. Image by: The World of Lygia Clark Cultural Association, Rio de Janeiro, Brazil [25].

The work places a specific reference to Lygia Clark series of relational objects. As observed by Adrian Anagnost, in the 1960s, the Brazilian artist Lygia Clark started moving away from distinct things whose intended purpose was aesthetic contemplation. Rather, she focused on viewer interaction and physical engagement through her tactile, wearable, and shareable works. The heads of performers in Clark’s *Máscaras Sensoriais [Sensory Masks]*, 1967–1968, were encased in sculptural hoods. Sachets with a variety of textures and scents (cloves, lavender, and a briny coastal smell) were nestled inside the folds of the hood. These sachets would encourage users to withdraw from their visual surroundings in favor of a rediscovery of physiological sensation and an immersive inner world when combined with a confusing reduction of visual stimulation. Simultaneously, Clark’s 1967 *O eu e o tu [The I and the You]* attempted to cause a state of collective disorientation by having two participants wear rubber suits that were attached like an umbilical cord. Participants were encouraged to investigate the nooks and crannies in both their own and their partner’s outfits. Clark’s artistic explorations oscillated between individuality and community during the 1960s. Nonetheless, as highlighted by Adrian Anagnost [25] the goal of all these pieces was to broaden the scope of creative experience. Art evolved from being an analysis of a painting or sculpture to an intersubjective activity based on emotive embodiment.

According to Adrian Anagnost [25], scholars have connected these works to Clark’s studies of Austrian-British psychotherapist Melanie Klein and her pupil D. W. Winnicott because of their emphasis on orality and nonverbal or preverbal communication. Clark was intrigued by Winnicott’s research on “transitional objects,” such as blankets or soft toys that kids touch, caress, bite, chew, hug, hit, and grip, as well as Klein’s theory of the oral integration stage during infancy as a means of differentiating self from other.

According to Winnicott's theory, these items helped kids distinguish between "me" and "not-me," which made it easier for them to realize that there was a world outside of themselves. The hope is that the 'relational system' in "Inhaling Consciousness: Talking Through Tubes" (2023-2024) can help reframe our understanding of the human body with its integration with other-than-human existences.

Final Considerations: Gut-Lung-Worldviews

"It was claimed that everywhere and in every age, an unchanging mute and impersonal nature established its grip, a nature that human beings strove to interpret more or less plausibly and from which they endeavored to profit, with varying degrees of success." [24]

Using low-tech electronics to explore aspects of 'performative data-visualization' [5] — being the audience-actor responsible for triggering the functioning of the systems through the act of breathing, blowing breath through the tube (tree's branch prosthesis) — I intend to explore shamantic as a quality of the 'entanglement of natural systems' that can be perceived, highlighted, made visible, through the use of 'computer technology' — on our way to return to the past walking through the future.

The connection to the conceptual strength in "Everywhen" is the hope that the forces driven by our decolonizing efforts including art and technology can help reimagine and reclaim 'ecologies of place' fostering the interplay of physical, digital, and ecological elements that shape our understanding and experience of place — beyond the macro-scale exploration and interpretation of multilayered ecologies and the interwoven interactions of human, more—than—human, and technological actors in shaping sustainable and interconnected places in the digital age.

The 'relational system' "Inhaling Consciousness: Talking Through Tubes" (2023-2024) is intended to help uncover hidden molecular, microscopic stories, and amplify marginalized microbial and molecular voices in our organisms and in the environment. ,

The intention cooperates with a "new cosmology" [24] that had emerged as a collective invention that "provided an unprecedented framework for the development of scientific thought [...]." [24] In a moment that, facing climate disruptions, we pay the price of simplification from intellectual and material engines that have driven us to judge everything according to our own particular norms, the work invites us to reframe those mutilated perspectives and partner with ancestral complexity in search for ecological and cosmological healing.

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Authors Biographies

Dr. Clarissa Ribeiro, Program Coordinator of the Roy Ascott Studio Advanced Program in Technoetic Arts at SIVA/DeTao in Shanghai, has been honored with the Pete Townshend Endowed Senior Lectureship in Performative Technoetics (2022-2024). Ph.D. in Arts (ECA USP Brazil, Poéticas Digitais/CAiiA hub of The Planetary Collegium, UK), Fulbright Postdoctoral Scholarship awardee (UCLA, Art|Sci Center/James Gimzewski Lab, US), M.Arch. (IA USP, Brazil), B.Arch, member of the UCLA Art|Sci Collective (2013-present), is the chair of the first Leonardo/ISAST LASER talks to be hosted in Brazil/Latin America (2017-present). The core of her explorations is the interest in cross-scale information and communication dynamics that impact and shape macro-scale emergent phenomena. She explores the metaphysics of information visualization in subversive morphogenetic strategies that welcome the animistic to navigate ecologies as cosmologies.

Dr. Rute Anacé, from the Anacé People in Brazil, PhD from the University of Salamanca, Spain, researches "reverse ethnography" as a political act and a fighting strategy of the Anacé people in the state of Ceará, Brazil, fighting for their territory. Rute Anacé has a Bachelor's degree in Social Sciences from the Federal University of Recôncavo da Bahia (UFRB), a Master's degree in Iberoamerican Anthropology from the University of Salamanca (2021) and in Social Anthropology from the University of Brasília UnB. Rute Anacé has participated in the Mental Health Movement (MSM) since 2014, when she discovered the "Indigenous Youth Realizing Dreams" project, through indigenous leader Benício Pitaguary. The project, carried out by MSM, contributes to strengthening ethnic identity and encourages the academic and professional training of young indigenous people.