

**The Rain Ants of Sarayaku**  
**Chapter 1**  
**"Inversion: a decolonial and transversal methodology"**

by

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## Acknowledgements

*Pagrachu!* First and foremost, I thank the people of Sarayaku. I acknowledge their culture and vision. They welcomed my presence and artistic forays across their living forest. They gave me the opportunity to experience the beautiful alterity of their life. I also acknowledge the multiple beings and territorial dwellers of *Kawsak Sacha* and *Sumak Allpa*, who allowed me to be in motion amongst them.

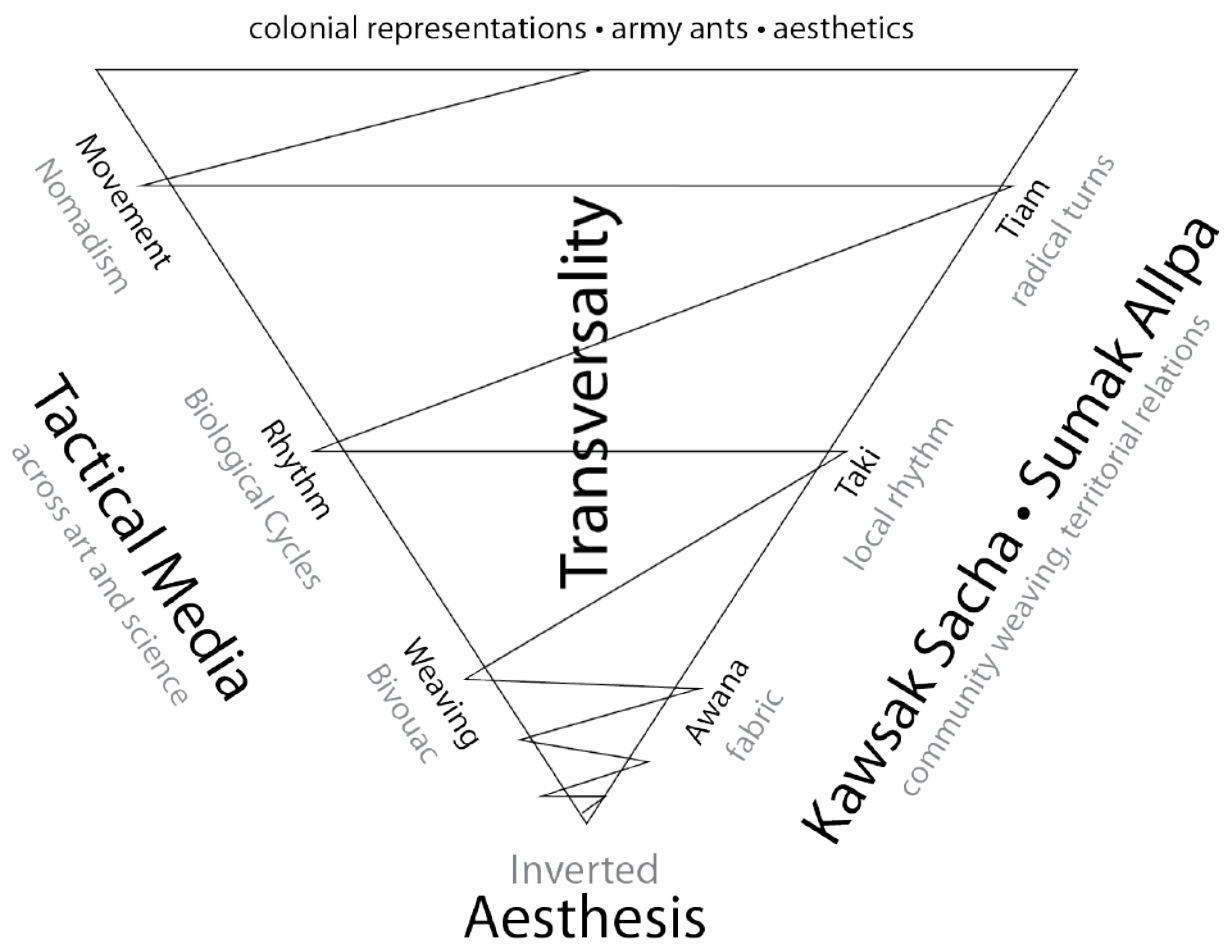
My intellectual creativity comes from being inspired by how Sarayaku comes to terms with technologies, and how younger indigenous generations manage to locally produce community-led content about their situated worldviews. The people of Sarayaku are actively engaged in digital media production, films, and documentaries. Constantly circulating photos and videos through different social media channels, the people have learned to use simple technologies but are opening to more complex computing practices. I learned to respect the ways they work with technologies, especially, because their objective is clear: to amplify their sovereign culture and community practices for tending to forest beings who are alive because of the indivisible human and nonhuman relations interwoven within their fabrics. In this regard, one local filmmaker has achieved international acclaim with his cinematography about resistant territorial practices vis-a-vis environmental catastrophes and political injustices. I acknowledge Traya, publicly known as Eriberto Gualinga, who has produced influential films about Sarayaku. Two of his recent films will be revealed in a discussion in Chapter Four (page 118) about the inspirational local notion of ‘the turn’ as a creative metaphor and method in my practice.

Overall this practice-led research underlines local performative notions in Sarayaku, and culminates in a multi-sensory exhibition about very unique ants. My artworks, however, will not be shown in the typical fashion, walled within a gallery. The exegesis exhibition will take place in my studio located in Cologne, Germany, where, since 2010 I have been creating with ants. I mention this beforehand because the building and area around my studio have undergone a gentrification process throughout eight years, and with many up and downs. The site you will be entering is a special shelter of creativity for hundreds of artists, We have resisted being vacated by a real estate giant. The Kunstetage is an interstitial gem with twenty-eight years of history hidden now behind rubble, upturned concrete, brand new hipster offices, a club venue, and reconstruction scaffolds. I want to

acknowledge my small artist community amidst this chaos of urban postmodernity, as it is here where all my thinking took place, and where the rain ants will come to life.

My love to my family: Antje, Mika, Maël, Thea, Gitti, and Kurt. I am immensely grateful to them because without their warmth and unconditional support in the most difficult times of this journey, this PhD would not exist.

Finally, I want to acknowledge the thorough supervision of Eben Kirksey, David Turnbull, Cameron Bishop, Jondi Keane, and the proofreading done by Kate Hall. Thank you. Your patience, countless hours of reading, your guidance and feedback, helped me shape my ideas.



This diagram depicts my modes of thought and shows the transversal relations that emerge from my inverting operations as a decolonial practice.

# **1 \_\_\_\_\_ Inversion: a decolonial and transversal methodology**

My artistic work with rain ants employs a methodology for turning colonially-biased scientific knowledges upside down. The performative value of *tiam*, understood as a radical turn, together with the creative figure of thinking and doing work with *invert* bodies, constitute the main source of inspiration in devising my methods. Inversion is at the core of my creative practice. Sustained by a set of principles and apparatuses, I operated electronic media to deterritorialise colonial aesthetisations and scientific structures that have constructed the image of army ants using imperialist views and military languages. By working with rain messengers of a territoriality from underneath, invertebrate performances can be inspected on grounds of sociopolitical and ecological meanings outside dominant regimes of knowledge, through knowledges that favour weaving capacities and territorial values.

Looking at army ants as messengers of rain opens up creative avenues to reimagine invertebrate social agencies crossing disciplinary, physical, and mental boundaries. The crossing of boundaries was elementary in devising my own methodology. Enabling a transdisciplinary understanding of ant abilities has been an integral part of my previous works. In Sarayaku, this acquired a stronger meaning. The first inspiration came from the physical and performative exigencies during fieldwork of moving, thinking, and following ants across the entanglements and through the thickets of this rainforest. These exigencies led me into modes of thinking and doing that deviate from usual scientific categorisations and compartmentalisations.

The acts of following ant trails became an attentive performance of cutting through the usual path to enter difficult places. I transited with them across Sarayaku's living barriers and artificial boundaries, between scientific and artistic methods, between western rationale and ancestral knowledges. Looking down as I followed them, I reflected on alternative reciprocal care-taking practices with rainforest lands, in particular considering that other response-abilities are so much needed in times of geopolitical crises (Haraway 2008: 71-72; Chao, Bolender and Kirksey 2022). Without the impetus of collecting specimens (the convenient scientific trade of placing ants in alcohol), extracting ants into laboratory settings, or elaborating on evolutionary analyses, I carried a backpack full of cameras, sensors, and electronics to mediate live encounters with the ants in situ, influenced by the local culture. I made artistic compromises as I carefully tried to adapt my methods

to their worlds. I performed with them as they performed with the forest, and I began thinking about ants as transversal beings.

Transversality originated in Felix Guattari's philosophy as a concept for freeing relations and crossing boundaries. Drawing from Guattari (2000: 113), I operated transversality to maximise the knowledge about these ants, cross-fertilising among different levels and in different meanings the values of looking at them as rain messengers. I elaborated my own transversality inspired by the idea of a fabric of knowledges and practices woven together by heterogeneity and tension (Franco 2019). Inspired by the community-weaving practices of Sarayaku, I turned transversality into a weaving operation for cutting through, mending, interconnecting, and creating tensions between apparently opposite modes of knowledge in order to exercise a decolonial practice.

This re-conception of transversality serves my artistic pursuit for thinking beyond, and working against, knowledge regimes of rigid territorialisation which have separated indigenous human-ant relationships, and reduced the natural history of these ants using colonial perspectives and militaristic terms. Transversality becomes a two-fold operation: first, to deterritorialise the scientific image of army ants from the epistemological enclosures in which they have been placed, and subsequently, reterritorialise them back into the Sarayaku world. Amidst environmental dangers and cultural exclusion enacted by capital powers, the transversal operation of following rain ants, and attending to the political, ecological and social meanings they invoke, not only breaks rigid knowledges, but enlarges the "scope of subjectivity" (Braidotti 2013: 82) of previously unattended relations.<sup>12</sup>

Using transversality in my research involves taking into account more than one point of view, and yet valuing one perspective more than the predominant other. Along this transversal path, I activate inversion as a methodology to work with the sensorial alterity of ants from a decolonial and inverted point of view. Inversion works as my direct statement of intent, driven by an ethical imperative to recognise ants' pliable and transposable bodies in relation to the fabric of territorial relations of Sarayaku. Inversion is conceived through a set of operations that invert the order of principles and values which have constructed the image of army ants, leading to a reverse of power relations in which cartographic and geopolitical perspectives are turned upside down, reassessed on

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<sup>12</sup> Braidotti says, "we need to visualize the subject as a transversal entity encompassing the human, our genetic neighbours the animals and the earth as a whole, and to do so within an understandable language" (ibid).

indigenous grounds. I inverted my artistic and scientific knowledge and practice: instead of extracting ants into artificial and aesthetic captivities, I came to them with my assemblages and force myself to respond to them on their own grounds. I inverted my practice towards prioritising Sarayaku's territoriality from underneath, and the performative values of *tiam*, *taki* and *awana*, in order to portray *tamya añanku* as invertebrate communities participating in the weaving of territories. A subjective repositioning is made possible by inverting the representation of ants' sensing abilities as distinctive to the places in which they are performed: rain ants' invertebrate modes of existence are tightly entwined with these forest lands and people's culture, thus, they can be perceived as being inverted in relation to colonially biased scientific evaluations.

Following this decolonial pursuit, I invert the uses of audiovisual techniques in order to work on the *tiam*, *taki*, and *awana* of rain messengers. With this in mind, I make use of sensors and computing operations as tactics, forcing them to operate in a manner that echoes tactical media (Garcia and Lovink 1997). Tactical media functions in my work as a critical apparatus for rethinking and reconfiguring my own technological appropriations and previous ant mediations vis-a-vis those undertaken by the Sarayaku people in response to geopolitical conflicts affecting their culture. The keen interest of Sarayaku's younger generations in learning to use emerging technologies is the result of an intensifying, proud indigenous identity that seeks to elevate and proclaim sovereign practices to the world. By means of film, photography, radio, and social media channels, Sarayaku people document their life and broadcast their sociopolitical views (Sarayaku 2022a; Sarayaku 2022b; Wayra Supay 2021). Sarayaku's younger generations appropriate tech-tools in their own terms amidst environmental crises and encroaching Capital interests.

Furthermore, any artistic result and operation using algorithms and electronic media must decolonise aesthetic paradigms and be guided by Sarayaku's community-weaving practices. In order to achieve this, aesthesis is used as an alternative principle over aesthetics for evaluating rain ants' invertebrate capacities otherwise (Mignolo and Vazquez 2013). Aesthesis is understood as the perception of the world by the senses, and I use it to create a situated valorisation of *tamya añanku*. By using aesthesis, I try to come to terms with the process of making sense of ant movements, rhythms, and weaving performances, on Sarayaku grounds, as guided by *tiam*, *taki*, and *awana*. Aesthesis enables a nuanced repositioning for an art practitioner such as myself to work on the performances of rain ants by following different sensorial evaluations.

Overall, my transversal methodology combines aesthesis and tactical media to invert technological operations, scientific evaluations, and Eurocentric aesthetisations, placing Sarayaku community-weaving practices on top. Supported by aesthesis and tactical media, I use transversality to weave relations between art, science, and indigenous knowledge, to bring into light a decolonial portrait of ants as rain messengers—a portrait intimately connected to the fluid forces of rain, on the one hand, and on the other hand, invoked as such in relation to the sociopolitical perspectives and biocentric performances of the Sarayaku people.

### **Transversality**

I discuss in this section the inspirational theories which gave impulse to my transversal methods. The essence of my transversal operations departs primarily from Felix Guattari's version of transversality.<sup>13</sup>

Transversality appears throughout Guattari's published work, but went on multiple permutations and deployments. In 1964 Guattari introduced transversality as a concept for deterritorialising stereotypical categories coercing subjects in mental institutions (2000: 119, 113). In this regard, Genosko remarks that the initial understanding of the concept was overshadowed by a psychoanalytic scaffolding, primarily due to Guattari's extensive work in Clinique de La Borde psychiatric hospital: "the concept of transversality had for Guattari practical tasks to perform in specific institutional settings. Transversality was not a philosophical but a political concept [and] the idea was to use it imaginatively in order to change, perhaps not the entire world, but institutions as we know them" (2000: 106). It is important to note that Guattari's transversality was inspired by Jean-Paul Sartre's dialectical sociology, which already accounted for subjective relations between individuals without a specific hierarchy (Palmer and Panayotov 2016; Guattari 2000: 109). In this sense, transversality as a political, deterritorialising concept becomes "a creature of the middle" able to potentiate the crossing of boundaries and dissidence against systemic regulations (Guattari 2000: 115).

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<sup>13</sup> However, it is relevant to note that the concept of transversality is also employed in mathematical differential topology. It was a French mathematician, almost contemporary to Deleuze and Guattari, Rene Thom, who in his doctoral thesis of 1954 introduced the concept of transversality in differential topology as a generic and stable property of intersecting smooth maps (Greenblatt 2015: 1). For hardcore mathematicians this became known as "Thom's Transversality Theorem," which can be employed to formulate both finite and infinite dimensions using nonlinear equations (ibid).



Deleuze then employed the term in 1970 as a “transversal dimension” in which artistic expressions can be interrelated (2008: 108). To exemplify this, he drew an analogy with the transmission of a ray from one universe to another (ibid). For Deleuze, transversality worked in a dimension in which relations cross boundaries affecting each other while remaining different. Specifically, Deleuze’s transversal thinking referred to Proust’s literary strategies, arguing that in his stories relations were created without ever “unifying or totalizing objects or subjects” (108-109). In a similar vein, Dolphijn and Tuin suggest that transversality does not attempt to generate new epistemologies, but operates by disrupting previous representations (2012: 108).

I operate transversality to disrupt the representations of army ants. I employ transversality to overcome any kind of linearity, horizontality, or verticality and generate a different space of interactions with ants. From this I started building my transversal work across established ant representations, refocusing variable angles to look at their agencies, acknowledging and drawing inspiration from local territorial histories and cultures. I started conceiving transversality as a process of performing and moving with ants, a process in which movement itself becomes the material for artistic explorations.

Ants are transversal beings. They cross boundaries and territories. Their movements are neither entirely vertical nor horizontal, but vivid, impermanent, and performative (Kuai Shen 2019: 6). Ants bring materials and species across boundaries into contact with each other and produce mutual and antagonistic interrelations. Their movements could be categorised as invasive, but beyond that they are transversal, they create tensions with the world of other species and the world of humans. Ants can be considered creatures of the middle “in a space in which becomings are truly creative, radically open and simply not what is now actual” (Guattari 2000: 115). Ants, and in particular *tamya añanku*, become the spaces they inhabit by nesting between boundaries: they weave fabrics generating multi-species topologies in which insect beings and rainforest matter get tangled up.

In Sarayaku, rain ants are restless entities moving freely across borders occupying any territory they want to. Rain ants are epigeic, an animal's condition of living in close contact to soil surfaces. They move smoothly across any terrain. Despite the topological irregularities of the rainforest, and the territorial presence of Sarayaku people, rain ants envelop whole areas with ease by weaving passages and bridges to transit over obstacles, gaps and water formations (Powell and Franks 2007).

Using their bodies they weave fabrics which adapt, by elastically extending and contracting corporeal masses, to the variable dimensions and materialities of this rainforest. This invertebrate capacity for weaving themselves into territories demonstrates their senses are tightly integrated to this territoriality from underneath. Following them as transversal beings across this territoriality from underneath opens “previously closed avenues of movement and perception” (Palmer and Panayotov 2016) demonstrating an intense mode of distribution across a smooth space without borders (Deleuze and Guattari 1987: 380).

I elaborated transversality to examine the fluid corporeal performances of rain ants becoming territorialities in motion across human-made and ecological boundaries. The territorialities in motion of rain ants afford a transmission of messages across species barriers, which lie beyond philosophical and scientific reasoning. Furthermore, relying on transversality is not sufficient to appreciate their invertebrate performances worlding with the local environments they traverse. Before transversal operations are exercised, a form of evaluation different from aesthetics is required as a principle. In the next section I introduce the principle of aesthesis in order to better allocate my artistic intentions vis-a-vis Sarayaku, and to approach invertebrate worlds from a decolonial perspective.

## **Aesthesis**

Any aesthetic framework used to describe human-nonhuman entanglements in rainforests would be inevitably bounded by Eurocentric art history. Within the topological and ontological boundaries of Sarayaku, in which weaving is a tactile and territorial experience, I argue rain ants should not be seen as aesthetic performers. As claimed by Mignolo and Vazquez (2013: 2-4; Mignolo 2010), aesthetics have been devaluing other modes, indigenous modes, for sensing and perceiving otherwise since colonial times. Thus an alternative principle needs to come forth and challenge conventional notions of beauty and aesthetic regimes.

In my transversal practice, I propose aesthesis as alternative to aesthetics to engage with the fluid performances of *tamya añanku*. Aesthesis came before aesthetics as the term originated in ancient Greece. Translated from the Greek *aisthenastai* as the awareness of stimulation, or perception of the world by the senses, aesthesis is the sensation of touching and being touched, strongly determined

by a sensing regime governing the moment of local experience (Mandoki 2015: 18; Mignolo and Vazquez 2013: 3). In this regard, Rancière (2013) writes that aesthesis concerns conditions and modes of perception in a “sensible fabric of experience” (9-10). Aesthesis, different than aesthetics, opens to accept the diversity of sensing experiences that exist which have been made invisible by the colonial matrix of power and the westernised imposition of the notion of beauty (Mignolo and Vazquez 2013: 3; Gomes-Barris, 2017: 135). Aesthesis is useful in my practice as it does not rely on exclusive visions outlined by Eurocentric theories of beauty, but rather opens to other sensations and relational meanings influenced by situated understandings.

Taken by this, I see Sarayaku’s fabric of experience diverging from the aesthetic regimes of Eurocentric and Anglo-American cultures. Fending off the remaining legacies of coloniality, which are still pressuring down on indigenous worldviews and evaluation forms, in a country like Ecuador that has been submitted to the US dollar economy and the aesthetic influence of its cultural commodities, is of uttermost importance. Drawing from Rancière, I understand aesthesis as a process of sense-making that comes before performances, images, objects, sounds, are given artistic value within recognised and established aesthetic canons (Rancière 2013: 11-12, 29, 33). Thus, I use aesthesis to ground my sensing of movements, rhythms, and weaving performances as underpinned by *tiam*, *taki*, and *awana*. In this manner, I use aesthesis with a decolonising impetus to creatively value the performances of rain messengers on conditions and modes of perception inspired by the Sarayaku culture.

Aesthesis becomes a better principle than aesthetics for a creative assessment of rain ants’ corporeal abilities. The social sensibilities of rain ants are determined by free forms of being in motion across worlds. They read the terrain with their feet, sense chemical messages with their antennas, feel temperature and magnetic fluctuations with their body receptors, and taste and transmit food by mouth-to-mouth exchanges. Their invertebrate bodies afford them other-than-human sensibilities to perceive the world. I take on aesthesis to acknowledge the invertebrate sensibilities of *tamya añanku*. In this respect, aesthesis connects to inversion: aesthesis implies inverting the aesthetic normative on the colonised and the cultures of the South, including the ones beneath, the beings of the soil. I guide my transversal methodology with aesthesis as a critical principle in decolonising aesthetics to prompt a local re-evaluation of army ants as invertebrate communities and inverted territorial weavers, whose performances are intimately bound to this rainforest’s material compositions.

Aesthesis thus demands experimenting with audiovisual operations that compromise aesthetic guiding principles from distant and privileged positions. It is necessary to explore other modes of flourishing with awkward creatures (Ginn, Beisel and Barua 2014) in order to promote different human-ant relations. Considering that studies have linked a catastrophic insect decline to anthropogenic industrial factors (Sánchez-Bayo 2019; Hallmann et al. 2017), I see the need for articulating a different perception and sensorial forms of evaluation of insects (Klein and Brosius 2022). Invertebrates are largely portrayed by high definition cameras and microscopes. Insect portraits with shiny gloss propagate through social media and conform to a desire for aesthetisation made possible by magnification technologies. This imaging process subdues insects to human time and anthropomorphisms, whilst the photographer mastering and operating expensive tech and armatures gets the spotlight. I claim this is an aesthetisation of insects which puts more value to the abilities of the author behind the camera and the technologies employed, than the insect abilities to create relations with the worlds appearing blurred in the background of those portraits.

Outlined by this, I use aesthesis as a tactical approach for working out a different kind of ethical-artistic interaction with rain ants as invertebrate performers. This implies assessing and readjusting sensors and technologies, and learning when and how to touch. Adequating human interactions and apparatuses to the finer sensorial worlds of significant others, involves being aware that reciprocity and respect require sometimes not touching or intervening at all (Kirksey 2013: 175; de la Bellacasa 2009: 308).

With aesthesis I force the past trajectory of my artistic practice with ants to adjust to the influence of the Sarayaku performative concepts of *tiam*, *taki*, and *awana*. But in order to do so, I need to diverge from aesthetisations of ant worlds—I need to reject an aesthetic framing of ants. I need to be critical with my own technological reappropriations. I need to invert operations to produce different audiovisual results and modes of inquiry that are in line with this territoriality from underneath. To come closer to an examination of *tiam*, *taki*, and *awana* in the performances of *tamya añanku*, the appropriations of technologies by the Sarayaku community need to be brought into light.

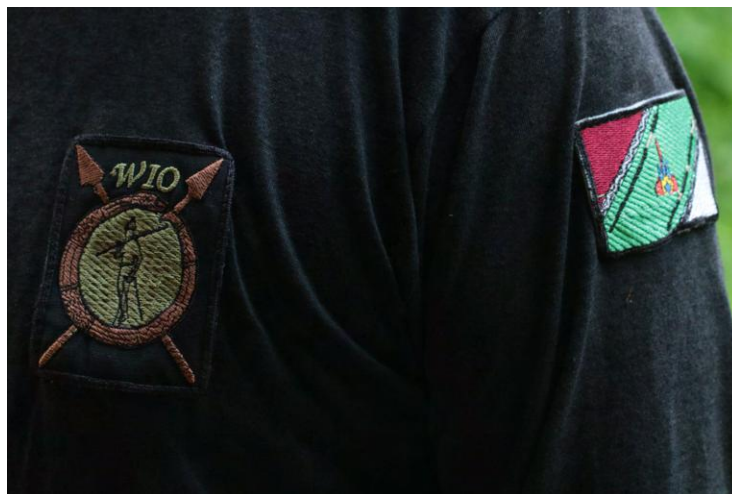
## **Tactical media**

Ongoing incommensurable changes are at stake at the crossroads between Amazonian knowledges and indigenous appropriations of technological tools. Sarayaku's technical use of media is akin to what da Costa and Philips call a large strategy-based movement of resistance to hegemonic forces (2008: 18). In this case, Sarayaku is an Amazonian community inhabiting its own territory, partially dependent on strategic non-profit alliances, but not an institution operating from within an authoritarian regime. Yet, Sarayaku's engagement with technology enfolds community practices in complicated undertakings for the defense of territorial relations with a curiosity that infiltrates and absorbs systemic reliabilities and commodities (da Costa and Philips 2008; Garcia and Lovink 1997).

For longer than twenty years several territorial and political disputes have affected Sarayaku: military incursions, disagreements with neighbouring communities, and ongoing international litigations demanding the Ecuadorian State to assume responsibility for illegally planting explosives. The Ecuadorian State has relied since the seventies on extracting fossil fuels from indigenous territories. In 1996, the State partitioned southern Amazonian provinces in blocks for oil and mining exploitation. During authoritarian cartographic processes of arbitrarily drawing lines over paper, the ministry of energy and mines (*Ministerio de Energías y Minas*) under the auspice of the state oil company, Petroecuador, illegally conceded 200,000 hectares of the Sarayaku rainforest to an Argentinian oil company, CGC. Between 2002 and 2003 CGC, aided by a group of militaries, proceeded to illegally plant pentolite explosives for prospecting mining sites in Sarayaku territory, within what the State back then illicitly mapped as block 23 (Ortiz 2016: 311-313). Soon after initially undetected intrusions, Sarayaku people became aware. The community began raising their tone on sovereign territorial rights and cultural practices by using different strategies and forms of media. From radio communication, to forging international alliances to seeking justice in the international court of human rights in Den Hague, ongoing national marches and mobilisations into the capital, and then to today's use of social media channels, Sarayaku has potentiated tactics of political resistance.

Under the leadership of Franco, the community began organising a long-term plan for safeguarding their lands by conforming a rainforest patrol of territorial vigilance called *wio*. *Wio* is the Kichwa name given to the native *Wasmannia auropunctata*, a species known in the West as the little fire ant. The little fire ant, listed as one of the world's hundred most invasive species, is also known by the

alias ‘electric ant’ as it delivers an electrifying-like painful sting, and often nests inside or near house appliances and electrical equipment (Global Invasive Species Database 2022; Electric Ant 2022). I witnessed the electric attraction of these ants during my time in Sarayaku when I stayed at Rumi’s.



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Rumi is Hilda’s son and he likes computers and electronics. He is part of *Watakchik*, the communication team of the Sarayaku council. Over the years, the financial support of European NGO’s have enabled the council to equip *Watakchik* with computers, video and photographic cameras, GPS equipment, and even a drone, amongst the already installed radio equipments, solar panels, and satellite Internet. Rumi has learned to use a Canon 50D camera and an AirBook computer. One day, I noticed a tiny ant running along the keyboard of Rumi’s computer. Suddenly it entered into a narrow cranny between the keys. After a while I noticed more coming out of other keyboard interstices. Some were just barely visible, intermittently extending their antennas from inside the keyboard and waving them out of the computer. *Wio* is a tiny, barely visible, 1-mm-long ant of pale yellowish coloration that delivers a painful burning sting, which is a characteristic defensive response. Gerardo, leader of the *wio* patrol, later told me that this ant represents “what we stand for because we are small (in reference to the height of the Kichwa people) but we hit hard like *wio*” (2019).

Gerardo (2019) emphasised to me that tactics were set in motion against threats of land expropriation: “*usamos tácticas de los motores fuera de borda para cubrir mas territorio...pero*

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<sup>14</sup> Left: the ant known in Sarayaku as *wio* carries an unknown prey along the wood plank of Rumi's hut. Right: the *wio* patrol emblem and the Sarayaku flag (on the left arm) stitched on a black shirt worn by Gerardo.

*somos conscientes del daño que causa*” — we use motorboats as a tactic to cover more territory, but we are aware of the damage they cause [in relation to fuel consumption and its emissions]. The illegal military incursions between 2002 and 2003 prompted not only a rise in consciousness in the indigenous identity of Sarayaku; it also increased the interest for technical means and a reliance on motor boats for rapidly reaching the forest areas targeted by the military. Motorboats have become since then the principal means of fluvial transportation. Educational workshops have taken place over the years to instruct the people how to operate and repair technical equipment and devices, but also to learn about fuel dependency. Gerardo argues the use of motorised canoes in Sarayaku, and the invisible effects of burning fumes, is a risky trade-off to ensure the continuous patrolling of the territory, the mobilisation of *wio* and *kaskirunas*, and the maintenance of life-making projects such as *sisá ñampi* (Chapter Two, *Weaving circles of florescence*, pages 76). Gerardo’s perspective entails not a harmonious but a friction-ridden ethical and political commitment of community response-abilities (Haraway 2016).

Technological communication systems and fuel dependency are already interwoven in Sarayaku’s biocentric ways of thinking and doing. These are everyday practices entangled with the foreign influences of cultures based on capitalism. In other words, as de Certeau claimed, these are tactics of insinuating “into the other’s place, fragmentarily, without taking it over in its entirety, without being able to keep it at a distance” (1984: xix). Sarayaku’s everyday community practices continually adapt to pressing circumstances by means of appropriating tools and media in their own indigenous terms. The Kichwa people are constantly negotiating tensions between their complicit models of life and the pressing influence of cultural hegemonies. The use of technologies for the purpose of activism has turned into a complicated affair of capital liabilities, overconsumption of Internet media, and opening the trap of mobile phone addiction in younger generations. However, Sarayaku has just started a journey of learning how to grapple with the trade-off of motorboats, technical operations, re-wiring cables, and recycling batteries for the sake of developing tactical mediations in their own terms.

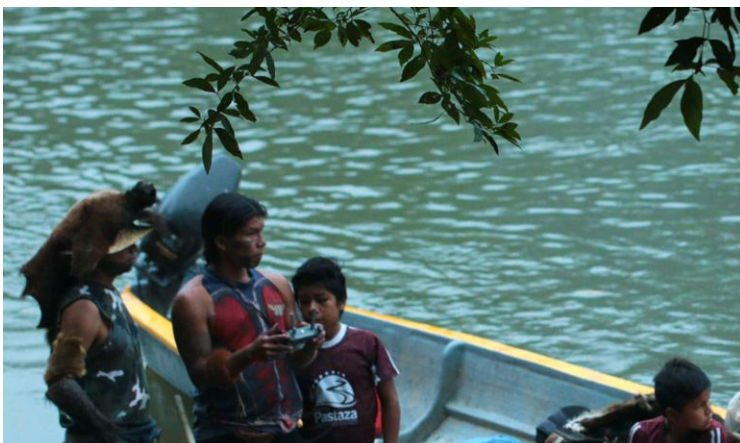
As Franco alluded, technology is not made for storing knowledge that is woven in the land, but to use it to convey values of community practices (2019). Almost thirty years ago Garcia and Lovink prophesied that technology opens gaps for subversions, enfoldings, and reappropriations (1997: 3-4). In this vein technological appropriations by Sarayaku people are integral of a process of decolonisation and resurgence of indigenous values with pits and slippery paths ahead. Unknown

risks loom in the horizon as younger Sarayaku generations adopt the habits of social media in their lives to amplify their indigenous perspectives. Yet in my view, tactical mediations in Sarayaku while complicated strive as much as possible to be grounded on practices outside the screen and beyond productive rational models based on capitalism.

Sarayaku people are aware that the cultural and sociopolitical challenges they face require strategies of owning media in Kichwa terms to express their vision of the rhythms of rainforest's life and death. The council has taken larger steps to instruct younger generations about technologies by organising workshops with specialists—from social activism using the Internet, to film-making, photoshop, 3D modelling, web-design, and recycling. The communication team Rumi belongs to, *Watakchik*, is integrated by young members of the community, from 15 to 23 years old. They take turns in recording, editing, and uploading major events to Sarayaku's social media accounts, including the political meetings they take part of with fellow ethnic Amazonian communities (Sarayaku 2022). The arguments behind these mediations, as Rumi states, is to maintain a “digital identity” for creating and curating their own communication channels to the Occidental world, “*el mundo occidental*” (2019). In this way, the young Sarayakus both learn to deal with issues of tech commodities and amplify cultural resistance in their own terms and territory.

Inspired by Sarayaku's entangled relations with technology, I have poached the critical apparatus of tactical media (Garcia and Lovink 1997). Employing transversality and following the principle of aesthesis, I cut “tactical media” apart and place one special “ant” in between—*wio*. Garcia and Lovink defined tactical media as a practice of crossing borders, “connecting and rewiring a variety of disciplines and always taking full advantage of the free spaces in the media, that are continually appearing because of the pace of technological change and regulatory uncertainty” (1997: 3). Thus the deployment of tactical media in my work becomes an apparatus for questioning the use of technologies. In this sense, my tactics using technologies must come to terms with the dimensional intricacies of the territoriality from underneath: a) to follow rain ants guided by *tiam*, *taki*, and *awana*; b) to turn scientific perspectives and artistic practices around and upside down; c) to problematise and diversify technological methods for the production of a different fabric to experience ant worlds.





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With this approach, I am strategically problematising ethical issues in practices that rely on technologies without regard for the insect subjects and their ecological habitats. Some of my early artworks were involved in this kind of media art production, especially with leaf-cutter ants. I created artificially mediated habitats and technologically augmented procedures to amplify ants' social faculties and forms of communication by technical means (Kuai Shen 2010). Under careful supervision, the ants I kept were constrained inside acrylic chambers, surveilled by cameras, and amplified with contact microphones. My previous practice forced ants into artificial time and aesthetically designed environments. I was an artist in love with and in control of their subjects. As hard as I tried, I failed them because I could not, and would never be able to, faithfully simulate the vital conditions they require. In healthy rainforests, the lifespan of a leaf-cutter community could reach 25 years or more (Wilson and Hölldobler 1990). In my studio lab I could not offer everything they needed—even though I managed to keep them alive for 11 years, the last leaf-cutter community passed away on April 2022. Moreover, my international agenda of exhibitions imposed a hardship on ants to travel in even more tighter compartments. Exhibiting ants in transparent

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<sup>15</sup> Top left: one of the few solar panels installed in Puma, the centre of Sarayaku. Top right: kids watching a drone getting ready to record an event of the council. Bottom left: six teenagers watching a movie in a mobile phone. Bottom right: Valerio operating the drone over the river.

habitats has a detrimental effect on them. Leaf-cutter ants dig fungal chambers underground. They are free to decide when and how to open vents for thermoregulation. In artificial captivity, this requires a constant monitoring of temperature fluctuations, humidity levels, and ammoniac emissions from the refuse piles. The overall stress of forcing them into aesthetic containments and touring with me as part of my artistic agenda is a failed responsibility I hold myself accountable for, despite the invaluable support I received from curators and assistants. This recognition brought me to the “open whole” where I am today (Kohn 2013: 63) to invert the roles. I now force myself and my media assemblage to adjust to their environments, subjected to their conditions and world interactions.

Artists working with electronic mediation and live insects out in the open under similar decolonial imperatives to raise indigenous values are few. I, for once, just started this journey of completely moving from laboratory and studio settings out to a specific cultural site of ant motions. There are many artists who have created artworks with or about ants, the global extent of which is impossible to map into meaningful relations to my present decolonial arguments. Donna Conlon is, however, a predecessor worth mentioning. She intervened on a free community of leaf-cutter ants in Panama filming a parade of them carrying artificial leaves painted as flags of different nations and peace signs. Her work “Coexistence” (2003) was a political statement against the Iraq war, yet it did not engage indigenous perspectives. In relation to my practice-led research, I chose to do a particular exegesis of art duo Mazonett and Quiroga, and Tomas Saraceno, in Chapters Four and Five, respectively. Mazonett and Quiroga did one performative intervention in the life of leaf-cutter ants in a Colombian forest which is being mined for gold. Saraceno’s long-term work with spiders employs similar amplification techniques as myself to sonically explore tingling senses and entangled webs.

Still, the aforementioned artists did not underline their approaches to invertebrate life with tactical media. Tactical media instigated a critical discourse that set me on a conversion path for venturing beyond the regulated space of art production and scientific methods. With tactical media I was able to develop electroacoustic and algorithmic mediations with *tamya añanku* at the interstices of art and science that amplify a territoriality from underneath and the worldview of Sarayaku people; tactical media open the opportunity to get out of my previous artistic comfort zone and test out the same electronic apparatus of sensors, this time rewired and adjusted to ant habitats, carefully acknowledging I am a guest in this world of earth beings. By assembling my own portable

technologies, I amplified invertebrate weaving forms at the site of ant motions and on the grounds of the Sarayaku culture. In the next section I present the transversal operations that combine aesthetics and tactical media in the materialisation of artworks using digital technologies.

### **Inverting operations**

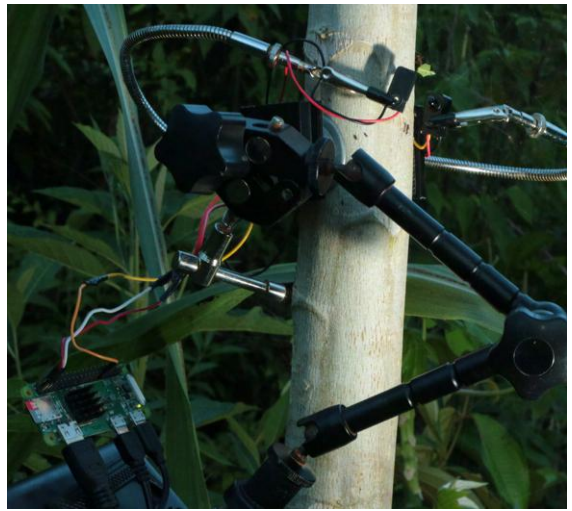
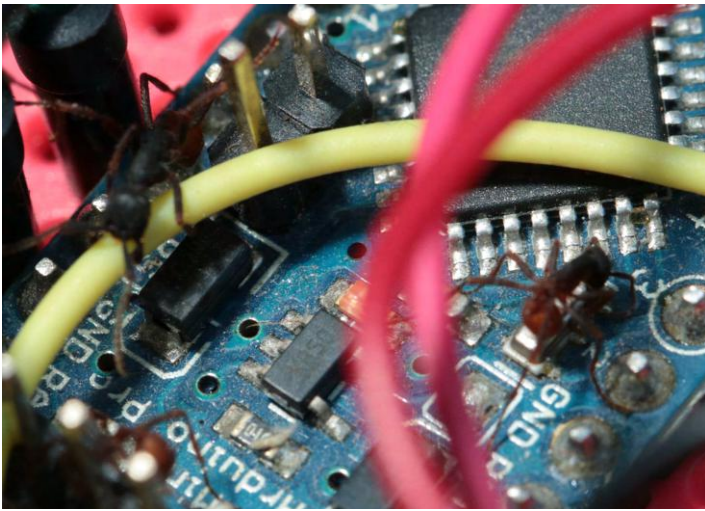
My transversal use of technologies consists of re-purposing and re-programming electronic assemblages in order to see, listen, and attend to ants as invertebrate communities weaving themselves with the territory. Thinking with aesthetics and tactical media, I tinkered with electronic media, rewired sensors, and re-coded programs. The human perception of the world of ants is heavily mediated by vision. Patient observation is required to make sense of what ants do and where they go. Scientific behavioural analyses depend on algorithms for motion detection to rewind, pause, and fast forward the moving agencies of ants. I intended to complicate the primacy of the eyes and the technological gaze by involving other modes for interspecies interaction. Through a series of experiments, I interfered and amplified the territorialities in motion of rain ants using intrusive and non-intrusive methods, combining audiovisual operations and electronic devices:

- non-intrusive: positioned at careful distances, time-lapse photography and infrared thermal cameras documented migrations and nest transformations;
- intrusive: devices assembled with micro-controllers, conductive, and piezoelectric sensors were placed across ant trails to pick up acoustic frequencies and electromagnetic variations. Conductive sensors work by reading the electrical conductivity within an electric circuit (Landwehr and Kuni 2013); commonly embedded in touchscreens, for example, I repurposed these sensors to register the physical interactions of ants forms in transit. Whilst piezoelectric sensors worked as contact microphones to amplify sounds transmitted over a surface or material, and with them I was able to record ant vibrations as they flow across the forest.
- intrusive: laser and photocell arrays were placed on the sides of running columns during migration and hunting, beneath nests and sudden clusterings. This allowed me to register collective movements of ant bodies blocking and scattering the incidence of laser beams. The photocells at the other end recorded the differences in laser intensities, a string of numbers measuring variations in electrical resistance as the laser beams were diffracted and interrupted by the ants corporeal performances.

- non-intrusive: computer vision and machine learning algorithms were used post-fieldwork to visually render rain ants in different postures and situations; to detect and trace their movements. By applying these algorithms on my fieldwork collection of photographs and video footage, playing with parameters and tweaking configurations, I created the portrait of *tamya añanku* as territorial weavers and rain emissaries.

Some of these assemblages were carried in my backpack during my Sarayaku forays. I challenged their technical capacity to register the aesthesis of ant movements and rhythms under the environmental pressures and cultural influences of this rainforest territory. I challenged their technical functionality under the extreme humidity. Failures ensued without repair. Electronics got wet and malfunctioned. Batteries ran out and mediations were abruptly interrupted. Programs crashed and did not work on time. These, I reckon, were important aspects in the exercise of transversal operations that depend on improvisations on the run, learning from mistakes, and levels of attentiveness to properly engage with the invertebrate fabrics of *tamya añanku*.

My transversal operations gathered qualitative data from the above listed intrusive and non-intrusive methods. I worked with these data through the use of four processes: amplification, interference, syncopation, and convolution. I claim the portrait of army ants as model organisms is rendered valuable by operating computing processes such as these. As I will demonstrate, amplification, interference, syncopation, and convolution were chosen because the processing modes of acoustic and visual signals they enable are much in line with technological operations widely accepted and employed in art and science practices—especially in the analysis of animal behaviours. I transversally repurposed these processes and operated them to invert the scientific representation of army ants and generate audiovisual results outlined by *tiam*, *taki*, and *awana*.



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**16** Top left: a mini Arduino computing assemblage being raided by rain ants. Top right: failed setup experiment with infrared sensors. Middle: ants crossing the main path in Shiwakucha intervened with my laser-photocell array (red laser of 650 nm wavelength). Bottom: when I was photographing rain ants, I stepped on branches that were interconnected with their woven nest—a regular event during my forays. In less than ten-seconds, they came to say hello. It took over 12 minutes until I could return to get my flash.

## Amplification

Amplification can simply be understood as the process of increasing the volume of sound, or the amplitude of an electric signal. Amplification is also a common process used in molecular genetics to obtain multiple copies of a DNA sequence, an increasingly common practice for identifying ant species. In sound synthesis, via hardware synthesisers or computing processing algorithms, a basic amplification is accomplished by increasing decibel units of any given signal.<sup>17</sup>

Amplification is a visual process too, as any image or video footage can be amplified via diverse software or electronic processing techniques. In this aspect it is relevant to take into account that were it not for technologically-mediated visual amplifications in scientific methods, e.g. microscopes, scanning-electron-microscopy, the knowledge acquired about ants would not have been possible. In other words, the meanings ascribed to the microscopic details of ant worlds, their social and spatiotemporal magnitudes, have been strongly mediated by observation and computer vision. It is only recently that the turn to molecular genetic methods to analyse the chemical nature of ants has been increasing in popularity and yielding new results. This brings into focus a critical assessment about relying too much on audiovisual amplification. Besides molecular genetics, I recognise other potential modes of amplification, i.e., chemical and olfactory, as artistic means of mediation to better come to terms with the world of ants.

While the process of amplification has many uses in different disciplines, I employed it by means of macro-photography, SEM<sup>18</sup>, piezoelectricity, and in experimental olfaction. Experimental olfaction occurs with synthesised scents spreading in the artworks I exhibit (Chapter Four). Piezoelectric amplification enabled me to record rain ants' vibrations in situ. Visual amplification with macro-lenses was conducted by placing cameras on tripods and holsters attached to branches, following a non-intrusive approach to avoid disturbing the ants' natural flow. Yet, sometimes this process became intrusive, as things fell out of hand, or I mistakenly stepped onto concealed roots that were

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<sup>17</sup> In sound production and for musicians, synthesis refers to the composition of new sounds, while processing refers to the modification or manipulation of sound compositions, pre-recorded samples, notes, or patterns.

<sup>18</sup> SEM, short for scanning-electron-microscopy, is a process in which a beam of electrons interacts with a conductive coated specimen, prepared beforehand, enclosed in a vacuum chamber. Usually this concerns any kind of organism or material whose microscopic features are in the nanometer scale. The resulting image gets magnified in great resolution by the reflected electrons carrying information from the specimen. In this way thinking transversally with aesthetics and tactical media, my practice using SEM looks at the intricacies of ant bodies as micro-topologies.

interconnected with the fabric of ants. Precisely in those instances transversality was issued by acknowledging that interferences induce displacements and create unforeseeable encounters, such as ants amplifying aggressive responses.

Another related aspect of amplification that accompanies my exegesis links to decolonial practices in the community. Sarayaku possesses a collective voice. Within the territory, people labour together, perform loud music with drums and flutes, they shout to announce arrivals, and all these sounds generate a collective rhythmic presence that gets amplified across the rainforest: an acoustic territoriality announcing human rhythms of activity. Besides, Sarayaku's political and ecological activism echoes forms of amplification, i.e., convocations to support the indigenous social movement in national strikes. In this regard, the people employ social media to amplify their knowledge and share different opinions, but also for communicating organisational tactics across regional and political boundaries. In their own terms, they combine radio and internet with traditional forms of bringing messages across rivers to notify convocations.

Amplification is an elementary operation that works on the social microscopic world of rain ants by implementing image and sound processing technologies to enlarge their spectrum of rhythmic motions. As part of my transversal methodology, amplification allowed the enlargement of rain ants' performances beyond aesthetically-pleasing or scientifically-conformed contexts. Amplification is my first operation to reveal different aspects about ant movements. The second collateral operation that follows amplification is interference.

## **Interference**

An interference is a disturbance caused by unexpected interventions. In physics, interferences are defined as two or multiple waveforms combining to produce a resultant wave, in which the displacement is either canceled or reinforced. I understand interferences as both means for elimination and creation. Barad's difference/diffraction studies in this aspect deserve special attention (2007; 2014). Diffraction is an interference phenomenon that creates patterns of difference resulting from the superposition of waves (Barad 2007: 77, 80). Following the diffractive figures of Barad, I look at the superposition of amplifications and interferences created by rain ants turns and rhythms. By working with interferences in this manner, I operated at the crux of technological and

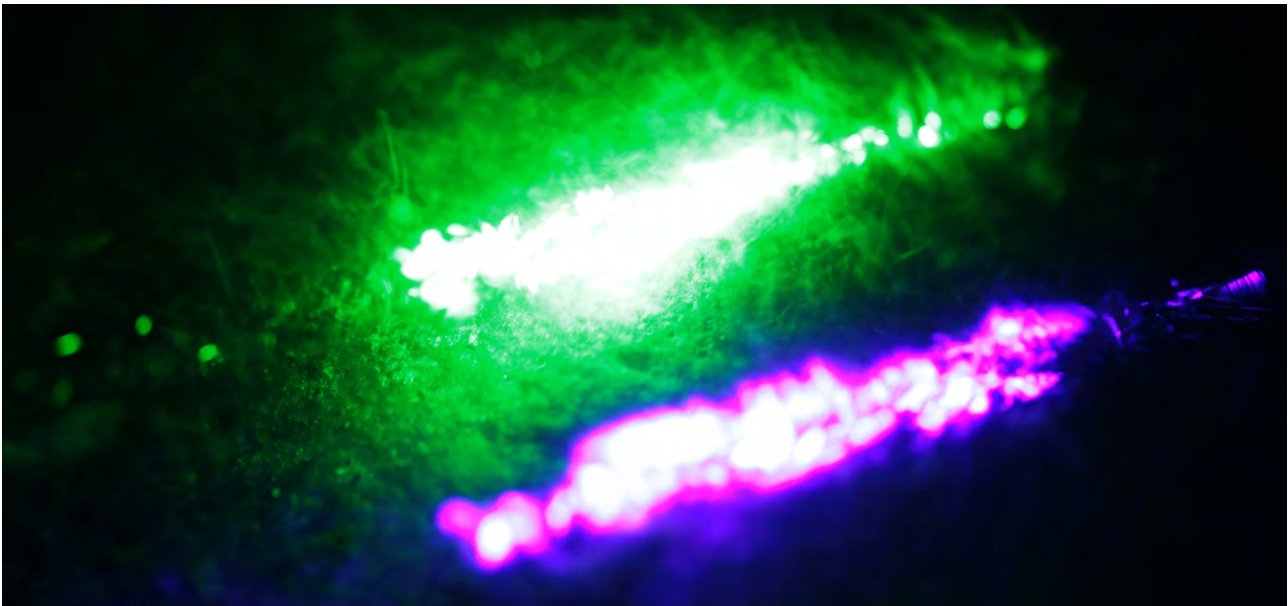
ecological understandings, acknowledging the capital-driven interferences in the lives of the people, my own interferences in the life of ants, and the trajectories of ants interfering in the life of others.

Rain ants, considered key predators of the Amazon, interfere with stronger rhythms setting in motion processes of redistribution, renewal and death, in the lives of other species. In this light, their interferences can be seen transversally, cutting apart living processes. Also, the invertebrates that depend on rain ants act as interfering agents. A wide range of parasitic and mutualistic relations oscillate between interferences and reinforcements in the vital performances of *tamya añanku*. It is at the threshold of interferences that noise, like the parasite as a “differential operator of change,” appears as both disruptive and creative force (Serres 1982: 196). In this regard, the noise of rain hitting the foliage and the noise of rain ants running across forest lands are forces of interference.

In my practice, interferences arose from intrusive technological mediations to create electromagnetic difference, e.g., as a product of piezoelectric amplification. Piezoelectricity here exemplifies interference as a process of transduction of physical differentials into electrical waves; physical vibrations and deformations make the ceramic layer of the piezo disc oscillate, generating electrical currents which can then be amplified as sounds. Interferences caused by rain ants running over piezoelectric discs might be understood with what Barad (2014: 168) calls a “cut together-apart (one move)”: different sound waves overlapping, coalescing, and ultimately becoming fluid sounds that metamorphose into the sounds of rain.

Another way interference worked in my practice consisted of laser-photocell arrays to register ants interfering beams of light. Ants crossing the lasers blocked and scattered the intensity of the beams, producing diffractions that were visually documented and electronically registered in situ. The data collected from these interferences was stored as numerical values for later creating algorithmic modifications. This form of experimentation with laser interferences at the site of ant motions lend a different character to rain ants’ performances. Barad says that “the temporality of re-turning is integral to the phenomenon of diffraction” (2014: 168). My laser interferences on rain ants play with her notion of making a cut that differentiates-entangles (185) to work on a novel materialisation of ant movement. In this light, I also invoke *tiam* as a radical turn: the corporeal flow of ants returning to the nest reflect and diffract the laser beams back to the photocell receptors with their bodies.





5 0.02  
 6 0.02  
 9 0.03  
 3 0.01  
 12 0.04  
 1 0.0  
 3 0.01  
 5 0.02  
 10 0.03  
 4 0.01  
 3 0.01  
 2 0.01  
 28 0.09  
 8 0.03  
 28 0.09  
 18 0.06  
 17 0.05  
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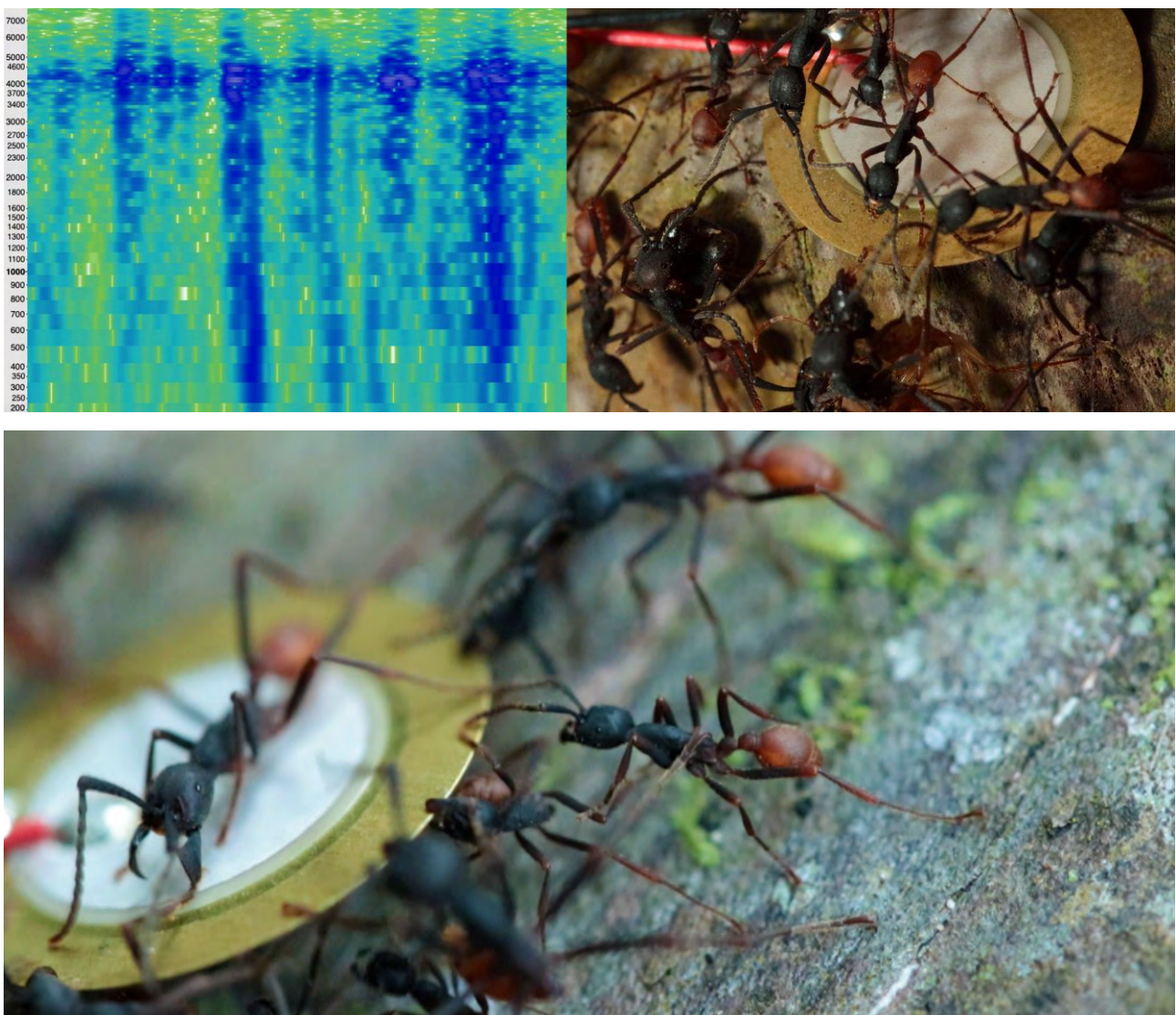
Interferences can be endeavoured as tactics for cutting apart systems of lines and colonial legacies. However, interferences have also been historically perpetuated by colonialism and capitalism. The community practices in Sarayaku in this respect entangle continuously with hegemonic forces interfering in their lives. Sarayaku creates waves of interference during national strikes, too. Raising voices and crossing rainforests and mountains, they adhere to the indigenous social movement in

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<sup>19</sup> Top: photograph showing a rain ant manipulating a photocell next to a corporeal passage during a registry of laser interferences. The data on the right shows an excerpt of the string of values registered with this operation. Bottom: photo of laser interferences placed across a night migration of rain ants in Shiwakucha.

Ecuador creating cataclysmic marches, with larger-than-life rhythms, that interfere in the status quo of civil order (Becker 2011; Gutiérrez 2014).

Interference and amplification were consistent operations in my practice. Transversal operations driven by amplifications and interferences enabled me to initiate the process of inverting the representation of army ants. Still, operating audiovisual technologies by means of amplifications and interferences were not sufficient, they had to be complemented by two other complex operations to fulfil the transformation of army ants into *tamya añanku*. I first discuss syncopation in the next section and then, for the last part, convolution.



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<sup>20</sup> Top left: bark spectrogram (range 200–7000 Hz) of 0.3 seconds from an original recording of 90 seconds length using piezoelectric amplification. Top right: rain ants walking over a piezoelectric disc, two can be seen carrying dismembered prey they hunted from inside a wooden cabin. Bottom: rain ants moving, biting, and dragging their stingers on a piezoelectric disc.

## Syncopation

The process of syncopation incorporates and intersects with that of interference. The idea to use syncopation was inspired by extensive sessions observing and listening to the displacing rhythms of *tamya añanku* when they traverse across the rainforest. Syncopation is a musical term. It means the placement of rhythms where they are not expected to occur, causing a disturbance or interruption in the regular flow of rhythm.

I employ syncopation to align with *taki*, the local notion of rhythm in Sarayaku, to describe the unruly rhythms of *tamya añanku*. Syncopation is employed in my transversal methodology to honour the sonic experiences of Sarayaku, and the forces of rain entangling with the migrations of rain ants. Syncopation enabled me to convert the performativity of invertebrate bodies in motion that impose their rhythms on other lifeforms into sounds.

I use syncopation to work on acoustic expressions of invertebrate rhythms that do not necessarily submit to harmonic music patterns.<sup>21</sup> Syncopation brings the former processes of amplification and interference into play to generate acoustic fabrics. According to Wright (2008), electronic music composer and one of the creators of MaxMSP, a software I use in my operations, syncopation is also known as offbeat: a beat “lying between the pulses of a higher metric level” (27). As remarked by Wright, syncopation “operates by defying the expectation that every beat will be articulated by a sound event” (ibid). In other terms, syncopation describes those asynchronous moments of improvisation during which certain instruments or sounds emphasise beats which do not necessarily match or follow an ongoing beat of a composition. Eventually, different beats either create even more rhythmic displacements, or coincide, strengthening a new rhythmic force.

My perception and use of syncopation is an entry into *taki*. Syncopation can be used as a decolonial acoustic operation that inverts harmonies. It focalises on unconventional rhythms and sudden emergent sounds which evoke a kind of acoustic resistance. Across different times and places, Sarayaku emerges as a landscape of acoustic resonance that is syncopated. Sporadic unexpected sounds of interference emerge through frequencies and drones emitted by running motorboats, shouts and laughter, or distant shotguns of people hunting: a composition of acoustic textures,

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<sup>21</sup> For instance, the Western’s twelve-tone chromatic scale, a defined set of twelve pitches for notes used in musical composition, and which standard, classic, instruments produced in Europe are able to reproduce.

polyphonies, and bioacoustics oscillating all at once. This is most remarkable during *minga*, when people take turns for transporting materials, improvising work together with a characteristic offbeat rhythm through the forest which at the end gets the task done; or when people drum and dance the *kajana tushuna*. In *kajana tushuna*, the initial beats of the drums are out of tune. Progressively, drummers join in and a temporary cohesive body of sound is achieved, which cues the turning motions of women dancers.

In electronic music composition, syncopation, with a properly intuitive tact and flow, becomes in time an identifiable offbeat one can follow and move to. However, syncopation bears an imminent risk of quickly diverging from a cohesive compositional body, turning into dissonances and distortions. I explicitly wanted to focus on dissonances and distortions, as for me these are sonic manifestations emitted by rain ants scratching and displacing the rainforest. I combined field recordings of airborne acoustics and substrate-borne vibratory sounds to experiment with different accents, patterns, and samples. I experimented in generating oscillations by means of applying granular algorithms to sound recordings of rain ants, using creative coding environments, softwares such as MaxMsp, Sonic Pi, and Touchdesigner. I also worked on layering rain sounds on top of the sonic textures created by rain ants. This approach turned into an iterative creative process for electronic acoustic syncopation, a process that materialised alternative sonorous expressions of the acoustic convergence of ants reproducing the sound of rain.

Across Amazonian dimensions, syncopation arises as an alternative process of rhythmic attunement to a local world in formation, in which rain can be seen as a force of syncopation. Tamyra añanku turn into shelters and weave passages to evade rain and water. Their invertebrate fabrics pulsate in and out in syncopation to the rain. At the same time, the turns taken by rain ants interfere in the lives of other species. These turns, guided by *tiam*, constitute a fundamental performance in the creation of invertebrate fabrics. The last visual operation I employ in my methodology approaches these turns as convoluted processes.

## **Convolution**

The final component of my transversal methodology is convolution. Convolution can be defined as the process of becoming twisted or coiled. This definition applies to environmental, social, and

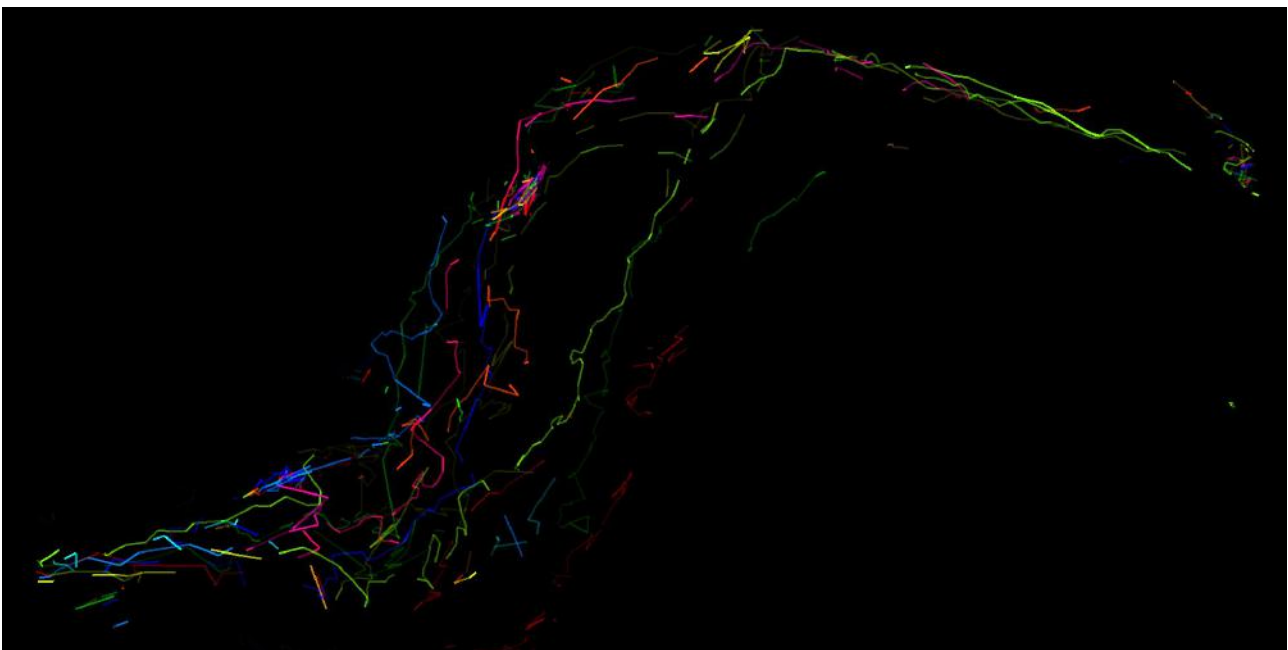
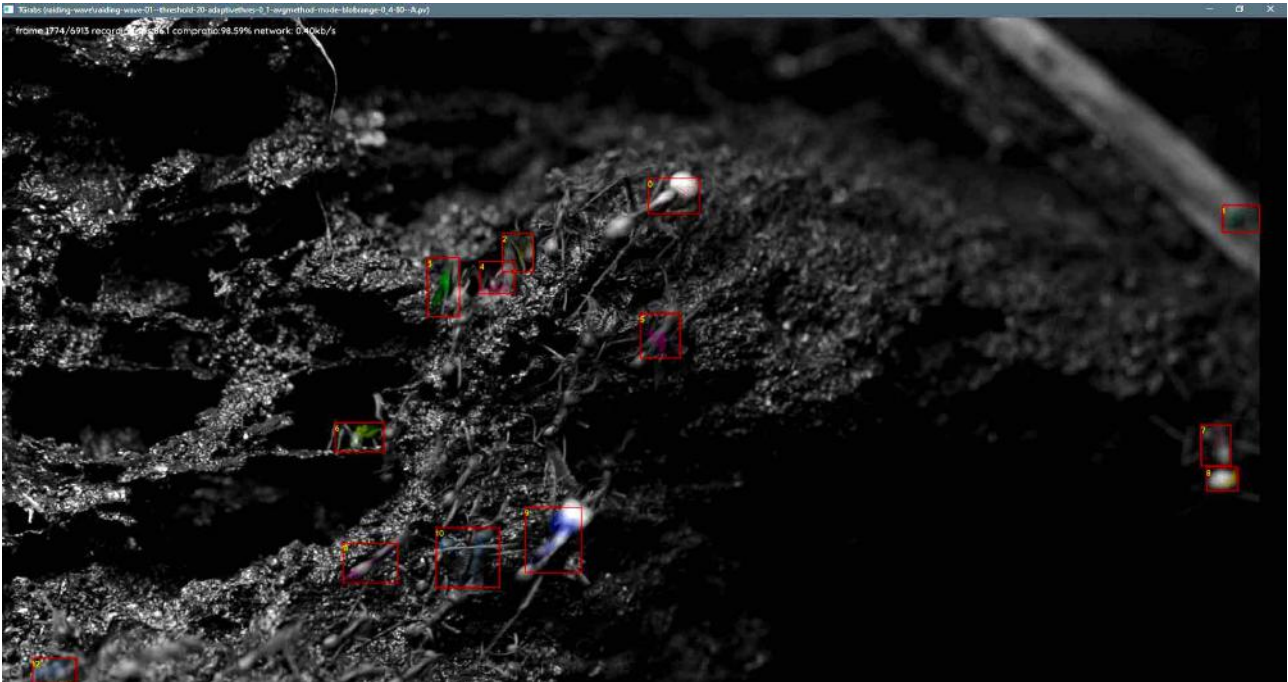
mental movements (Guattari 2000: 112), when following complex subjects and difficult trajectories. In this sense, convolution describes an ontological process of getting caught or becoming captivated by the interplay of movements and rhythms of rain ants, as they force you into uncomfortable positions, making you turn around and upside down.

Convolution is a process of turning motions. It induces circulation, spins, spirals, and vertigo. Convolution can be conducive to entanglements and irregular or unexpected forms of weavings. Convolution interconnects with *tiam*, as radical turn, in this sense. Convolution involves radically inverting perspectives. I underpin my artistic perspective and intent on using convolution by departing from the following definitions in botany, mathematics, and computer science:

- Botanic convolution describes spirally tangled elements such as leaves rolling around themselves forming an identifiable pattern. Under certain conditions, epiphytes, branches, roots, and rhizomatic formations convolute.
- Mathematical convolution is an operation on two functions that produces a third function, which expresses how one shifted and reversed function is modified by the second function.
- In computer science, a convolutional neural network, also known by the acronym CNN, is a set of classification algorithms for signal or image processing that uses mathematical convolution operations. The name convolutional neural networks is inspired by the animal visual cortex, which relies on receptive layers of neighbouring neurons that respond to a set of stimuli to produce particular image outputs. The functional interconnectivity of a CNN is usually illustrated in computer science by matrices or interconnected layers. This image, once situated in the territoriality from underneath of Sarayaku, is evocative of a fabric.

Convolution was materialised via a transversal operation that interconnects its botanical, mathematical, and computing meanings. Looking through transversal glasses, an encounter with rain ants is a convolutional process: ants crossing each other, rolling on top of one another, a viscous mass spiralling down, disentangling from woven nests, becoming multiple in intimate adjacency as they weave themselves into passages and shelters. The human mind has to alternate attention on individual ants in order to progressively make sense of the moving whole. Individual trajectories and traces are extremely difficult to follow without the control of time by technical means. This process of identification is facilitated by employing computer vision algorithms for

motion tracking. In my practice, I specifically use algorithms for convolutional neural networks to detect and draw the moving patterns of rain ants.



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By repurposing these algorithms, I visualise radical turns and the weaving of invertebrate fabrics. I also worked with convolutional algorithms for image processing by transferring styles from one photograph to another. The visual results are shown in photo prints and on multi-screen installations

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<sup>22</sup> Top: still from a video sequence of rain ants going hunting, processed with algorithms for motion detection based on convolutional neural networks (Trex). Bottom: I reconfigured the tracking parameters to visualise weaving trails.

presented in the examination exhibition, especially in my artwork *Tiam Movements*, presented in Chapter Four. I basically used open-access algorithms for image transfer published by Athalye (2015), and the tracking system for markerless identification called TRex by Walter (2021). By operating these two open-access algorithms with the imperative of inversion, I created visualisations of the world of tamyá añanku that emphasise their fluid and entangled identity with the Sarayaku territory.

Adapting code and playing anarchically with algorithms has been integral to my past line of work with ants in “Oh!m1gas” and “Thermotaxis” (Kuai Shen 2010, 2017).<sup>23</sup> In my tactical work now, I utilise open source applications as part of a transversal critical making practice that cross-fertilises “creative powers of invention with which life among media must be taken up” to involve innovative schemas of confrontation and insertion (Fuller 2005: 10, 5). My own methods of coding are messy, and exercised by means of trial and error for creative experimentations. I have always programmed my own interfaces and media installations. Every artist should learn to code its own programs. For me, coding practices can represent a statement of ethical proportions and subversive creativity against software monopolies and technological propriety. I claim deviations from aesthetic standards using computing algorithms is imperative in times of global crises and social unrest, particularly concerning learning algorithms that are exclusively trained with visual contents using images solely based on European and Anglo-American cultures.<sup>24</sup> Artistic explorations bending the limits and exposing biases in programming languages are anarchic acts against the system of technocracy.

However, open source coding and free-software encompass a wealth of tactical practices and critical aesthetic-political discourses, the discussion of which lies outside the main scope of my present project. I focus my transversal operations with machine learning algorithms that can be repurposed to convolute moving images and also sounds. In regard to the latter, I worked on granular synthesis using an artificial network of algorithms called self-organising maps, or SOM for short. SOM has been deemed by its creator as a topological computing neural network, which

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<sup>23</sup> There are numerous open-source programs available to implement convolutional neural transfer algorithms. These are accessible via Github repositories under sharing licenses such as Creative Commons. Basically, GitHub is a public online platform with a free-to-use share-alike mentality, hosting a myriad of developers who follow the open source credo: to contribute utilities and applications, whose code is open for reprogramming, collaborative debugging, and reinvention.

<sup>24</sup> For example, the text-to-image DALL-E machine learning model from OpenAI, which generates entire digital worlds by taking a text prompt as input. The scope of my present decolonial methods do not involve this technology. However, I am considering working with this in the future as I see the need for a serious exegesis of its artistic employment in order to decolonise its uses.

organises itself based on the input patterns that it is trained with (Kohonen 1982). In this case the input patterns are audio files, instead of images as in the case of convolutional algorithms. By passing in sounds, the synthesised result acquires a granular acoustic texture. This sonic texture is meant to invoke a carpet full of ants, and can be played back in different iterations, in the manner of a weaving pattern that transforms, mutates in time. This method of weaving sounds is inspired by the weaving performed by *tamya añanku*, and builds on the notion of pattern-making, which is commonplace practice in electronic music composition. The result of implementing self-organising maps with recorded sounds of rain ants is part of the artwork *Taki Rhythms*, presented in Chapter Five.

By reworking machine algorithms with images and sounds of ant origin, I exercise a critique of the programming and classification bias persisting even in open source technologies. It is crucial to point out that most datasets, i.e., the image models used to train algorithms of recognition, have been exclusively compiled with objects, figures, and human features of Anglo-American and European cultures. Machine learning algorithms are commonplace, enforced by the infrastructures of technology-hungry societies in which unsupervised computer tasks have capital value. Integral to my tactical media discourse is to become transversally creative with the limits and sociocultural issues hidden in codes, without losing a critical making impetus of origin and trajectory in respect to Sarayaku. With this in mind, I combine amplification, interference, syncopation, and convolution to express the *tiam*, *taki*, and *awana* in the aesthesis of *tamya añanku*.

My transversal methodology explores a new form of inquiry and re-presentation of this species of ants. However, it is necessary to take into account that tactical mediations with algorithms are placed in confrontation with the Amazonian world of Sarayaku. Levelling with audiovisual programming, circuit-bending, and coding practices, vis-a-vis the Sarayaku reality, is not free of issues. I am aware that lessons need to be learned and adjustments need to be made in the deployment of this methodology. These will be discussed in the final chapter.<sup>25</sup> For now it is important to remember that coding practices, like the ones I engage with, are still foreign to the people of Sarayaku, as programming languages are mostly written in English. A debate has to ensue

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<sup>25</sup> I reckon my practice still has to be contested by the people of Sarayaku in order to know the values of my artistic contribution. For the purpose of achieving the ethical contribution I seek, and to merit their local practices and culture of territorial relations, the artworks and ideas I have developed need to be shown in Sarayaku. This is discussed in my conclusion (pages 179-184).



about computer programming that dares to include indigenous languages and logics, or else offer opportunities for them to learn coding languages.<sup>26</sup>

### **A spectrum of rhythmic motions**

I created media installations that amplified, interfered, syncopated and convoluted the colonial image of army ants. These were transversally operated to produce a diversity of visual and electroacoustic compositions. Ant movements were rendered as visual threads, and ant rhythms as sound waves, crossing and weaving invertebrate fabrics. The variable results mediated through my transversal operations show a spectrum of audiovisual oscillations emerging from the unruly performances of rain messengers. The notion of spectrum is key to understand what comes in the next chapter. My notion of spectrum incorporates oscillations, dissonances, frictions, and tensions, ongoing processes of differentiation and diffraction, which result from the application of transversal operations to understand ant worlds in Sarayaku. This spectrum is materialised, on the one hand, in photographic prints and dynamic visualisations, which I produced using algorithms of convolutional neural transfer and motion detection (Athalye 2015; Walter 2021), and on the other hand, are shown in photographs taken during night migrations of ants crossing laser beams: these images depict colourful diffractions and displacements caused by the interferences of ant bodies.

A spectrum signals divergences from fixed and stable definitions. Following my ethical intention for inverting colonially biased scientific representations of ants, I use the term spectrum to indicate that rain ants' mode of existence demonstrates indeterminacy. This indeterminacy, however, is deeply affected by the territorial relations being woven in this rainforest. The notion of spectrum emerges as an appropriate exponent of rain ants' invertebrate territoriality in motion, as this is being affected by the fabrics of Sarayaku. Inherently transversal, rain ants' territoriality in motion transcends barriers bearing ecological, sociopolitical, and meteorological significances. It is by recognising radically variable movements and rhythms in rain ants' invertebrate performance that they become territorial weavers. As territorial weavers, they adjust their corporeal fabrics to this Amazonian world and evade the epistemological confines of 'a colony,' of militaristic analogies and obsolete imperialist perspectives. By working with the notion of spectrum, guided by *tiam*, *taki*, and

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<sup>26</sup> This is a considerable possibility, however, which bears its transcultural issues and complications. The interest is emerging especially in the younger generations of Sarayaku, who already are bilingual (Kichwa and Spanish) and not shy of learning another foreign tongue.

*awana*, I create an artistic rendition of *tamya añanku* that is not categoric nor strictly defined, but open and unruly. *Tamya añanku* are active participants in the weaving of territorial resistance and their movements and rhythms unfold a spectrum of possibilities. Theirs is an inverted world freely woven (*awana*) by radical turns (*tiam*) and rhythmic oscillations (*taki*).

In Sarayaku, movements weave rhythms, rhythms weave movements, and a world is being brought into life through weaving. This encompassing understanding is my canon. With this understanding, I turned transversality into a weaving method that inverts army ants into rain messengers. This transformation is done by crisscrossing between disciplines, linking different processes across the territoriality from underneath of Sarayaku, along a sociopolitical culture, and ecological place of territorial relations with greater earth beings. In the following chapter, I present these earth beings, and the territorial relations woven with them, by invoking the Kichwa concept of *kawsay*.

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