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From Xenomateriality to Xeniomaterialism: an architecture of climate-responsive nature-techno-culture continuums

Abstract

Purpose: This essay is a prompt towards climate-related action strategies for an architecture based on planetary thinking. It proposes a conceptual framework of entanglement, rethinking design practices through sympathy, care, and relationality beyond anthropocentrism. The essay offers a conceptual trajectory between two neologisms: xenomateriality and xeniomaterialism.

Approach: First, the essay re-examines the notion of xenomateriality coined as the currently contested relationship between traditional systems of creating architectures and what is seen as alien matter. It then uses xenomateriality as the basis to develop, conceptualise, and contextualise a xeniomaterialism. It is a new symbiotic materialism in-between nature, technology and culture to be invented and re-composed through products of human and nonhuman activity towards a resilient planetary ecology.

Findings: In xeniomaterialism, the revised construct of living matter, is entangled with omnipresent human intentionality and nonhuman creativity and engaged in a non-hierarchical symbiosis and sympathy – an inclusive hospitability. In xeniomaterialism the “geo” is linked with the “Gaian” and framed by posthuman and decolonial ecologies of matter and care.

Originality: The essay presents an architecture and action strategy where nature, technology, and culture are composing matter-to-come, affirming the importance of pluriversality: a coalition of non-hierarchical agency on a global scale. This

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2
3 radical proposition of achieving a xeniomaterialism creates a meta-philosophical
4
5 blueprint towards a sustainable Gaian Anthropocene.
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10 **Keywords:** alien, materiality, materialism, Gaia, planetary, xenos, xenios
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14 **Anthropo[s]cenic Relationalities**

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17 This essay acts as a proposition for a conceptual framework for climate-related action
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19 strategies related to architecture emerging from planetary thinking. It promotes
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21 sympathy, care, and relationality beyond anthropocentrism, through a conceptual
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23 trajectory between two neologisms: xenomateriality (a materiality encompassing alien
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25 matter) and xeniomaterialism (a materialism of hospitable coalition). It should be read
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27 as a roadmap from re-conceptualising planetary architectures of care towards a meta-
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29 philosophical blueprint for decolonial and climate-resilient Gaian ecologies. This should
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31 be rendered as neither the only way, nor a process of linear correlation and causality. On
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33 the contrary, it can be potentially founded on hybrid thought processes and practices
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35 that are inclusive and non-binary, therefore transcending Euro- and anthropocentrism.
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43 To attempt this roadmap from re-conceptualising planetary architectures towards a
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45 blueprint for decolonial and climate-resilient ecologies of care, we (authors) opted to
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47 rely on a dirty (Frichot, 2019) and decolonial feminism (Vergès, 2021). Our approach
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49 aims to disarm dichotomies (Salter, 2015, p. 27) that is founded upon inefficient
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51 ecological thought and praxis, and which is endorsed by disciplinary eco-chambers and
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53 mono-dimensional methodologies. The dirtiness that Hélène Frichot teaches us is a
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55 hybrid becoming, “a life, where it is not stultified as nature morte, is inevitably dirty,
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57 messy, buffeted by contingencies. Theories, ways of actively thinking-with, can be
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derived from all kinds of sources and situations” (Frichot, 2019, p. 5). McKenzie Wark on the other hand, reminds us pertinently that “the common task of knowing the world reverses the relation between the disciplinary and the interdisciplinary... it is only the edges of knowing that are interesting (Wark, 2020, p. 5). This approach does not seize to be of methodological standing. It presents key thresholds offering malleable shifts and conceptual anchors. They are identified as: a grounding of new materialities in the Gaian paradigm, a revisiting of alien materiality and the notion of “xeno” as alien, the potential entanglement of Gaian and posthuman systems of thinking filtered through a connectedness of nature, culture and technology, the highlighting of non-human creativity emphasising on equitable symbiosis and sympathy (from xeno-/alien to xenio-/hospitable), and the compassionate affirmation of agency needed in times of climate anxiety (figure 1).

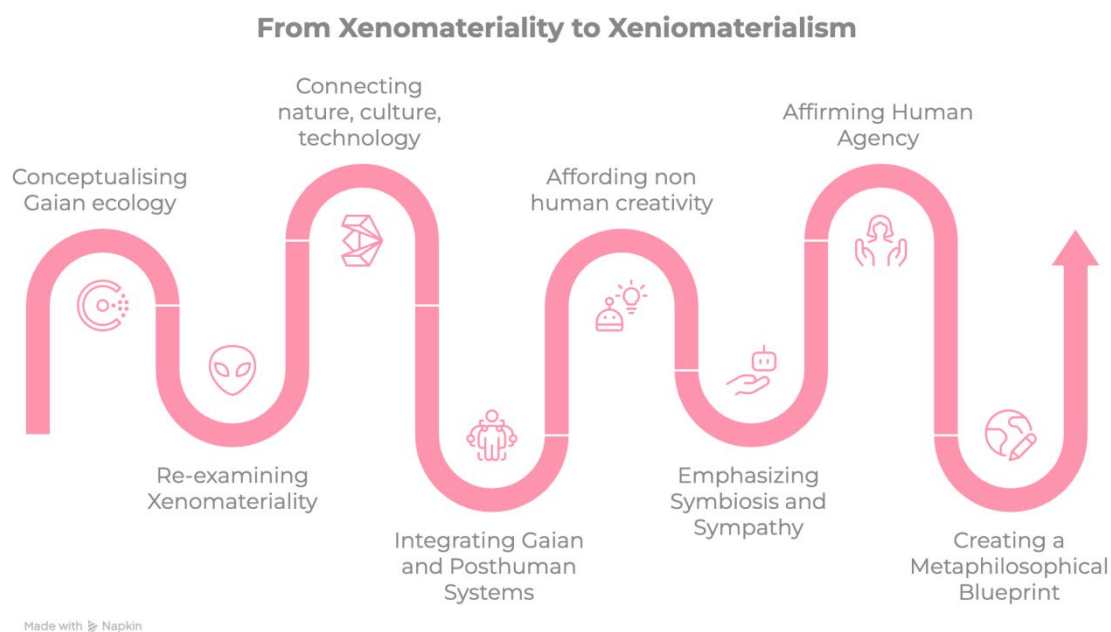


Figure 1: From conceptualizing a Gaian ecology to framing a meta-philosophy blueprint or the operative roadmap of an architecture of climate responsive nature-techno-culture continuums: from xenomateriality to xeniomaterialism. © the authors, made with Napkin.

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3 To start the roadmap towards the blueprint, we must first address the most important
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5 point of urgency, climate change. The latter and its byproducts including climate
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7 anxiety (Mental Health UK, 2023) have been increasingly receiving philosophical
8
9 treatise by thinkers whose work focuses on new materialisms in the context of
10
11 architectural humanities, Anthropocene studies, and the Gaian paradigm. The latter can
12
13 be summarised as the planetary ecologist hypothesis that earth is a system which thrives
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15 on its own imbalance to sustain and regenerate life, and where living entities and the
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17 environment are in constant symbiosis (Margulis, 1999). Acknowledging that any new
18
19 materialism is a methodological approximation, the Gaian paradigm may lead to new
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21 theoretical hypotheses framed within an honest problematisation of and on the
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23 Anthropocene.
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31 The latter, a term widely challenged yet still relevant in architectural humanities
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33 debates, was made popular by Crutzen and Stoermer (2013) to denote the distinct epoch
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35 throughout which humanity progressively and impactfully changes the planetary
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37 environment through conscious “Eurocentric” “man-made” “extractive” interventions.
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39 These interventions often rely on global systemic and hierarchical infrastructures.
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41 Thinking the Anthropocene in a context of shock means “abandoning the hope of
42
43 emerging from a temporary environmental crisis” (Bonneuil and Fressoz, 2017, p. 288).
44
45 Many contemporary thinkers negotiate the notion of the Anthropocene, among others
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47 David Chandler and Jonathan Pugh, Bruno Latour, and H el ene Frichot, by bringing in
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49 geopolitical relationalities (Latour), insular ontologies (Chandler-Pugh) and creative
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51 ecologies (Frichot). Chandler and Pugh who write extensively on the Anthropocene and
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53 future planetary thinking, note that “in more recent debates about the Anthropocene,
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55 however, this older process of critiquing modernist or rationalist approaches
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3 increasingly seems to reproduce the ontological binaries of culture and nature, and
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5 perpetuate colonial thought. It generates values based on human instrumental reason
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7 and utility, on the grounds of the continuation of life itself” (Chandler and Pugh, 2020).
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10 Frichot on the other hand reminds us of what it means to witness the “exhaustion of
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12 worlds” and asks: “If we pause imaginatively to project into a future, what will some
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14 alien ‘other’ witness when humankind has been erased from the face of the earth, and
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16 the world-historical scene of the Anthropos has all but faded from view?” (Frichot,
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18 2019, p. 5).
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24 For many thinkers, including Frichot, it is exactly the result of anthropogenic
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26 activity that will progressively lead to human extinction or – as currently seen – an
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28 exhaustion brought by the stagnation of the capital. In the concept of post-
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30 anthropocentrism and advanced capitalism, Rosi Braidotti sees this burnout of resources
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32 as “a threshold of transformation of forces, that is to say a virtual state of creative
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34 becoming” (Braidotti, 2019, p. 17). Any abysmal ontologies that may be detrimental to
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36 imagining hopeful futures, at least for humankind, imply as such a radical shift. One of
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38 those regards the widening of our perception from a localised understanding of
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40 anthropogenic activity towards including a global consideration of its impact on the
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42 environment. To be effective, the latter must remain away from anthropocentric
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44 appreciations of established polarities, such as nature versus culture, natural versus
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46 artificial, and zoe versus bios. What is, on the contrary, defined as a posthuman nature-
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48 culture continuum (Haraway, 1997) and an entanglement of matter (Barad, 2007)
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50 ecosystemically fosters a shift into alternative constituencies. These include new
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52 paraontologies of ecological being, such as Braidotti’s posthuman humanities (Braidotti,
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54 2013a) and her interconnectedness of life, planet and technology (Braidotti, 2016).
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3 These may not necessarily lead to what we normally question through the ideological ‘if
4 not this, then what?’ or as Braidotti implies a new posthuman subjectivity. They may
5 drive a more desirable ecological order, because in the words of Lee Edelman if we
6 continue to adjourn “fidelity to a futurism... purchased at our expense... we might
7 rather, figuratively, cast our vote for ‘none of the above’...” (Edelman, 2004, pp. 4-5).
8 Of course, to imagine, design, and ‘build’ an eco-techno-cultural understanding – let
9 alone a continuum – is more challenging than an ontological world-building. In the
10 words of Kohei Saito:

21 “Nature is socially affected and modified by humans, so natural events like
22 droughts and wildfires are affected by climate change due to CO2 emission from
23 human economic activities fuelled by the burning of coal and oil. In this sense,
24 societies are physically reconstituting nature... Nevertheless, we cannot
25 conclude from this social influence and reconstitution that nature is ‘built’ as a
26 social construct... While we can build a house, it is not possible to build nature
27 by sowing, cutting trees or mining coal. Rather, all economic activities are
28 dependent on trees and coal, whose processes of formation are independent of
29 humans. Nature is an objective presupposition of production” (Saito, 2022, p.
30 108).

37 Planetary techno-cultural thinking can enable us to appreciate current
38 ecosystemic challenges and pave sustainable ways ahead, addressing ethical and
39 cultural appendices. In the context of terraforming, for instance, Benjamin Bratton
40 imagines a pro-universalist, planetary network based on the principle that the planet is
41 “artificially [and therefore technologically] sentient” (Bratton, 2019, p. 66). The media
42 and technology we invent and use, can extend our human abilities whilst introducing
43 new abstractions. Colomina and Wigley define this as “design” in their seminal book
44 *Are We Human?* (Colomina and Wigley, 2013). When not underpinned by the very
45 purpose that makes it human – to be led by design – this can be alienating, deprived of
46 perceptive and relational logic, and guided by tactics only inherent to the specific
47 technological means it is served by. Climate change is rendered as a threat to (human)

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3 life when associated to actions cannot be critically developed (beyond a computational
4 environment for instance). It cannot be reckoned however in separation from the
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6 geotechnical dimensions it emerges from not the least because humans “have always
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8 been technological” (Bratton, 2019, p. 66). At the same time, the rapid and extended
9
10 ubiquity of automations and artificial intelligence in the production of infrastructures
11
12 fuels a threat implying an irreversible global social collapse. Two closely interrelated
13
14 global threats of climate and social crises are entangled and demand new, more
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16 sympathetic approaches to their handling. Such critical entanglement almost implies an
17
18 equally entangled action strategy based on hybrid practice.
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26 With the geo-socio-political inseparable from the geotechnical, the question
27
28 ‘what Architecture can do to regenerate future ecosystems?’ cannot be comprehensively
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30 considered if approached in isolation. Any isolated answer presents yet another binary
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32 ontology and is therefore a return to a clear-cut positivist anthropocentric approach
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34 bound to contemporary design limitations. Such an approach focuses on the
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36 symptomatology rather than the ecology of the pathology. It cannot be radical because,
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38 by default, it does not acknowledge the roots of the problem, and the rhizomatic
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40 interconnections of any associated domains. It rather perpetuates a narrative of human-
41
42 centred ecology that is no ecology at all – it is yet another fable of human sovereignty
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44 over Gaia. This return could also estrange architecture from its very meaningful purpose
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46 to be primarily environmental science and humanity that is creatively responsive and
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48 proactive to its broader, planetary contextualities.
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56 Architecture can be a tangible manifestation of cultural references to specifically
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58 localised value systems and yet remain connected to global networks – a glocal reality
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(Mihir, 2022). It is under this complexity, that architecture is being challenged to keep a distance from the stagnated orders that have provided context for it for centuries. At times, it may also radicalise itself towards its own emancipation. It is then furthermore challenged when it forces to engage itself in meaningful action strategies, as Spencer points out in Aureli's work (Spencer, 2016) with all its ethical and aesthetic, or rather poetic and poietic entanglements (Aureli, 2012). While these value systems continue to create and re-create autonomies, conflicts and dead ends (some arbitrary and some non-hierarchical) it is worth mapping out a non-exhaustive elemental genealogical taxonomy (figure 2). This taxonomy can perhaps be read as a contextual cartography tool of reference that positions the different manifestations of architectural systems of thought and production against value systems and their ontological characteristics of material style. What this taxonomy does not do, helpful as it may be as fundamental genealogical tool, is to adequately explain the entanglements among hybrid components and lots and of course the very fundamental – sometimes antagonistic – more-than-human reality that survived with and regardless of these manifestations of production on local and global scale. In other words, this genealogy and taxonomy may remain anthropocentric.

If we look at what Rob DeSalle calls 'the brainless majority' (DeSalle, 2018, p. 1) – the genome of the organisms that most sustainably tend to survive Gaian extinctions – we can agree that the condition for the survival of any species is its ability to adapt through mutations to the different destabilizations and crises of its own and other ecosystems. To survive in various types of crises, humans, instead, develop tools, tactics and action strategies. Architecture can be present adaptive, agile and action strategies creatively nourished by crises. Crises and disorders are great opportunities for design to push for radical, more drastic novelty. Even though North (2013) argues that novelty cannot be

radical as the thinking of the past is dissolute in the thinking of the present, we can still hope towards a drastic, action-based novelty, following the origin of Greek verb ‘*δρο*’ (*dro*), which means ‘to act’ based upon strategic thinking. Thinking differently and speculatively means appreciating tools and action strategies devised to create neither designed things only, if at all, nor ideas and ideals only (Dunne and Raby, 2013) but primarily action strategies. For such action strategies to be relevant, resilient and sustainable, we argue that it should be constitutively posthuman and Gaian.

value system [human perception]	architectural production (project)	materiality	material
theocentric [power axis x]	monumental [plebian and noble]	binary extremes; autocratic systems	traditional and mainstream
Scientific [power axis y]	industrialised and automatised	standardised; kit- of-parts	a colony of the three: concrete, glass, steel
sociopolitical nostalgia	facadism, participatory and radical	unfinished architectures; vernacular dreams	bastardised assemblages
Digital [power axis z]	computational elitism	pseudo a-political capitalism	white paste, architectural kenosis
top-down digital powerless	autotelic eccentricity	passive, components	robotic fabrication
hybridity and wilderness	post human eco- narratives	Xeno-materialities, biostructures	nano, live, and hybrid bio-matter
gaia-centric- planetary architectures	discretisation	Xenio-materialism - eco-politics of techno-culture	symbiotic and sympathetic

Figure 2: Genealogical taxonomy of human values-architecture systems – a diagram, © the authors.

Architectural Posthumanities for Gaia

The Gaian concept tends to be warped by thinkers who arbitrarily assign anthropomorphic attributes to planet Earth (Donague, 2010) and define the Earth as a living organism. Sometimes, earth is considered naively and vaguely as mammalian entity with a nervous system and other time a type of sentient slime mold. This, can be a huge leap of faith, causing methodological predicaments in emerging systems of thought and exposing the constitutional inadequacy of such systems to posit any substantial breakthrough. In its radical and more authentic version, Gaia imagined by Lynn Margulis and James Lovelock presents the “discovery that any living planet, insofar as it is like Earth, would be a self-regulating system. And further, that an actively regulated planetary atmosphere that is not in thermodynamic equilibrium is a strong indication that life may be present at the surface” (Margulis and Sagan, 2013, p. 3). In such hypothesis, Gaia is not a “reactive, cybernetic system but rather an anticipative, autopoietic one” (Latour, 2017, p. 9). The regulatory property of this autopoiesis is in fact in the hands – or rather the microbial tentacles – of the brainless majority mentioned earlier that can transform gases among others regulating planetary temperature.

Margulis and Sagan remind us that “control of Earth’s surface [and therefore life] by unintelligent organisms calls into question the alleged uniqueness of human intelligent consciousness” (Latour, 2017, p. 28). We can agree with Margulis and Sagan that the Gaian paradigm is mythopoetic; a vision of a romantic environmentalism or environmental romanticism that could be reduced to an uneventful planetary conviviality. Life in the Gaian hypothesis is in reciprocal existence of atmospheric imbalance, and the atmosphere we breathe is made of the waste, produced in turn by the

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3 very brainless majority that rule the planet (Latour, 2017, p. 46). In addition, we must
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5 not forget “wasted lives and wasted lands” (Vergès, 2021, p. viii). Following Vergès,
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7 we may turn to a feminist decoloniality or a decolonial feminism. In such,
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9 methodological entanglements -like the ones presented systematically in this paper –
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11 “facilitate transborder and international alliances” (Vergès, 2021, p. viii). Although this
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13 approach may read as assemblages of thought at times by the untrained (and colonial)
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15 eye, it fact “pulls threads that simultaneously, yet not in a linear-cause-and-effect way”
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17 (Vergès, 2021, p. viii). As Vergès points out, this feminism is not civilizational
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19 feminism that borrow the language of the “colonial civilizing mission” (Vergès, 2021,
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21 vii) (and mythos) On the contrary, it is an approach that does not wish to “become *the*
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23 theory” (Vergès, 2021, vii). It may offer however *a* roadmap towards *an* architecture of
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25 climate-resilient nature-techno-culture-continuums.
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33 Such approach, does not imply yet another abysmal ontology of the future. It
34
35 potentially creates a call to what being a species living by design means to a planetary
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37 future where humans are still around and the systems invented and evolving – including
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39 architecture – can contribute to a resilient ecology for all. As implied previously, one of
40
41 the key characteristics of decolonial feminism is that it accepts other kinds of
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43 feminisms, including most pertinently here xenofeminism. In her book *The*
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45 *Xenofeminism Manifesto* (2018) Laboria Cuboniks highlights the urgency and for
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47 planetary approaches that are emancipatory. In her words, “[x]enofeminism understands
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49 that the viability of emancipatory abolitionist projects – the abolition of class, gender,
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51 and race – hinges on a profound reworking of the universal” (Cuboniks, 2018, 57). This
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53 is why in hybrid, planetary approaches – like the ones presented in this essay – the very
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55 languages that allow for the problematic binary otherness including race, remain silent,
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3 to give way to sincere anticolonial and pre-colonial voices that are not necessarily
4 racialised. In the words of Nell Irvin Painter, “[i]f we were to find our way out of the
5 hidden place that we’re now, we’re going to need a lot more conceptually than race”
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10 (Painter, 2022, 35).
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14 In his book *Facing Gaia*, Bruno Latour takes us to pre-Lovelock times and
15 immerses us in the mythological genealogy of Gaian thought, surrendering to its pre-
16 colonial, ancient spirit. “Prolific, dangerous, savvy, the ancient Gaia emerges in great
17 outpourings of blood, steam, and terror, in the company of Chaos and Eros... in
18 Hesiod’s narrative, Gaia plays the role of a terrifying power but also that of an astute
19 advisor” (Latour, 2017, pp. 81, 86). In all recurring scenarios we see in Westernized
20 modern thought, there are spirals of ideas that entail matter, material, materiality and
21 materialism, interchangeably and in vertigo. In such state, Latour insists:
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33 “One thing is certain: the old role of ‘nature’ has to be completely redefined.
34 The Anthropocene directs our attention toward much more than the
35 ‘reconciliation’ of nature and society into a larger system that would be unified
36 by one or the other... [and] we would have to have accepted the dividing line
37 between the social and the natural – the Dr Jekyll and Mr Hyde of modern
38 history (I’ll let you decide which is which). But the Anthropocene does not ‘go
39 beyond’ this division: it circumvents it entirely” (Latour, 2017, p. 120).
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45 In such turmoil, architecture can be an act of transforming this divisiveness into new
46 ecologies of fragile reconciliation that can affirm life, analogous conceptually to the
47 atmospheric imbalance sustained by bacteria in the Gaian hypothesis (Margulis, 2023).
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49 It does so by being the pendulum between the abstract and the tangible. Aureli
50 illuminates this act by suggesting a distinction between project and design. For him,
51 design is a “managerial praxis” of building something, while the project is the
52 aspirational strategy on which the design praxis will bring this into life (Aureli, 2012).
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5 The question of what transformation architecture can do in favour of a
6 sustainable Gaia invites us to speculate on strategies that could fulfil architecture's new,
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8 action strategy that is both material and natural. Such strategy invites design to move
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10 from its everlasting preoccupations with managing alien matter in favour of new
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12 inclusive materialisms capable of resiliently leading to truly autopoietic futures. Aureli
13
14 bids us to use materiality as our starting point towards new materialisms. Antoine Picon
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16 defines materiality not as a synonym for matter but as the relationship we, humans, have
17
18 with matter, a relationship that is a cultural construct (Picon, 2004, p. 117). It is the
19
20 sub-processor of the outcome of the simultaneous emergence of the human and
21
22 nonhuman, in other words, for Picon, of techno-culture and nature. Human thinking is
23
24 profoundly radicalised by digital and technological means that are not mere tools but
25
26 ways of thinking. In this context, our relationship with matter – the definitive substance
27
28 of architectural tangibility – is also transformed. With it, our understanding of
29
30 architecture and its role in a techno-culture-nature continuum is under revision. The
31
32 growing consideration of matter as vital substance (Bennet, 2010) can refute the long-
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34 established anthropocentric ontological dualisms calling for materialities that render
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36 architecture tangible as appropriate to be inhabited by a revised and hospitable human.
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47 Currently, humans inadequately interrogate any emotive kinship with own and
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49 alien matter. The natural and the artificial continue to compete for the award of the most
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51 uninvited guest, a disliked relative in feud, or so to speak the shorter end of the stick on
52
53 the pageant of sustainable oddities. Reza Negarestani's work in *Cyclonopedia* (2008)
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55 deploys xeno- as a destabilising force that ruptures anthropocentrism while insisting on
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57 rationalist inhumanism. The xeno- for instance appears in xeno-chemistry, xeno-
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3 architectures, and the “xenosphere” (a realm of alien logic that corrodes human
4 meaning) (Negarestani, 2008). Xeno- here is the meeting point where Lovecraftian
5 horror meets a dirty materialist inversion of Braidotti’s posthumanism, in a hybrid
6 entanglement. This awkward phase can be called a xenomateriality; a material
7 conundrum where our relationship with matter is about to be reinvented, reclaimed,
8 reconstructed, and recomposed through existing by-products of the human and
9 nonhuman activity. It is a strange state of material and conceptual corruption about to
10 give birth to emerging ecologies for Gaia. It presents a fragile, ephemeral geopolitical
11 aliening, that allows us to gaze hopefully towards not the future of the existing, but a
12 new prospect of its becoming. A realm of alien logic that corrodes human meaning
13 based on xenoentities, like inhuman agents that manipulate geopolitics, dissolves
14 boundaries between geology and war (Negarestani, 2008) leading to hybrid practices.
15 This includes the speculation of turning detritus, harmful materials that emerge from
16 human activity to a new materiality as a new relationship to matter.
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38 Xenomateriality therefore can be seen as a highly geo (Gaian)-political action
39 strategy. It is radical in itself as it walks away from any romanticization of
40 breakthroughs and seeks the evolution of those advances (Johnson, 2010) that takes
41 available resources, exploring them in a similar way to what Ordine defines as the
42 obsession for material goods and the cult of utility ultimately wither the spirit,
43 jeopardising creativity, and our most fundamental values, human dignity, love, and
44 truth, “the usefulness of the useless” (Ordine, 2017). It is an ontological constitutive of
45 architecture to define itself as an ongoing act of contesting the familiar and the
46 established. By justifying itself as such, it serves a reinvented, through design,
47 posthuman entity (Colomina and Wigley, 2013). The harbinger of novel ideas, often a
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3 haecceity along humans and nature, architecture at times aspires to construct the new,
4 the other, the unfamiliar, the “xeno” ([Auhtor 2] and [Auhtor 1], 2020). Architecture
5 then may debunk the existing, opening new horizons in thinking and practicing
6 previously thought to be attainable. It does so by differentiating and then reconnecting
7 what is coming and what already exists.
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17 Architecture can be a constant metaxy, in-between state of experiencing
18 interregnums, periods between the surge of a crisis and its handling. The term
19 interregnum was used in ancient Rome to refer to the moment of legal and political in-
20 betweenness that followed the sovereign’s death and preceded the enthronement of his
21 successor. Gramsci offers an interesting definition of crisis as the condition in “the old
22 is dying and the new cannot be born; in this interregnum, a great variety of morbid
23 symptoms appear” (Gramsci, 1971, p. 276). Architectural materialities are, ultimately,
24 nothing more than alternations of interregnums. In them, experiments on newness
25 deploy new and hybrid materialities based upon emerging ideas of matter. Architecture,
26 as we know it, is in constant flux of these alien, xenomaterialities, which are alive, in
27 productive imbalance like Gaia. Of course, social crises, cultural interchange, and
28 technological advances encapsulating these materialities have always been pivotal in
29 enabling change and pursuing the new, what Kousoulas calls after Massumi and
30 Simondon a “reticular technicity: technê in action” (Kousoulas, 2023, p. 66).
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51 **Alien Matter – Xenomateriality**

52 The idea of the vitality of matter is not at all recent and contemporary thinkers like
53 Bennett and Braidotti pose different versions of questioning the ontological dualism of
54 life-matter in philosophical concepts and claims in the works of Epicurus, Spinoza,
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3 Nietzsche, Thoreau, Darwin, Bergson, Driesch, Adorno, Foucault, Serres, and Deleuze.
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5 However, the interregnum of xenomateriality invites scientific investigation to evolve
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7 through trans and cross-disciplinary encapsulations of the operation of material reality
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9 (materialism) to address urgent and future challenges related to societal, environmental,
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11 demographic, geopolitical, and economic crises. This material vitality of
12
13 xenomateriality, in other words the capacity of a materiality to exist in fragile
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15 equilibrium among its familiars and its aliens, is not at all about determinism, inbuilt
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17 purpose, or finality but rather about becoming and transformation (Braidotti, 2013b, p.
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19 91). It is a shift from an understanding of the world as the outcome of an assemblage of
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21 discrete elements to its new understanding of the result of growth. In ancient Greek,
22
23 Xenos (ξένος, /'kse.nos/) is a word carrying positive cultural connotations. Historically,
24
25 xenos is an entity coming from another place, an alien. To accept and welcome a xenos
26
27 is to offer philoxenia (hospitality) – a bold gesture of kindness and civilisation – the
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29 action strategy of becoming xenios (ξένιος /'kse.nee.os/).
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38 Xenomateriality invites experimentation on materials aligned with the new
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40 action strategy of architecture to sustain the survival and future life of Gaia. On this
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42 premise, matter may not be a product of non-renewable resources harvested from Gaia
43
44 but can be the by-product of human activity with a harmful impact. Some underlying
45
46 experimentations may not only be about materials but also about speculations on what
47
48 architecture can do to cope with crises through purposefully generated and arranged
49
50 matter. In such in-between, hybrid, materiality, humans, nature, and intelligent learning-
51
52 to-learn machines start to become less different entities either enacting or representing
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54 (see figure 3). They become elements of complex types of matter that is living,
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56 intelligent, self-organizing, and forming the material substance of Gaia. They constitute
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3 an inseparable and embodied ecology exposed to unpredictable stimuli of the different
4 kinds of environments – natural, human and nonhuman –. They are entwined in the
5 production of identities and new and unfamiliar forms of subjectivity. Xenomateriality
6 implies that non-human substance may not be separated from human subject and
7 consequently human actions. This complex exposure to randomness and
8 unpredictability may generate more, new action strategies.
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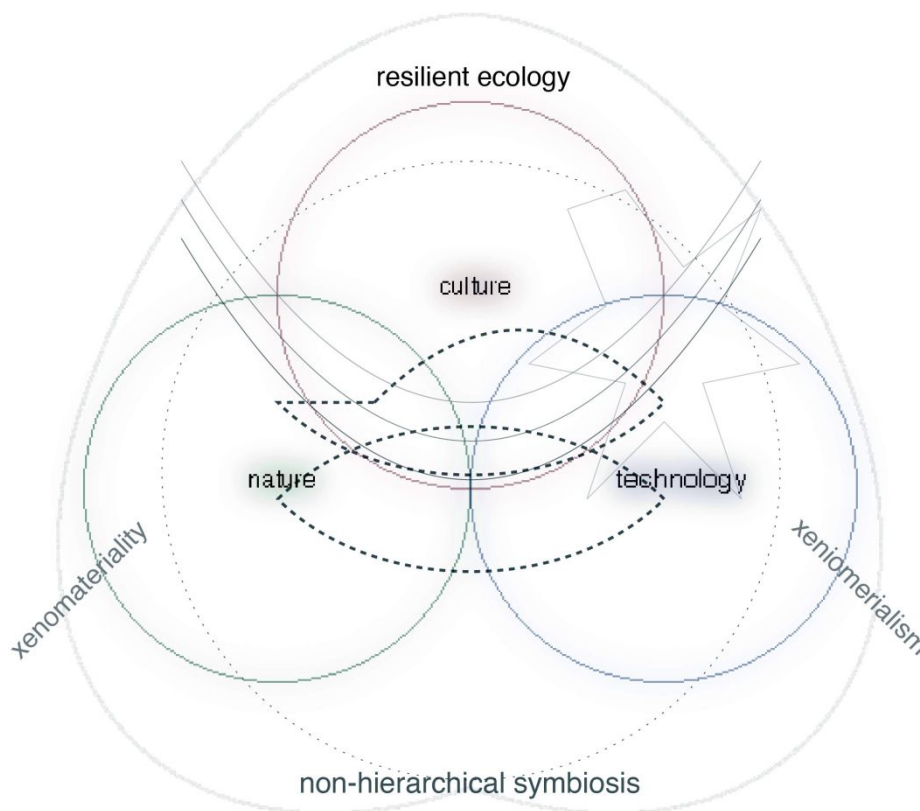


Figure 3 Entanglements of nature, technology and culture towards non-hierarchical, human and non-human symbiosis, © the authors, made with Claude Ai.

The idea that matter – including the embodied human flesh – is intelligent, self-organising, and creative, destabilises the sovereignty of the civilised human over the nonhuman. This instability is life in itself, Gaian life. In this context, matter can be conceived as something more than substance of an artifact in objecthood. It can become

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2
3 an agent arranging energy, or a composition process (Latour, 2010). In the context of a
4
5 broader ecology, matter is opposed to neither culture nor technological mediation. It is
6
7 in continuum with them (Latour, 2010, p. 350) and the rapid development of
8
9 technocultures enhances the importance of material agency. An action strategy that
10
11 generates agile responses to random new stimuli, including products of learning
12
13 machines can create a technicity – the creative ground from which new patterns can
14
15 emerge. Architecture is challenged to redefine its ethics and aesthetics through new
16
17 narratives, creative potentialities, and practice machine-mediated experimentations to
18
19 enact the becoming of Gaia effectively.
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26 An ecology of xenomateriality presents three intertwining strands. In the first
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28 case, it regards new, environmentally friendly materials, such as materials developed as
29
30 part of circular economy or composite materials created using ethically harvested,
31
32 natural and raw matter. With the use of advanced digital tools, these approaches may
33
34 create new sustainable assemblages of organic or inorganic matter. This architectural
35
36 materiality can be seen as cooperation among entities of matter existing in nature,
37
38 harvested, and assembled as different and distinctive entities. It implicitly may still
39
40 follow a human-centred tradition (a heritage). It considers however that combinations of
41
42 parts with different capacities under a predefined purpose can become new
43
44 architectures. For instance, the Waste Brick Wall by Kirkland Frazer Moor Architects is
45
46 a “re-imagining of the historical Bungaroosh Wall as a composition of bricks from off-
47
48 cuts, demolished industrial waste and bee, bat and insect habitats” (Kirkland Frazer
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50 Moor, n.d).
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3 The second strand regards materials and elements that present qualities and
4
5 behaviours equivalent to those of living organisms, with their key operating principles
6
7 embedded in the architectural fabric, and deploying data, information, crafts, and
8
9 knowledge through the interaction of different machines with contextual stimuli. These
10
11 may evolve into resilient, hybrid, mechanisms that acquire kinetic capacities and can
12
13 become capable of adapting, transforming, and responding to users and environments.
14
15 This strand also regards controlling material performance of architectural components
16
17 by robotic systems during the building process, where materials are not harvested but
18
19 programmed-designed. Action strategies become design methods that control the
20
21 continuity between the digitally designed component, its material crafting, and its final
22
23 operability. We move from an object-oriented design to a process-oriented, alien
24
25 technicity. Hybrid agency in matter is developed using human and nonhuman
26
27 instruments. Its ethical dimensions reconsider the architecture a result coming “from
28
29 within the materials, a form that we tease out of those materials as we allow them to
30
31 have their say in the structures we create” (DeLanda, 2004, p. 21 cited in Menges, 2012,
32
33 p. 19). These experimentations are methodologically underpinned by the simulation of
34
35 natural processes in biological growth. Interactions between human and nonhuman
36
37 agents – notably developed by Western institutions – divulge different spatial constructs
38
39 towards an environmentally sensitive footprint (Bier, 2018, pp. vii-viii).
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49 At the same time, against canonical colonialism and as early as the 1970s, we
50
51 observe notable examples of hybrid practices that encompass action strategies where
52
53 nature and culture entangle in the making of an architecture that is primarily ecological.
54
55 Demas Nwoko’s work in Nigeria was renowned for its inventive designs, an
56
57 architecture seamlessly integrating local materials with traditional construction
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3 methods, frequently highlighting sustainability and cultural relevance. Similar long-
4
5 standing vernacular practices were studied in Ghana a decade later (Schreckenbach and
6
7 Abenkwa, 1982). Analogous references exist in local, material-led architectures, like
8
9 Esculturas Margivagantes (marginalised sculptures) (Ramirez, 2006) that developed
10
11 as an anarchic blend of site-specific craft and vernacular building by self-taught builders
12
13 who constructed highly customised structures beyond the canonical. The extraordinary
14
15 architectural expression of the Batammaliba roundhouses in Western Africa (Blier,
16
17 1987), and the eco-poetical explorations of Bernard Lassus (1998) are also notable
18
19 examples of entanglements of craft, design, and nature where hybrid matter prevails.
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26 Building matter is embedded in architectures and often conceived as the
27
28 assistant of form and the ally of structure, with postmodern materiality becoming a
29
30 syntax of meaning in and with building matter in architecture. Anthropocentric
31
32 materiality in any case can be seen as passive, mute, and inert, and imposed by
33
34 hierarchical commands ([Author 1], 2011). Anticipations are prescribed into ideas and
35
36 translate into operational articulations, with form often becoming an overpowering
37
38 materiality. The problem is assuming matter to be about being and not about becoming
39
40 (Bennet, 2010, and [Auhtor 1], 2018a, p. 3). This is what Carpo elaborates in his book
41
42 *The Alphabet and the Algorithm* taking on the difference between the allographic and
43
44 the autographic (design while building) approach to architecture, where the allographic
45
46 is an intellectual construct detached from the hands-on experience (Carpo, 2011). The
47
48 main concern was the materiality of architecture and not the architecture of materiality.
49
50 Architecture here becomes a process of mental constructs that shape new appreciations
51
52 of materialities, and the invention of structures lead to an ecology that influences the
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54 relationship between its parts. The human designing for the human dismissively
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3 neglects the potential of nonhuman agents to become creative. It furthermore deprives
4
5 these agents' potential for self-transformation, self-organisation, and auto-healing. Such
6
7 approaches can render materiality as indeterminate, continuously forming and
8
9 reforming in unexpected and even unpredictable manners.
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15 The third strand of xenomateriality searches for hybrid materials, but no artifact
16
17 is expected to behave like a living organism. Instead, it may constitute a living
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19 organism. To achieve this, any hybridisation may need to move beyond the assemblage
20
21 computational interfaces and incorporate living organisms in this entanglement. Hybrid
22
23 materials could dispose biological substance emerging from the intersection of the
24
25 digital, the biological, and the physical (organic or inorganic). This intersection can
26
27 simulate a contemporary understanding of Gaia's living matter with its autonomous
28
29 components, the physical, the biological (including the human), and the nonhuman
30
31 (including the digital). Matter no longer needs to be seen as the outcome of an
32
33 assembly. It can be allowed the growth or self-assembling, using the digital to shift
34
35 from the material to the biological. What Neri Oxman for example explores through her
36
37 biologically mediated matter is new ways to establish respectful symbioses and
38
39 sympathy between nature (organic and inorganic) and culture (human and nonhuman
40
41 artifacts). As Oxman states, it is no longer nature that inspires design but nature itself
42
43 that is "inspired by design's synthetic and integrating procedures" (Oxman, 2015). It is
44
45 an invitation to design with and for nature.
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54 **Xeniomaterialism – A New Interregnum**

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56 All three strands of xenomateriality aim to design and construct the architecture of a
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58 future materialism that goes from xeno- as the alien to xenio- as the welcoming host.
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3 The latter is a new architectural materialism born out of the crisis made of this
4
5 xenomateriality, following the ontological and epistemological reconsiderations of
6
7 matter and experimentations mentioned earlier. Xenomateriality becomes the central
8
9 concept through which architecture is reconstructed into Gaian xenomaterialism – a
10
11 new nature-techno-culture continuum. Through crises, a new interregnum is poised
12
13 between inward-looking old powers and recalcitrant, emergent ones. The emerging
14
15 newness is based upon the assumption that “everything that had been taken for granted
16
17 in the modernist narrative of progress, is fully reversible, and it is impossible to trust in
18
19 the clear-sightedness of anyone” (Latour, 2010, p. 473). As the critical constituents of a
20
21 normative worldview, the human, the natural, and the artificial must be radically
22
23 repositioned.
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31 This repositioning is founded on questioning the binary and divisive ontological
32
33 dualisms, polarities, and dialectics established throughout westernized anthropocentrism
34
35 including human/machine, *zoē* /bios (Braidotti, 2019), natural/ “man-made”, and
36
37 will/determination, which in Braidotti’s more recent work is used to revisit biopolitics,
38
39 aligning Agamben’s exclusionary mechanisms with her critique of humanist
40
41 exceptionalism (Braidotti, 2019, pp. 112–115). This shift can fuel novelty, conceived as
42
43 progressive incremental recurrence and as revolutionary formal technical and
44
45 conceptual recombination. In the former, the environmental crisis is seen as remedied
46
47 through new materialities that emerge from the use of environmentally friendly and
48
49 recycled, upcycled, repurposed, recycling, retrofitted, “superused” materials (van Hinte,
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51 Peeren and Jongert, 2007). The revolutionary formal, technical and conceptual
52
53 rearticulation is primarily looking towards forms emerging by the extensive use of
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3 digital means, albeit motivated by a latent techno-utopianism. Both approaches have
4
5 limited connections and osmoses between them.
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10 The critical agent that can connect nonhuman creativity with climate emergency
11 is a revised appreciation of materiality ([Auhtor 1], 2018a). This appreciation is based
12 upon the assumption that the world is of diversely composite substance and tenuous
13 materiality – an entanglement. The latter presents cross-pollinating ecologies and no
14 ontological dialectics. Its demarcation lines are blurred by technological developments
15 and scientific advances, including computation, molecular biology, quantum physics,
16 and robotics. A “mono-logical account of emergent, generative material being,” (Coole
17 and Frost, 2010, p. 8) framed by a monistic and geocentric worldview founded on the
18 self-organizing, autopoietic force of the living matter constitutes its new challenging
19 background ([Auhtor 1], 2018a, p. 4).
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35 The emergence of a promising newness in the contemporary interregnum brings
36 new speculations on the material agency for even more radical novelties such as ex-
37 nihilo creations. It is in the same context that North in his “history of the new” (2013)
38 traces the diachronic contemplations on novelty to conclude that novelty seems to arise
39 from recurrence and recombination. The consideration of Gaia as a self-organizing,
40 living matter challenges the established polarisation between life and matter, a space
41 where the only source of vitality is the soul or the spirit. It fuels contemplation on
42 material formations like edibles, commodities, artifacts, machines, and physical
43 phenomena and materials. These affect our wills, desires, decisions, behaviours, mental
44 and bodily structures and identities, our lives, social structures, institutions, ethics,
45 aesthetics, and politics. This context renders them vital materialities, equally responsible
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3 for Gaia's survival. These vital materialities form other lively powers with which all
4
5 agents are involved and need to establish symbiotic relationships for the survival of the
6
7 threatened planet.
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10 11 12 **Ways Ahead**

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14 A xeniomaterialism is founded on the premise of continuity against oppositional ways
15
16 of contemplation. The latter nourished Western modernity that embraced an attachment
17
18 to transcendent reason in the name of civilisation. The same supported postmodern
19
20 thought, revealing a world headed to a (de-)constructed reality by debunking social,
21
22 cultural, and political prejudices. The creative thinking from modernism to high-tech
23
24 architecture in Europe and the US in the 1990s was again motivated by oppositional
25
26 thinking, based on innovative abstractions. New materialisms emerging from opposing
27
28 oppositional thinking instead, may accelerate the recuperation and regeneration of
29
30 Gaia's fragile, diverse, composite materiality. Gaia may not be seen as an inactive entity
31
32 in need of protection but as an entity with a materiality that can be progressively re-
33
34 articulated. A geocentric universality promotes careful (re)arrangements of assemblages
35
36 composing and composed by heterogeneous entities understood as agents of a
37
38 seemingly finite yet unpredictable becoming of the planet.
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47 Despite the emergence of this new materialism in the current interregnum, its
48
49 sovereignty is still to be established. Its theoretical hypotheses are underpinned by
50
51 extended scholarly work on matter embodied in the alive, and on the characteristics of
52
53 the vitality of matter carried out by all branches of natural sciences ([Auhtor 1], 2018b,
54
55 p. 5). The impact of a new mediated matter in architecture, or in other words, of a
56
57 hybrid material agency in architecture, may be a recalibration of its purpose as new
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3 action strategy. There is great potential in the symbiosis between the physical, the
4 biological, and the digital. However, in many approaches to this symbiosis, the
5 emphasis is put on the eventual or circumstantial operability of the autoregulating
6 growth of the under-formulation data and life-mediated matter. It is implicitly suggested
7 that the new “materialist philosophy must take as its point of departure the existence of
8 a material world that is independent of our minds” as Delanda advocates (Dolphijn and
9 van der Tuin, 2012).

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22 Even though the unpredictability of the interacting agents renders the entire
23 behaviour of life-mediated matter as volatile, it must not distract us from considering
24 the decisive role of human intentionality. In this context, new resilient architectures can
25 still result partly from human intentionality and nonhuman creativity. The (new)
26 constructs of living matter, entangled in an architecture conceived as spatial
27 manifestation of life on the planet, suggest omnipresent agency of the human and the
28 nonhuman, including any machinic and biological intellects, living in a non-hierarchical
29 symbiosis and sympathy. That re-attributes to culture its crucial role in composing
30 matter and affirms the importance of the purpose of this agency. This purpose is
31 understood as an action strategy that can drive architecture and a rearticulation of living
32 matter, and which understands building as action plan for contributing to the planet’s
33 survival (figure 4).
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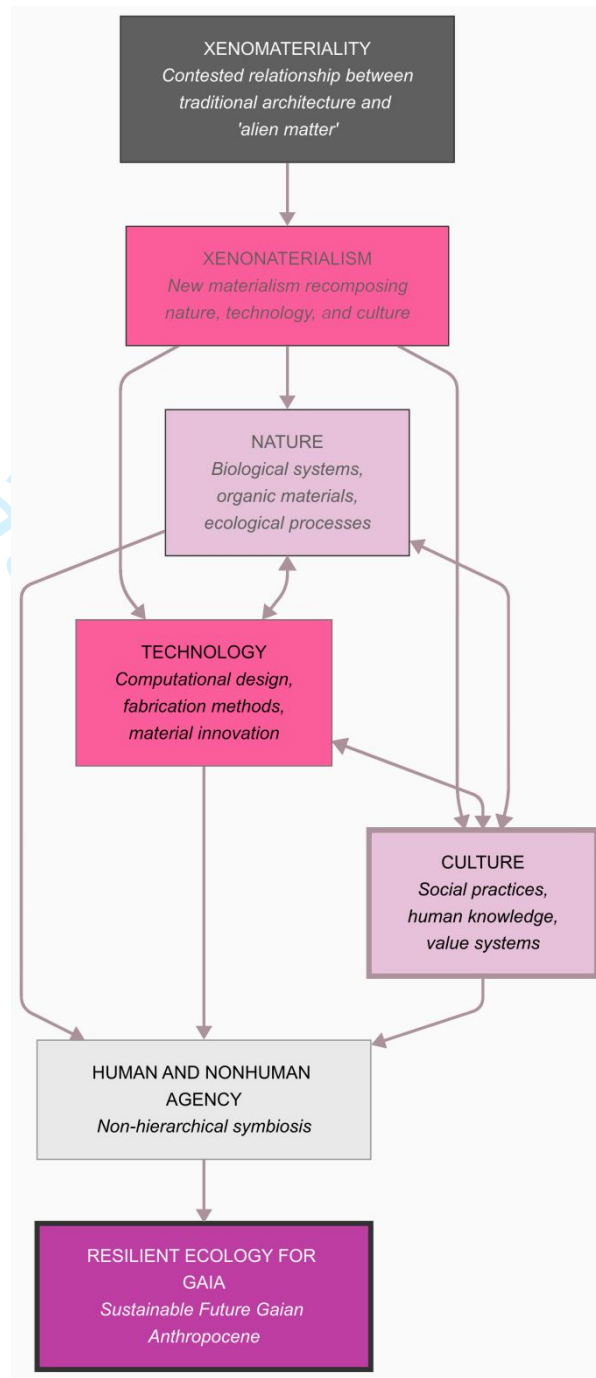


Figure 4 A symbiotic conceptual roadmap for Gaian survival, from xenomaterialism to xeniomateriality, © the authors with Mermaid Chart.

The impact of the hybrid material agency on architecture can also be appreciated through agency in designing, where design can be an act of managing the realisation of the aspirations of an architecture. How can this matter be designed to assure the “composition” that Latour suggests in his seminal essay “An Attempt at a

1
2
3 Compositionist Manifesto” so that it could contribute to emancipating humans from
4
5 capitalist utopias and turn them to the search for ecology? (Latour, 2010, p. 488).
6
7 Composing matter from utterly heterogeneous elements is challenging. It is hard or even
8
9 impossible to stabilise a whole (Latour, 2010, p. 474). What can be left, at best, is a
10
11 fragile, revisable, and diverse material. The fragility of mediated matter needs sympathy
12
13 amongst its components and presupposes “serendipity and synchronization, surprise or
14
15 disengagement” (Pangaro, 2019). Pangaro in the same context considers conversation as
16
17 the foundation of any community, implying on our argument that architecture can be a
18
19 perlocutionary act. This may be the case based on an appropriate hospitable context,
20
21 common communication channels, engagement of mediating agents, agreement on the
22
23 exchanged values, and a (trans)action. For any conversation, an appropriate aspirational
24
25 context is needed, alongside communication amongst the agents, a possibility to be
26
27 engaged in actions, and the operability of this engagement (Pangaro, 2017).
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36 Based on these premises about the material substance of architecture, and the
37
38 repositioning of culture as a speculative action force ([Author 1], 2018b), we propose
39
40 that the experimentations on building materials may follow speculations on what
41
42 architecture can do to cope and assist with resolving with ecological problems. A
43
44 xeniomaterialism conceptually encapsulates this concern, acknowledging that
45
46 materiality can still include the relationship humans have with matter and materials.
47
48 Xeniomaterialism defines the relations established by and with new purposeful matter in
49
50 the role of a welcoming host. Matter in this case, may be invented, extracted,
51
52 constructed, and re-composed through detritus, and existing by-products of human and
53
54 nonhuman activity. Its composition becomes part of a new action strategy and emerging
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56 ecology.
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Xeniomaterialism presents an invitation to embed the ethical and aesthetic values about the planet in the emergent matter that can turn useless into useful. It is driven by a new geopolitical perspective, looking not towards the future of the existing but the prospect of its becoming. It is driven by the competencies and qualities of the promising crafting that emerges from humans working with intelligent machines, a cross-pollination between the human and nonhuman in symbiotic creativity. The persistent ambition of anthropocentric architecture is to redesign the human, backing it with the pretext of serving human needs (Colomina and Wigley, 2013). This redesigned species, the offspring of modern ambition, is one that “systematically designed its extinction and seems to be getting close to accomplishing the goal” (Colomina and Wigley, 2013, p. 15); a species either redesigned in the Promethean logic, looking forward and creating myths of its future, or following the Epimethean premises, looking back and contemplating existing mythologies.

An architecture based on xeniomaterialism redesigns for and with other species, embedded in Gaia, affected and affecting its complexities, being in a perpetual transformation and a polyvalent becoming. There will be a welcoming re-construction of the so-called user, the intruder, be it human, posthuman, or nonhuman, to construct a new worlding. We must accept that architecture may (re)define politics and engineer new spatio-temporal assemblages at the same time as polluting waters that travel through nations. After all, “the hard lessons of colonialism, capitalist extraction, and urban renewal have shown that a tabula rasa does not exist” (Iturbe, 2019, 21). Gaia’s return reunites and reconciles Prometheus, Hassan’s first performer of posthuman culture (Hassan, 1977) and Epimetheus, Stiegler’s encapsulation of structural prosthesis

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2
3 of the human (Stiegler, 1998) in mythopoetic ecologies of nature, the alive, the
4 machine, technology, culture, the human, matter, substance, and the environment. An
5 architecture based on xeniomaterialism aspires to a new earth by sidelining established
6 and tested Promethean and Epimethean narratives and opens a rich dialogue with
7 Margulis' symbiogenesis and Braidotti's posthuman knowledge. As such it is not
8 strictly speaking just a Gaian materialism. Xenio- (not xeno-) embodies the reciprocal
9 hospitality of ecosystems, where the alien becomes host in multispecies and hybrid
10 practices (e.g., forests hosting mycorrhizal networks, the healing practice of tree
11 embracing as performance art, or indigenous epistemologies viewing land as kin).

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26 A xeniomaterialism action strategy may also treat for instance clay, mycelium,
27 or algae as agential partners of equal standing (e.g., Xenio Clay redolent of ancestral
28 handprints). It may also develop protocols that adapt from indigenous gift economies
29 like the potlatch (Graeber, 2001) to non-human exchanges (e.g., offering CO₂ to trees in
30 return for oxygen). It may therefore afford new kinds of affect, based upon such radical
31 symbioses of autonomous intelligence. Xeniomaterialism hopes for and anticipates new
32 relationships where matter of diverse origin embraces contingency, serendipity, and the
33 magic, or in other words, assumes the labour of controlling the slider between the good
34 and the evil.

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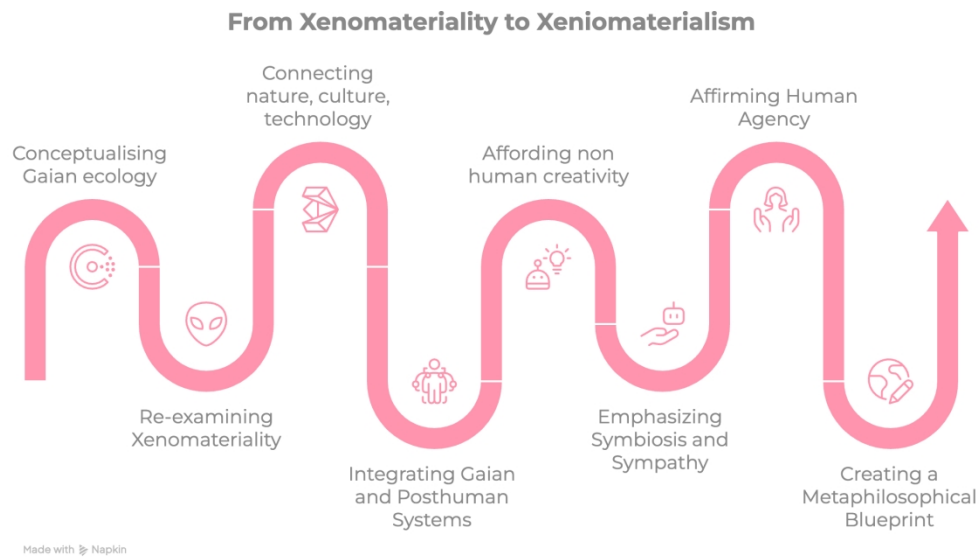


Figure 1: From conceptualizing a Gaian ecology to framing a meta-philosophy blueprint or the operative roadmap of an architecture of climate responsive nature-techno-culture continuums: from xenomateriality to xeniomaterialism. □ the authors, made with Napkin.

740x448mm (72 x 72 DPI)

value system [human perception]	architectural production (project)	materiality	material
theocentric [power axis x]	monumental [plebian and noble]	binary extremes; autocratic systems	traditional and mainstream
Scientific [power axis y]	industrialised and automatised	standardised; kit- of-parts	a colony of the three: concrete, glass, steel
sociopolitical nostalgia	facadism, participatory and radical	unfinished architectures; vernacular dreams	bastardised assemblages
Digital [power axis z]	computational elitism	pseudo a-political capitalism	white paste, architectural kenosis
top-down digital powerless	autotelic eccentricity	passive, components	robotic fabrication
hybridity and wilderness	post human eco- narratives	Xeno-materialities, biostructures	nano, live, and hybrid bio-matter
gaia-centric- planetary architectures	discretisation	Xenio-materialism - eco-politics of techno-culture	symbiotic and sympathetic

Figure 2: Genealogical taxonomy of human values-architecture systems – a diagram, □ the authors.

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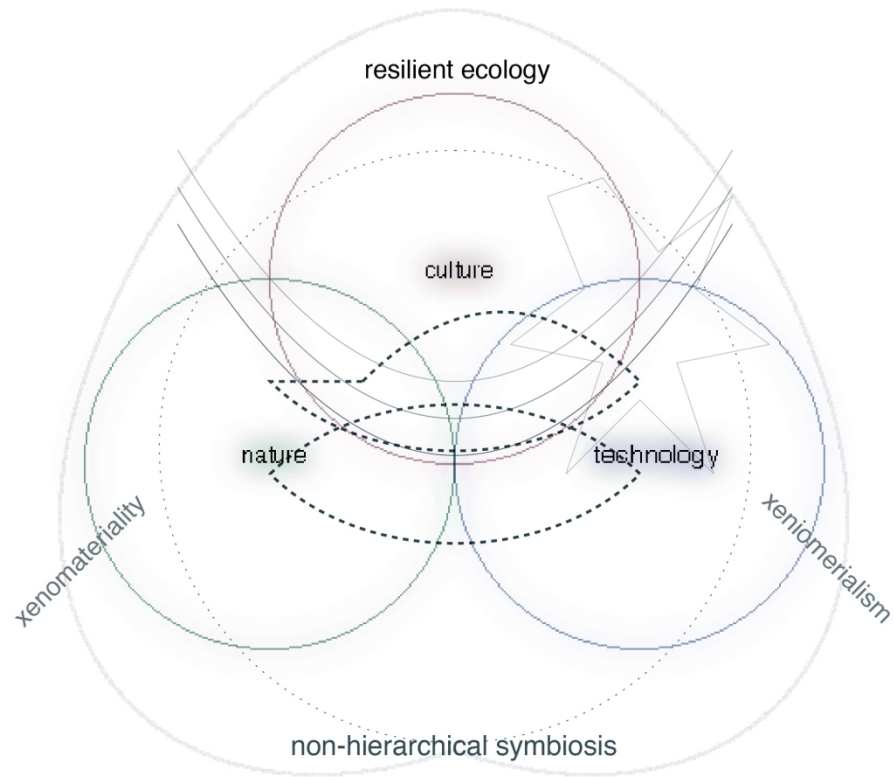


Figure 3 Entanglements of nature, technology and culture towards non-hierarchical, human and non-human symbiosis, □ the authors, made with Claude Ai.

190x190mm (300 x 300 DPI)

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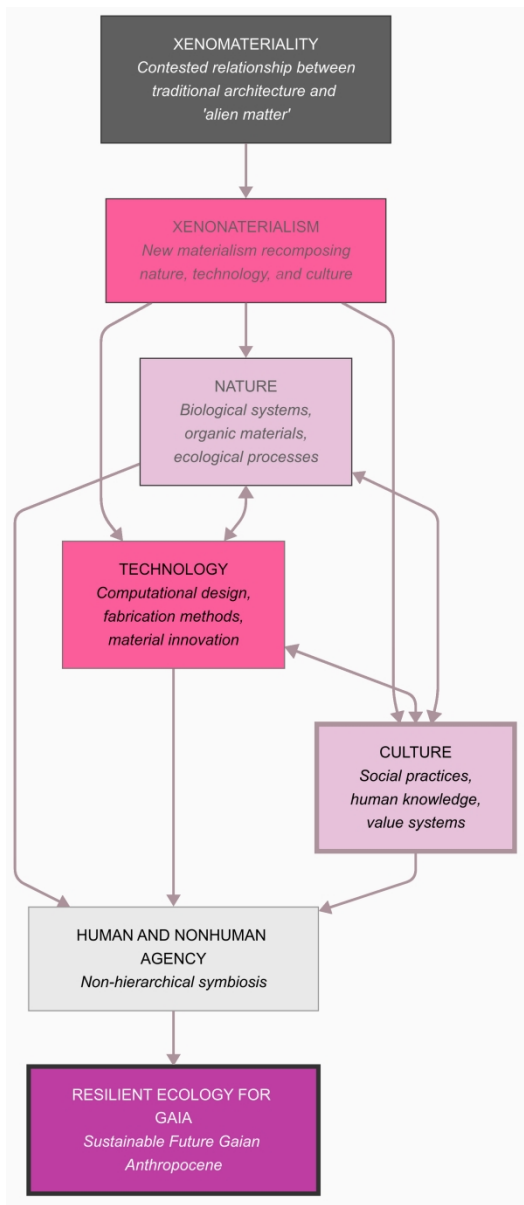


Figure 4 A symbiotic conceptual roadmap for Gaian survival, from xenomaterialism to xeniomateriality, □ the authors with Mermaid Chart.

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