**Executive Summary:**

This position paper explores how Waag Futurelab plans to address degenerative/extractivist attitudes imposed on wider audience as well as specifically on practitioners in the creative fields. With the introduction of Desigining Regenerative Technologies project it proposes transition away from defeatist and tech praising sentiment to one that supports proactive approaches to ensure a liveable planet for humans and more-than-humans. It argues for a shift in how technology is designed, developed, and deployed by describing a three step plan that Waag Futurelab will undertake with support of partners from critical infrastructure lab (UvA), Willem de Kooning Academy (Rotterdam University of Applied Sciences), Greenhost and Zoönomic Institute. Key contributions include educating creatives, engaging the public, building a knowledge hub, and fostering systemic change through frameworks such as the Public Stack and Zoop models.

### **Introduction**

As a society we find ourselves in an uncomfortable spot. We are realizing our contribution to the environmental crisis we experience, and yet we are also entrenched in systems that make us complicit in its further degradation. It is also becoming clear there are no quick fixes to this problem. Because this issue seems so expansive and there is no single solution, discussions around this subject often feel exhausted or devoid of tangible action.

Thankfully, there is a growing pool of inspiration from which we can draw. Waag Futurelab started the project Designing Regenerative Technologies to spotlight practices that actively and creatively counteract extractivist attitudes ushered by big tech companies. To do so Waag Futurelab will source knowledge and expertise from our partners at critical infrastructure lab (UvA), Willem de Kooning Academy (Rotterdam University of Applied Sciences), Greenhost, Zoönomic Institute and work with creatives who, through their practice, emphasize our place in the ecosystem. Though we collectively grew accustomed to tools, modes of working, and imaginaries that keep us in perpetual circles of dependency on mainstream tech there is also a shared recognition that this status quo is unsustainable and will lead to our demise.

There is strength in organizing and actively exchanging knowledge which already brews in the creative world, specifically at the intersection of technology nature and society. While commonly technology is framed as a tool for innovation and progress, we know that its material footprint tells a different story. This project will focus on people and practices that work to challenge the role of technology in both creating and mitigating the environmental crisis.

## **1. Silent trade offs**

While we embark on this project, Waag wants to emphasize that the ecological crisis at the center of this problem has roots in socio-economic and technological systems. Tech expansion propelled by unwavering consumerism and encouraged by tech optimists has been a direct cause for the growing economic disparity between people on a global scale[[1]](#footnote-2). Environmental and social justice are deeply tied to harmful technological dependencies and conditional on whether we are willing to name them.

Yet, as a society, we are struggling to address these issues stuck in a seemingly contradictory approach to technology; on the one hand, we see it celebrated as a tool that helps us to innovate and escape planetary crises (e.g., carbon capture and biodegradable electronics). On the other, the mass production and usage of technology exacerbate issues like e-waste, unfair labor conditions, energy consumption, resource depletion and digital colonialism[[2]](#footnote-3)[[3]](#footnote-4).

This tension reflects more profound questions about societal values: can technology coexist with ecological and societal limits, or must it radically transform? Is it possible to minimize our consumption in time or should we direct effort to new technologies such as biodegradable electronics and carbon-capturing materials?

While there exist initiatives that aim to find answers to these questions , in the meantime, as users we often resort to lesser evils. Overwhelmed we still gravitate towards what's easy and accessible, such as large energy-hungry digital systems and the use of devices that are designed to become e-waste in only a few years time. This duality might make many of us conflicted and even defeated. However, we are slowly recognizing that the difficulty of breaking this cycle is not a personal failing but a direct consequence of the immense and pervasive influence of big tech.

In response there is growing public pressure and, as of recent years, legal action, forcing tech giants to take accountability. Many of them react by announcing adopting “sustainable” practices. However, we are now acutely aware that many of these actions often fall short of the promises. Suppose it's not for their intention that is flawed. In that case, it is their actions that often manifest as superficial, like purchasing carbon credits[[4]](#footnote-5) to offset ongoing pollution caused by their operations or that of their suppliers, rather than investigating and subsequently cutting down emissions at their source. In theory, such actions could be seen as sustainable since they allow large companies to claim that they have minimized their harm or "offset" it.

The impact of such attempts is now often reported as overblown[[5]](#footnote-6) or even seen as blatant greenwashing[[6]](#footnote-7) . **Still, tech giants have become skilled at co-opting sustainability efforts to align with their business models, rather than risk losing profit to redesign their perfectly optimized operations.**

To close these loopholes and leave less room for interpretation of what an actual change is, we need to make sure that they are implemented at an earlier stage, where the design of technology begins and practices around it form.

## **2. Defining ‘regenerative’**

Sustainable transformation focuses on adjusting already existing systems. Regenerative approaches go deeper, attempting to reimagine the system itself[[7]](#footnote-8). Thinking in systems is at the core of regenerativity. Practically, that means that singular efforts like installing a green roof or a swap to a paper straw - if not designed as a part of a larger system that can regenerate rather than drain resources - are not sufficient to be called a regenerative design. Regenerativity forces us to question the very intentions behind tools and practices we have grown accustomed to and understand their impact on a larger scale than that immediately visible or felt by us.

Taking up regenerativity as a focus of this project allows Waag and our partners to make one more important statement, that **all computational technologies are, by default, extractivist, and there simply is no 100% green tech**. All current computational technology comes with costs to our ecosystem, which, with the current rise of AI, is believed to grow exponentially. **To oppose tech optimists who claim that the abusive tendency of current technologies towards the environment ocan be fixed by investing more time and resources into more high-tech solutions, we propose to give way to new and transformational attitudes towards technology and its role in our lives.**

By taking this stance, we avoid the fallacy of promoting green alternatives or green solutions but rather **highlight tools and practices that expose, counteract, and critically engage with narratives spewed by big tech**.

## **3. Waag’s take on ecological resilience in three steps**

After recognizing that all computational technology carries an extractivist cost, the next step is not to search for a 'perfectly green' alternative but to embrace new ways of thinking that prioritize long-term ecological resilience. This is where alternative approaches to computation, revised assessment methods, and new models of governance come into play.

**Permacomputing as a Guiding Principle**

It is challenging to oppose the mainstream messaging of tech proponents and accelerationists. The pace with which we are introduced to yet another technological standard is astounding, typically leaving us with little to no time to question its applications before they get widely adopted. We need frameworks that we can can prevent us from following not only the same ways of thinking but also ways of working. To resist this broken dynamic with technology, we must afford ourselves more time and energy to immerse, test, and potentially apply alternative approaches to tech-human relationships. For that reason, in the Designing Regenerative Technology project, we decided to use permacomputing[[8]](#footnote-9) as a main guiding principle.

Permacomputing is described as both a concept and community of practice, oriented around issues of resilience and regenerativity in computer and network technology. Its name is inspired by permaculture, an approach to natural resources in which regenerative practices are used to ensure that land and natural resources used to grow food are treated thoughtfully and with consideration for other forms of life dependent on the same ecosystem. Such practice requires acknowledging the scarcity of natural resources and willingness to care for human as well as non-human needs.

Though permaculture practices cannot be directly translated to computation, in its essence, permacomputing assumes a similar to permacultural understanding of interdependencies between humans and nature, except in this case with an added focus on the role of technology. It exposes tangible impact of tech on our environment but also tries to expand collective imagination beyond immediate space and time we experience and force us to imagine possible consequences of unregulated technological growth.

Practically, this translates to encouraging limiting energy use whenever possible, prolonging the life of hardware to reduce e-waste, avoiding obsolescence by promoting sustainable software built for resilience and accessibility for many years to come, and more.

Inspired by this approach, Waag will work in collaboration with various creatives who apply permacomputing and simmilar practices in their work. The goal is to learn from their process, understand where they succeed and where they struggle and share the knowledge with other creatives who might still be at the beginning of their journey toward alternative working modes.

**Updating our methods**

While Waag Futurelab has long explored the intersection of technology and society, integrating permacomputing and adjacent regenerative practices marks a new frontier for us.

Waag has developed the Public Stack[[9]](#footnote-10), a framework through which we broke down technological complexities into more explainable layers showcasing the values of various stakeholders and the public that shape our interactions with digital devices. It is a tool that helps to understand underlying reasons for how technology is desgined and consequences of these desgin choices. Since technology is constantly evolving it’s an ongoing effort to feature as many defining aspects of  the human-tech relationship in the Stack. As we dive deeper into the consequences of technology on life on earth, it has become clear that **we must update it by giving ecology a more prominent place**. Through desk research, physical gatherings and interviews with various creative practitioners, we aim to gain new knowledge on how to practically implement ecological layers in the Stack. Our goal is to stay true to the original purpose of the Stack—making the ecological entanglement of technology clear, compelling, and accessible.

**New year, new governance**

Beyond the design and implementation of technology, we must also rethink governance structures we apply that will consequently dictate how we use technology in a regenerative way. For Waag Futurelab that means looking inwards to find ways in which we can apply regenerativity in our way of working and clear path to simmilar action for fellow cultural organizations. To do so, we will experiment with a new governance model that will put into question our tried practices.

Waag Futurelab has decided to partner with Zoonomic Institute and adapt their model called Zoop[[10]](#footnote-11). We will work together with a *Speaker for the Living*, chosen by the Insitute, to introspect on our, so far, rather human-centered operations. Our ambition is to identify where in Waag's day-to-day operations we can meaningfully accommodate the needs of non-humans, then start with small incremental changes to apply as many of our learnings as possible, and if all goes well, be the first organization of this type to become a Zoop.

**Call to action**

This is a call for systemic change. Waag’s project Designing Regenerative Technologies maps the ecological impact of technology and creates opportunities for collective resistance. This is an open invitation to designers, hackers, makers, and thinkers who already question or actively challenge their own technological practices and those imposed on them by their workplaces or educational institutions.

Call to join and organize.+ how to contact us

1. https://itif.org/publications/2022/10/03/inequality-has-been-the-price-of-winning-in-big-tech-thats-changing/ [↑](#footnote-ref-2)
2. https://www.aljazeera.com/opinions/2019/3/13/digital-colonialism-is-threatening-the-global-south [↑](#footnote-ref-3)
3. https://www.researchgate.net/publication/336775102\_The\_Digital\_Divide [↑](#footnote-ref-4)
4. https://onlinelibrary.wiley.com/doi/epdf/10.1002/gch2.202200158 [↑](#footnote-ref-5)
5. https://carbonmarketwatch.org/publications/ccrm\_2022/ [↑](#footnote-ref-6)
6. counterhate.com/research/greenwashing-google-big-oil/ [↑](#footnote-ref-7)
7. https://www.researchgate.net/publication/301966198\_Regenerative\_Development\_regenerative\_development\_and\_Design [↑](#footnote-ref-8)
8. permacomputing.net [↑](#footnote-ref-9)
9. publicstack.net [↑](#footnote-ref-10)
10. zoop.earth [↑](#footnote-ref-11)