

The Polygenetic designer

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1.0 Introduction

In *Metamodernism; The Future of Theory* Jason Storm structures a new timeframe to understand better the 20th century; the pre-modern, the modern and the post-modern, which gives way to the Metamodern. Metamodernism is a way of viewing the world that emphasizes a kind of integrated pluralism. Given the latest development of design during late 19th Century and 20th century this framework may assist to understand the evolution of its practise. Following this framework, the evolution of design practice may be structured in four fundamental periods; pre-modern embodied by the craftsman, modern embodied by the industrial designer, postmodern embodied by the innovator, and an emerging metamodern paradigm embodied by what I will describe in this chapter as the Polygenetic designer (Fig. 1). In what follows, I will review the evolution of design practise from a historical perspective to understand the current intersection between design and biology. This position will lead a case for the Polygenetic designer and a potential operational framework.

1.1 Design practise evolution

The pre-modern craftsmen can be understood in two main evolutions; the single craftsmen (before 1000AC), and the collective craftsmen after 1000AC (Guilds became possible in Europe only with the appearance and growth of towns in the 10th and 11th centuries (Britannica, 2021). This model was true until the beginnings of the industrial revolution and the utopic socialists led by Robert Owen, who generated large factories around 1820. This episode started a transitional period culminated by Henry Ford and his specialization of workers skills and development of the assembly line technique of mass production. With industrialized mass production the modern period is launched and with it, the industrial designer is born.

In this context Andrew Blauvelt in his seminal article *Towards Relational Design* (2008) underpins Modern design between 1900 and 1950. This typology focused on forms, which were disseminated rationally and potentially universally. This analysis can also be found in *L'eclipse de L'object* by Findeli and Bousbaci (2005). They describe how up to mid-20 Century the material object or product has long been the main focus of the theories. After the 50's design evolved towards a post-modern paradigm. In this period between 1960 to mid-90's, according to Blauvelt, its practise focused on design's meaning-making potential, symbolic value, semantic dimension and narrative potential. For Fideli in this period the object tends to disappear from the concerns of the theoreticians. After this period, design moved towards an innovation-led type of design that is relationally based and contextually specific. It focused on effects on users, pragmatic and programmatic constraints, rhetorical impact, and the ability to facilitate social interactions. Blauvelt presents IDEO as primary practitioners in this new evolution. In his account, he describes relational design as including performative, pragmatic, programmatic, process-oriented, open-ended, experiential, and participatory elements, moving away from designing discrete objects 'to the creation of systems and more open-ended frameworks for engagement: designs for making designs' (Blauvelt, 2008). For Fideli a shift took place away from the product in the preoccupations of the theoreticians. Theoretical models, for Fideli, are now interested in either the actors of the design process or the experiences of the user as a 'whole'

human being. If the first wave of design offered us a multiplicity of forms, and the second a multiplicity of meanings and interpretations, the third wave presented a multiplicity of contingent, bounded, or conditional solutions: open-ended rather than closed systems; real-world constraints and contexts over idealized utopias; relational connections instead of reflexive imbrication; “the end of discrete objects, hermetic meanings, and the beginning of connected ecologies” (Blauvelt 2008, p.6).

This evolutive transition was consolidated by a seminal work; *Design and the elastic mind* by Paola Antonelli in 2008. This book introduced the principle of elasticity – The by-product of adaptability + acceleration – Elasticity is here defined as the ability to negotiate change and innovation without letting them interfere excessively with one’s own rhythms and goals – to be able to cope with this reality (Antonelli, 2008). She connected design with the sciences (social, natural, and formal), breaking with the traditional Bauhaus marriage with the arts. And reflects on how the figure of the designer is changing, as argued by Blauvert the same year, from form giver to fundamental interpreter of an extraordinarily dynamic reality. She also introduced the future as a fundamental space to enable change in design. And introduced a new intersection between design and biology. Although she introduces notions of scale, the human is still at the centre of design practise, yet morphing from consumer to user.

This book was followed by another influential publication *Biodesign; Nature, Science, Creativity* by William Myers (2012). As acknowledged in the text: “the experiments with biologists have garnered the strongest momentum, and a new form of organic design is rapidly evolving—the biodesign that William Myers explores in detail in this volume” (Antonelli on Myers, 2012, p.7). Biodesign fundamentally addresses living materials (cultured tissues or plants), and aims to implement the dream of organic design. Its fundamental process is designing objects via growing them. In this context, as we are dealing with living beings or living tissues, “the implications of every project reach far beyond the form/ function equation and any idea of comfort, modernity, or progress” (Myers, 2012, p.7). Design in this context breaks from the modern elements of predictability and control and trespasses its traditional boundaries “aim[ing] straight at the core of the moral sphere, toying with our most deep-seated beliefs” (Myers, 2012, p.7). In this ethical/moral context, designers need to build scenarios and prototypes to foresee potential behaviour in order to protect society in a future of unthinkable situations, as we don’t know how these bio-entities may develop. E.g genetically modifying humans. However, in quoting Sottsass, Myers still positions the human at the centre; “the designers’ presence guarantees that human beings are always kept at the centre of the discussion” (Myers, 2012, p.7)

With the formalization of these practices at the intersection of design, biology, and the environment we are transitioning from earlier *elastic* speculative practises using props to real-world outputs aiming to change the way we operate in collaboration with and accounting for other species. In this context, biology, whether implemented via synthetic biology or biologically-inspired algorithms, is providing some degrees of agency to designs which keep evolving after the design has been ‘completed’ and released – which consequentially we cannot fully control. In this context, we are transitioning towards a consequential model of design in which, the nature, intentionality and implications of the system of interaction demands a different kind of design and time intervention. In this scenario, design research and practise must address complex systems and unintended consequences via prospectivity and emancipation, while dealing with uncertainty, and not-fully-knowing (Galdon, & Hall, 2019: Galdon, F., Hall, A. & Wang, S. J. (2019): Galdon, F., Hall, A, Ferrarello, L. (2021): Galdon, F., Hall, A. (2021)). Furthermore, we need to acknowledge, and remediate, the catastrophic implications of the human-centred approach and hegemonic *the world-for-us* position in the state of the environment. As we move forward, we need to balance this aggressive, selfish and extractive mannerism by giving others (animal, plants) the same level and status. What I argue in the rest of the chapter is the need to integrate reparation, accountability, and the ubiquity of fluid and symmetric cyber-blended and hyper-connected ecologies into a new design paradigm at the intersection of design, biology, multi-species, synthetic systems collaboration, and applied ethics.

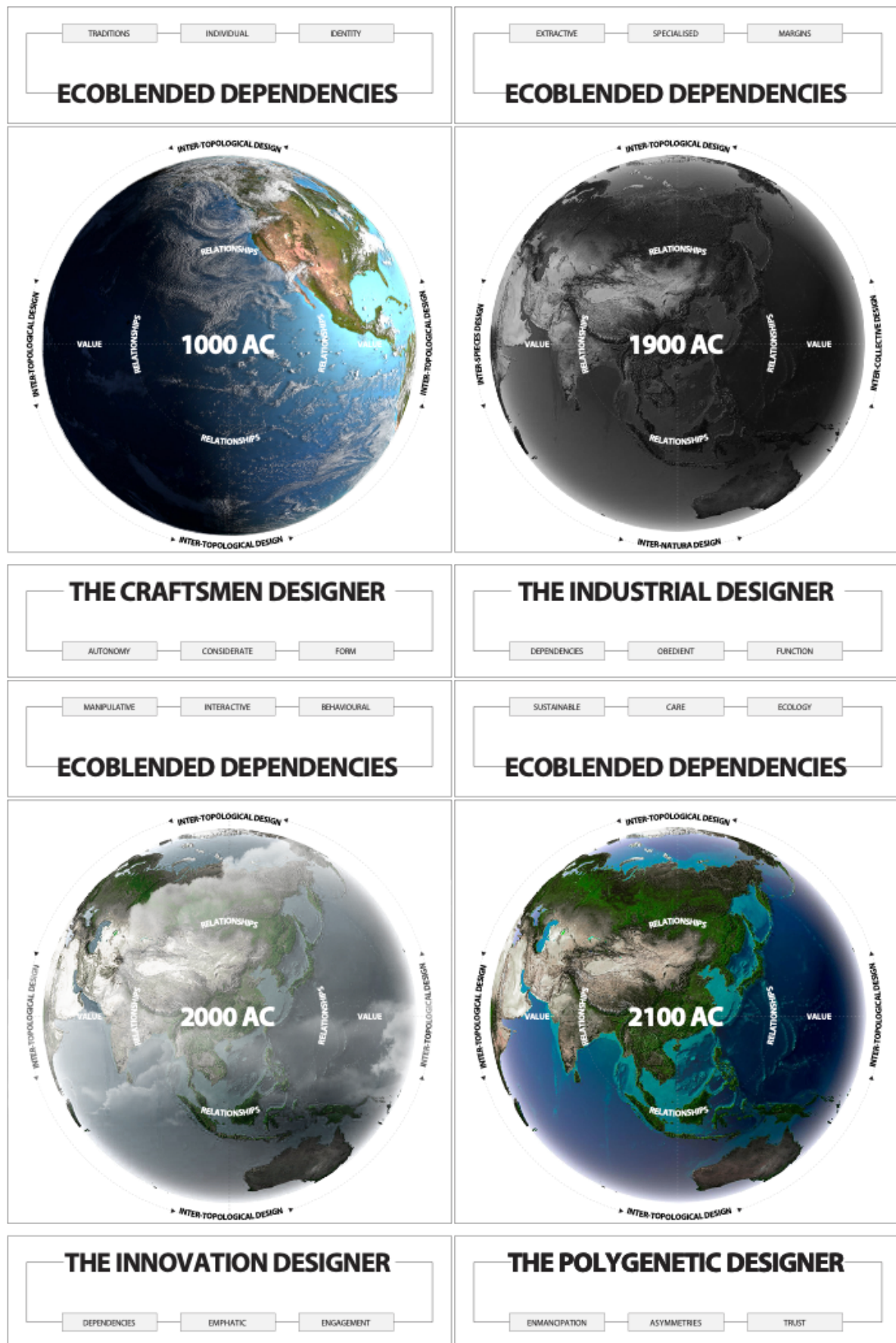


Image 1. Four levels of evolution in design practise. F. Galdon, 2023

2. The Polygenetic designer

Building from the biological paradigm, I will use some notions from this discipline to construct a prospective designer typology. Biology structures the development of organisms in three fundamental stages; ontogenesis, epigenesis and phylogenesis. This triad will be used to develop a new paradigm at the intersection of design, biology, species, systems, and applied ethics.

In this context, ontogenesis, is concerned with development of a single unit (a.k.a. the designer). Epigenesis is concerned with learning processes resulting from interacting with external or environmental factors (a.k.a. the environment-process). And phylogenesis is concerned with its evolution. This evolution can be discovered through phylogenetic inference methods that evaluate observed traits, such as sequences or morphology (a.k.a. traces (Traces as fundamentally related to impact of actions referring to accountability)).

The intersection between ontogenetic and design can be traced back to Glanville's second order cybernetics. Second order Cybernetics, is understood in his account as "proposing an epistemology and (through autopoietic systems) an ontogenesis, is seen as connected to the philosophical position of Constructivism" (Glanville, 2008, p.2). These ideas, together, give a basis for the conceptual step involved in proposing the ontogenetic system type referred to by the term "Autopoiesis." In quoting Maturana, Glanville lays the foundation of this intersection;

"... a class of mechanistic systems in which each member of the class is a dynamic system defined as a unity by relations that constitute it as a network of processes of production of components which: (a) recursively participate through their interactions in the generation and realization of the network of processes of production of components which produce them; and (b) constitute this network of processes of production of components as a unity in the space in which they (the components) exist by realizing its boundaries." (Glanville, 2008, p.13).

He follows with the idea of growth as an evolutionary element;

"An autopoietic system "grows" and maintains itself by reference to itself. In this way it reflects von Foerster's eigen function, with which it is contemporaneous. It uses a self-referential circular process, in a system of continuous self-making. When used to express life, autopoiesis studies the verb "live" rather than the noun "life" (Glanville, 2008, p.13).

Other references to ontogenesis can be found in Rick Dolphijn and Iris van der Tuin's *New Materialism: Interviews & Cartographies*; in which anti-dualism becomes a philosophy of difference that opens up for a "new" ontology, or rather, a "new" ontogenesis" (Dolphijn & van der Tuin, 2012. P.119). On interviewing Karen Barad, the discussion cutting across the epistemological and the ontological is continued. Barad proposed a visionary aspect of this new materialism that she calls 'agential realism'. This notion can be defined as the ontological inseparability of intra-acting agencies. In this context, agency is a relationship and not something that one has.

Building from these perspectives, I address ontogenetic as concerned with the development of a single unit (a.k.a. the designer). In this context, I am aiming for an inter-ecological, autonomous, and emancipatory perspective, free from traditional models of subordination to commercial forces. A historic position that isn't worth wading into any longer.

In this account, I address epigenesis as concerned with learning processes resulting from interacting with external or environmental factors (a.k.a. the design process). Here, I preliminary build from Alice Rawston attitudinal perspective, and Rodgers & Bremner undiscipline (2011, 2013), to align with Galdon & Hall undisciplined stewardship (2022). The notion of stewardship introduces an ethical, ecological and responsibility principle beyond the will of the designer which aligns perfectly with the idea of the PolyGenetic designer as somebody designing on behalf of ecology operating in the context of agential realism and developing practise by interacting.

Rosa Chow (2005) provides the first specific reference to the epigenetic from a design theory perspective. She addresses epigenesis by building from Gregory Bateson (1980: 51-53), understanding of this notion as renewal (ways an organism renews itself). Epigenetics in this context is an 'act of becoming which must be built upon the immediate status quo ante'. She connects this principle to the act of recycling.

In my account phylogenesis, is concerned with evolution. This evolution can be discovered through phylogenetic inference methods that evaluate observed traits, such as sequences or morphology (a.k.a. traces in the broad sense of the word). The traits I am interested in are related to impact; the positive traces of design interventions for betterment as we are designing on behalf of the environment.

2.1 Discussion

I started to reflect on these notions when I was doing my MRes in Design at Goldsmiths back in 2012/13. Goldsmiths approached design practise from the mind of the designer rather than the produced object and its economic impact. This personal repositioning created a space of enquiry in which I realised that design, then, should be attitudinal.

As can be seen in the diagram I produced at the time (Fig. 2 - Top right and left), this attitudinal repositioning redefines the process and orthodoxies of design. Traditionally, the designer operated in a reactive mode in which a brief was delivered by a higher entity (Industry or University). He or She became a brief-answerer decontextualised of time. In this old paradigm profits, margins and results operate as external forces shaping the destiny and identity of the designer. On the contrary, by implementing a reflective practise, the designer becomes a proactive entity. She/he/they acknowledges his/her/their past as a fundamental construction of the professional self. In this context beliefs and contextual experiences define and frame fundamental intentions. This reflective practise leads to a fundamental question: what kind of designer do you want to be? This question operates as a cathartic process of personal and professional emancipation. This approach aims for an attitudinal and expanded practise which combines personal, social, and ecological opportunities with responsibilities (stewardship). In this new paradigm timing, and coherence operate as external forces shaping the destiny and identity of the designer.

The genetic triad presented enables a progressive and evolutive perspective into what a designer could be, questioning in the process established modus operandi around profit and margins. This perspective enables an ontogenetic approach to design, which presents the designer and his/her designs as a metabolic system continuously evolving by simulating/projecting and interacting with itself and the environment while considering past, present, and future and its consequences and responsibilities (Fig. 2 - Bottom right and left). This repositioning enables a deontological position by integrating a prospective approach aiming to place design practise in the context of applied ethics at the intersection of emancipatory strategies and asymmetric relationships. The fundamental practise of design in this context is based on the co-production of systems aimed to decrease repression and enhance human and more-than-human freedom, sustainability, responsibility, liveability, and trust; an inter-natura, inter-species and inter-collective designer resulting in hybrid relationships (inter-topological designs) (Fig. 3).

In this context, inter-natura refers to the capacity to integrate flora into our design practise. Flora refers to all the plant life present in a particular region or time, including (indigenous) native plants. Although some categorisations provide it with its own category (Funga), we may also include bacteria and fungi which are also referred to as flora, as in the terms gut flora or skin flora.

inter-species refers to the capacity to integrate animal species into our design practise. Fauna refers to all the plant life present in a particular region or time, including (indigenous) native animals.

inter-collective refers to the capacity to integrate social collectives into our design practise. Collective refers to all social collective life present in a particular region or time, including (indigenous) native, immigrants and foreigner citizens, different faiths, sexual orientations, or democratic political expressions.

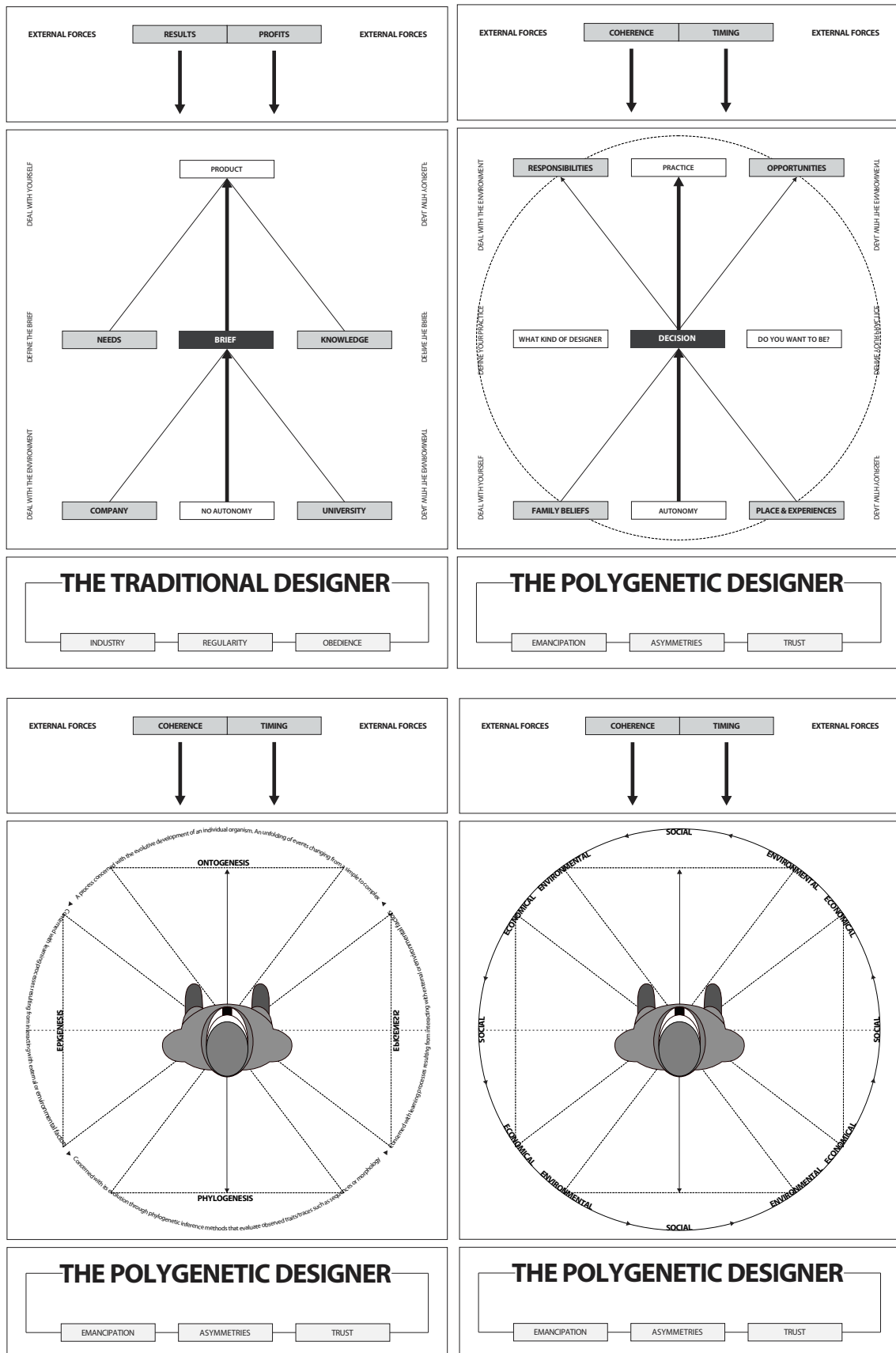


Image 2. – From the traditional designer to The Polygenetic designer. F. Galdon, 2023

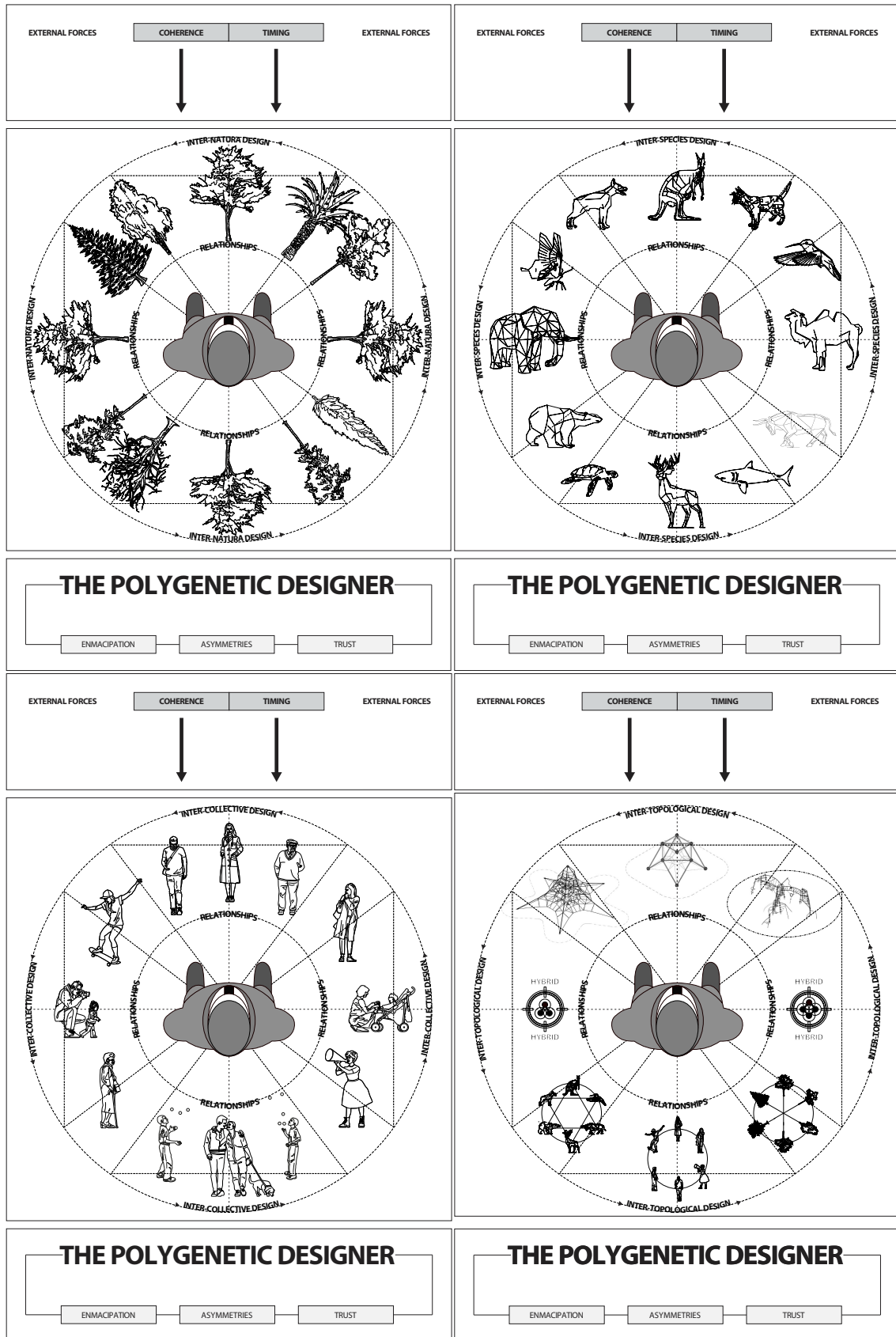


Image 3. – an inter-natura, inter-species and inter-collective designer resulting in hybrid relationships (inter-topological designs). F. Galdon, 2023

2.2 from Geo-Poiesis to Bio-Poiesis

As we are transitioning towards a new practise of design based on the co-production of systems aimed to enhance human and more-than-human freedom, sustainability, responsibility, liveability, and trust, we may need to consider the overarching paradigm underpinning it.

In a recent publication Jon Goodbun (2022) coined the concept of Geo-Poiesis;

We coined 'Geopoiesis' as a heuristic research concept, to map and discuss both our own work, and a wider field of related 'world-building' and 'worlding' practices. We conceived of 'world-building' in relation to collective political imaginaries, and 'worlding' in relation to the construction and performance of political subjectivities. (Goodbun, 2022)

Their approach include: science fiction, fantasy and counter-factual fictions, IPCC reports, Green New Deal proposals, Gregory Bateson/Felix Guattari's Three Ecologies, Benjamin Bratton/Strelka's Terraforming programme, Arturo Escobar's pluriversal politics, Humberto Maturana and Francisco Varela's 'bringing forth of worlds', Donna Haraway's multi-species worldings, and the Zapatista call for 'a world in which many worlds fit'.

This model is very interesting; however, it still places the human at the centre by placing political subjectivities at the centre. Instead, building from a conversation with Dr. Delfina Fantini van Ditmar, I propose the term BioPoiesis, which aims to place more-than-human relationalities at the centre of decision making; An inter-natura, inter-species and inter-collective designer. Biopoiesis builds from *bio*– which comes from Greek *bíos*, meaning “life.” The Latin cognate of *bíos* is *vīta*, “life,” which is the source of words such as *vital*. and - *Poiesis* - etymologically derived from the ancient Greek term ποιεῖν, which means “to make”. Bio-Poiesis then is the design practise on making life and making vitality. The politics of living and caring beyond the human.

By removing the human from the centre, a fundamental question arises; where do we place the human? Some arguments suggest to place the human in a pre-modern context; To return to a place of craftsmanship based on ancient techniques. Others suggest to dissolve the human into a new entity via transhumanism; A cyborg typology in which technology will transform the human for the better. In either case, the human still is at the centre. Instead, I proposed a symmetric and balanced positioning in which the human, the digital, the flora, and the fauna interrelate as equals; An inter-natura, inter-species and inter-collective designer. In this model, I aim to generate symmetrical connections as a radical reconceptualization of current asymmetric relationships of power which have led and almost destroy *the-world-given-to-us* as Rodgers and Bremner suggest.

In paraphrasing Jon Goodbun, I conceive 'Biopoiesis' as a prospective research concept, to map and discuss both our own work, and a wider field of related 'world-building' and 'worlding' practices in the context of *unthinkable worlds*. I conceive 'world-building' in relation to the premise of this book as defined by Bremner and Rodgers;

A world-without-us does not mean a world devoid of humans or an interstellar-world, but a world that continues to revolve around the sun but no longer revolves around us. *A world-without-us* means we must accept that *what-might-become* now equates to *what-might-not-become* and in an *unthinkable-world* we need to consider the following permutations – an *un-designable-world* / and *un-researchable-world* / and *un-changeable-world* / and finally the *world-changing-us*.

For design the design of *what-might-not-become* is an *unthinkable-world* ... Designing for the *world-without-us* – in an *unthinkable-world* – shifts design from its preoccupation with new certainties and stable solutions to designing to avoid an irreversible crisis by designing-among-

us / designing-despite-us / designing-before-us / designing-within-us / designing-following-us
/ designing-beyond-us / designing-except-us

This reconceptualization presents a challenge for design research. In this context Bremner and Rodger propose a new model in which existing prepositions would have to morph into new phrases charged by new prepositions;

Research-without-us, Research-against-us, Research-after-us, Research-among-us, Research-despite-us, Research-before-us, Research-between-us, Research-since-us, Research-within-us, Research-following-us, Research-beyond-us, Research-except-us, Research-but-us, Research-near-us

In this context, as we transition design practise and research from a human-centred and discipline-based approach into an inter-natura, inter-species, and inter-collective model around Biopoiesis, the only discipline possibly remaining is care and the design practise of making life and vitality focused on the betterment of ecology-at-large.

One of the fundamental questions at this point is how to construct a conceptual model for knowledge operability in the context of post-disciplinary Biopoiesis?

2.3 Pluripolar knowledge(s)

Polarity is a concept used in international relations. It contains three potential embodiments; unipolarity, bipolarity, and multipolarity (for more than three centres of power) (Jiang, 2012). Multipolarity is a distribution of power in which more than two entities have nearly equal amounts of power. This model is different from multilateral relationships. Multilateralism refers to an alliance of multiple countries pursuing a common goal.

From this simple framework we can construct Biopolarity. Biopolarity then aims to provide an operational framework to build symmetrical relationships among the human, the digital, the flora, and the fauna. What follows will provide a theoretical framework to operate this concept in the context of research via Pluripolar knowledge(s).

I am coining Pluripolarity as a more-than-human knowledge scheme. Pluripolarity refers here to the interplay between different modes of knowledge(s) within and beyond the human. Pluripolarity is an inter-ecological approach that understands knowledge generation and representation to be beyond human unipolarity leaning towards more than human perspective. It aims to be developed to systematically address much debated questions about changes in the biosphere, for instance in relation to technological impact and ecology-at-large. Pluripolar approaches will aim to provide concepts, methods and a framework for the collection and analysis of inter-relational and inter-ecological human, flora, fauna, and cybernetic systems in terms of interaction and environments, and the relationships between these. Pluripolar representations aim to mediate the multiple ways in which these modes are combined in the investigative and prospective process of change. In this context, three interconnected theoretical assumptions underpin Pluripolarity;

First, Pluripolarity assumes that interaction always draw on a multiplicity of modes, all of which contribute to knowledge. It should focus on analysing and describing the full repertoire of knowledge-making resources that digital systems, species and nature use in different contexts, and on developing means to show how these are organized to make operational and guiding knowledge for prospective designs. In this context we can articulate a triad of modes for each of the four centres to identify critical information to guide interventions; Flora (topography, climate, and soil), Cyber (preferences, patterns, and routines/trends), fauna (pollution (animals/insects as biosensors), food, and diversity), Human (quantitative, qualitative, and tacit) (Fig. 4)

Second, Plurimodality assumes that resources are biologically and culturally shaped over time to become knowledge making resources that articulate the knowledge demanded by the requirements of different contexts – This implies the integration of time (past, present, and future). These organized sets of interactive resources for making knowledge (with) are referred to as modes which aim to realize insightful work in distinct ways – making the combination of modes a central aspect of interaction and knowledge generation. The more a multiplicity of resources has been used in a context, the more robust and finely articulated it will become.

Third, digital systems, species and nature orchestrate knowledge through their selection and configuration of modes, foregrounding the significance of the interaction between modes. Thus, all investigative acts will be shaped by the interactions and rules operating collectively, and influenced by the motivations and interests of people in a specific ecological contexts. The main challenge will be placed on operating these streams of knowledges symmetrically by giving them the same level and status.

In this context the flora elements seem the most challenging to integrate. However, the plant paradigm contains a different approach to earth and the environment. Plants know how to cooperate with the environment around them. Their perspective may provide a principle to change orthodoxies in design practise. As explained by Jarb:

Since Darwin, biologists have emphasized the perspective of the individual. They have stressed the perpetual contest among discrete species, the struggle of each organism to survive and reproduce within a given population and, underlying it all, the single-minded ambitions of selfish genes ...

An old-growth forest is neither an assemblage of stoic organisms tolerating one another's presence nor a merciless battle royale: It's a vast, ancient and intricate society...

The trees, understory plants, fungi and microbes in a forest are so thoroughly connected, communicative and co-dependent that some scientists have described them as superorganisms. (Jarb 2020).

Research in Pluripolarity aims to develop new theoretical approaches and methodologies for understanding a-world-beyond-us that is made through the combined use of multiple sources by integrating a multiplicity of other elements beyond the human such as plants, animals, or computational systems via eco-blended dependencies.

I anticipate that there will be considerable debate as to whether Pluripolarity can truly be considered a theory or whether it is more appropriate to view it as a method. In principle, it can be argued that Pluripolarity can be used as a theory, as a perspective, or as a method, and that these different degrees of engagement with Pluripolarity will help to make sense of what is seen to count as Pluripolar knowledge(s).

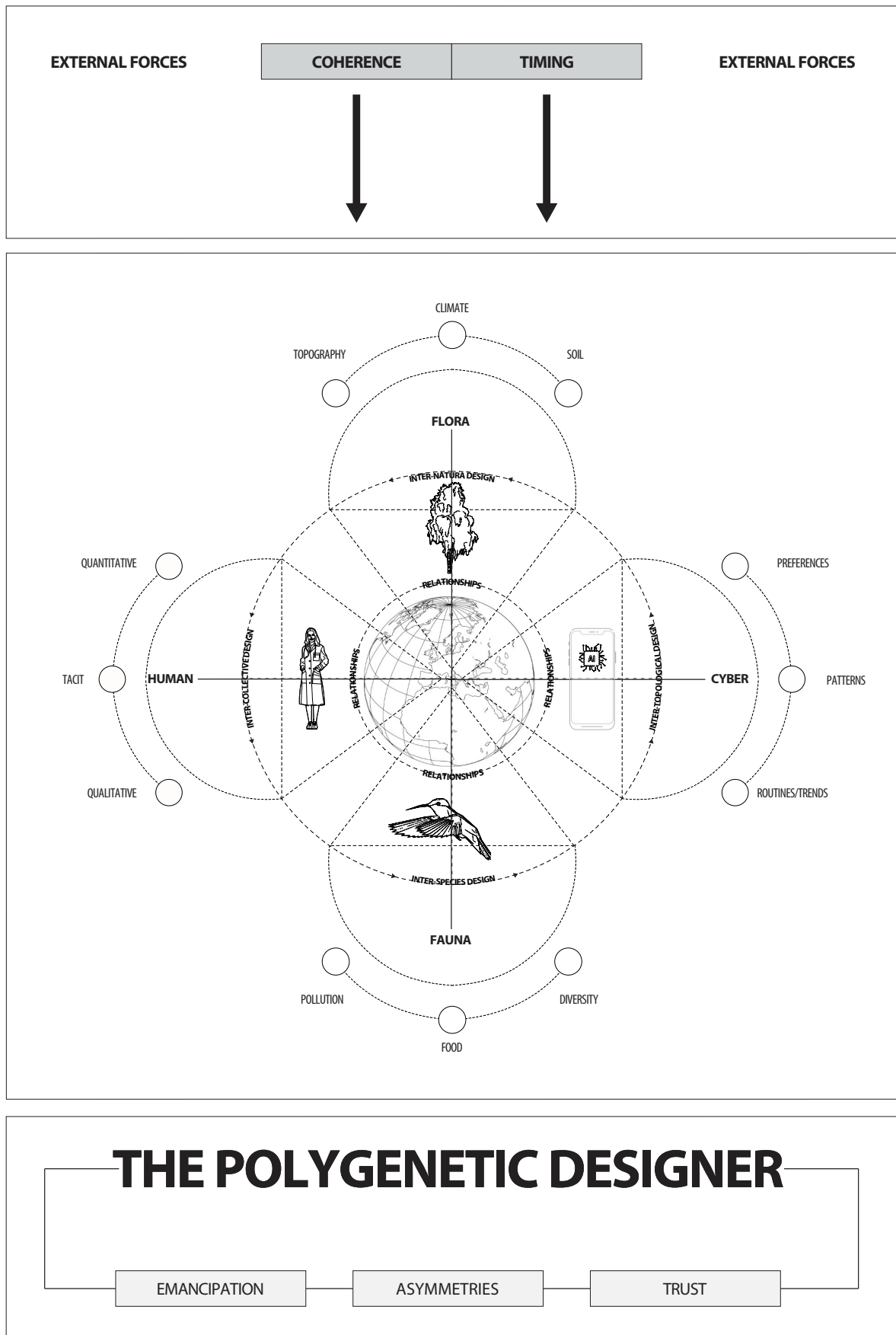


Image 4. The four centres to identify critical information to guide interventions; Flora, Cyber, Fauna, and Human.

3.0 Case Study

This project was started by Fatimah El-Rashid as part of her Innovation Design Engineering Double master's Solo project and aimed to transform Frogs into BioSensors. She built from earlier examples using bees as BioSensors ((Bromenshenk et al. 2015). From this point the project evolved collaboratively by implementing a Polygenetic design perspective. The resultant project proposes a bioNet of Species as a prospective world. In the process, it questions the current model based on consumption and engagement and propose a new world based on trust and care. The project leads to a potential Biospheric Domestic Index (BDI) as an alternative model to articulate this perspective, positioning Biospheric value as the most important value. This project was selected for the 2021 London Design Biennale (El-Rashid & Galdon, 2021). The Design In An Age Of Crisis Gallery features submissions to a global open call issued in 2020 by Chatham House and London Design Biennale, inviting radical design thinking from the world's design community.

3.1 The BioNet of Species

Building from the principle that IoT connects humans with cyber forms but neglects other life forms that inhabit the planet, this project presents an AI-powered autonomous IoT device that uses UV light to detect diseases in frogs, in turn, reporting on the general health of frog populations. This data is then analysed to determine the state of their particular ecosystem. The device utilises frogs as bioindicators of a healthy ecosystem and can determine the overall health of biosphere by analysing the presence/absence of the deadly disease in frogs.

Amphibians are a species that has been around for roughly 250 million years and has lived through 3 different mass extinctions including no. 5, which wiped out the dinosaurs. Amphibians are suffering the highest rate of extinction because of human activity. Frogs are natural bioindicators and their rapid rate of extinction is a desperate signal that the Earth needs help combating pollution and other environmental stressors. Frog populations are rapidly declining because of the chytrid fungus – a deadly disease that stops their skin from regulating the movement of water and electrolytes. Its spread similar to that of coronavirus – originating from a toad on one side of the world, when was then illegally traded to another side of the world.

Frogs – at all stages of life – play crucial roles as both predator and prey in the food chain. As tadpoles, they feed on algae, which helps filter and keep our water supplies clean. Full grown frogs eat large quantities of insects, including disease vectors that can transmit fatal illnesses to humans (i.e. mosquitos/malaria) and those that wreak havoc on our crops. Frogs are natural bioindicators: the health of frogs is thought to be indicative of the health of the biosphere as a whole. Frogs are important for medicinal purposes. Over 200 beneficial alkaloids are found in amphibian skin. One of these can even be used as a painkiller that is 200 times stronger than morphine and without the addictive qualities of morphine. Other uses are as antibiotics and peptides, which help organs heal post-surgery. Approximately 10% of Nobel Prizes in Physiology and Medicine have resulted from investigations that use frogs. When frog species disappears, so does any promise it holds for improving human health.

Humans rely heavily on the services that nature provides. The present trend of elitism towards all other life on the planet is dangerous and extremely short-sighted. We need to recognise that human longevity directly correlates with the Biospheric state of the planet.

The project was developed by creating a scale model of a lake to train a neural net equipped with vision. Fatimah went to train the system in its more challenging light conditions by recreating nightlife conditions to test the network identifying capabilities (Fig 5-7). Once the system was developed, a camouflage style housing was designed for its deployment (Fig. 8).

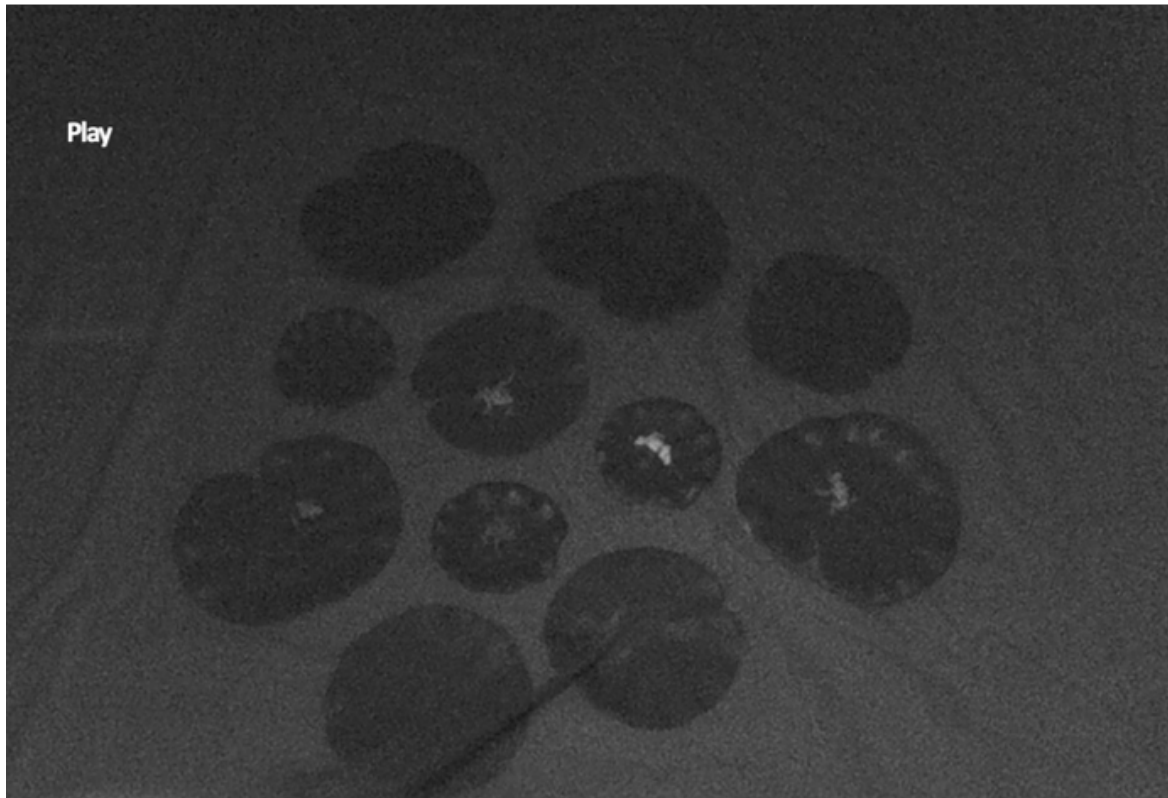


Image 5. Small scale model to generate ground truth. Fatimah El-Rashid, 2021

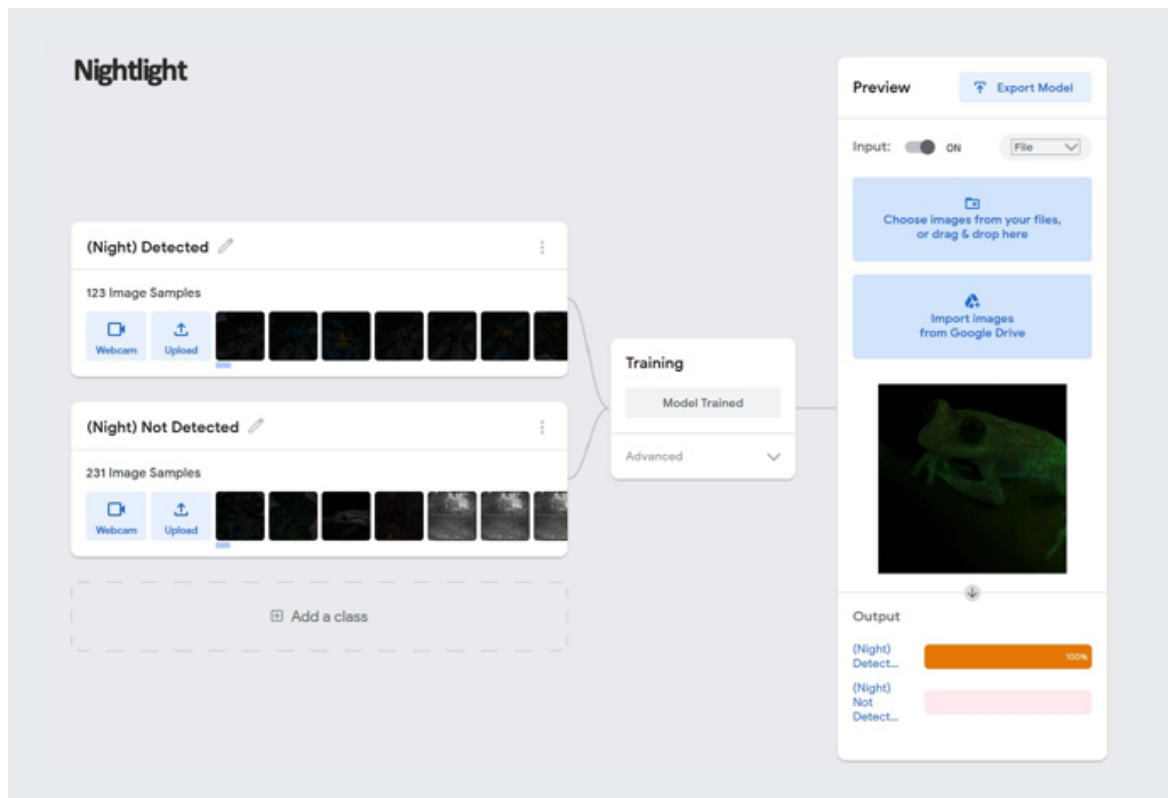


Image 6. Training network model to identify frogs under the worst conditions. Fatimah El-Rashid, 2021



Image 7. Testing the Network identifying capabilities. Fatimah El-Rashid, 2021



Image 8. Graphical representation of IoT device, Fatimah El-Rashid, 2021

The design intervention opened an opportunity to conceptualise a strategy operating at a systemic and political level aiming to effect change. In this context, the Biospheric Domestic Index (BDI) was developed (Fig. 9).

In 2006, Gretchen set up the ‘Nature Capital Project’ aimed at spreading recognition that we need to include the values of nature in decision-making (Kleiner, 2009). They operate via partnerships with governments, banks, businesses, communities, etc. They consider China to be their biggest success, in that Chinese leadership now asks three questions: The first is where and how much nature should we protect (pursuing the idea of an ecological civilisation). Second is how can we harmonise people in nature and have jobs. The third is how we can track performance.

Gretchen Daily developed a metric to rival GDP, called Gross Ecosystem Product (GEP), to help countries better value nature. She speaks of how the shorthand often used when speaking of GEP is that they’re putting a price tag on nature. However, she believes they’re of a deeper transformation: “it’s much more about engaging people and enabling people to be part of the solution.” (Vaughan, 2020)

Is in this context we developed our BDI. Its main focus was to pursue an ‘ecological civilisation’ and harmonisation between people and the planet. BDI aims to be a measure of performance. In many ways, it’s complimentary to GEP – which many are opposed to because they think it’s ‘putting a price on nature’, as if we were to ‘put a price on human life’.

BDI aims to be the 15iospheric value of all territories encompassed within a region during a specific period. BDI aims to provide a 15iospheric snapshot of a country, and aims to be used to estimate the impact of a sustainable economy and growth rate. BDI aims to be calculated by combining natural biosensors, ecological education, investment in sustainable production, health levels, and CO2 emissions (Fig. 9).

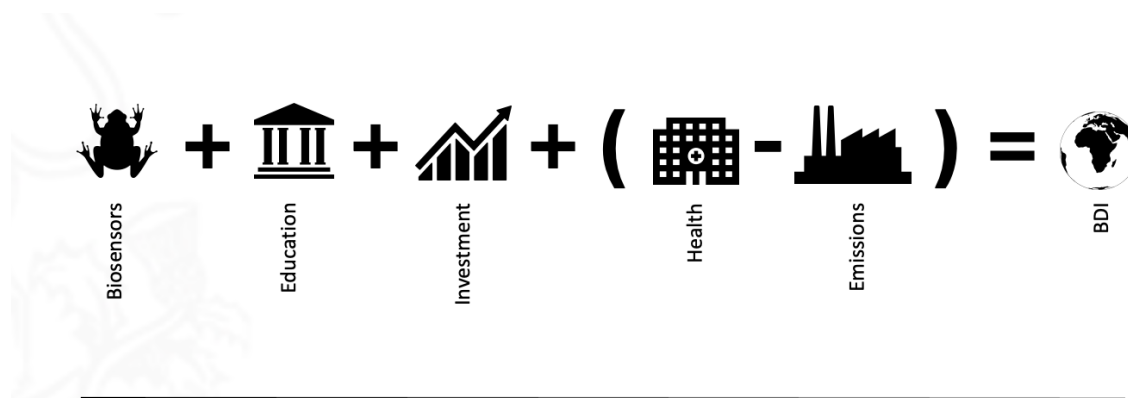


Image 9. Biospheric Domestic Index (BDI) metrics. Fernando Galdon & Fatimah El-Rashid, 2021

To summarise, the fundamental ethos of the project was the idea of collaboration. It combines other species as biosensors, computational systems to identify frogs and pollution to build symmetrical relationships among the human, the digital, the flora, and the fauna, which could be tested by measuring the levels of fertility/vitality of soil affecting the health of the ecosystem and society in what can be characterised as Pluripolar knowledge(s) in the context of Biopolarity. This project was carried by what we may characterise as a Polygenetic designer aiming for holistic betterment placing the planet as the most important stakeholder. From this case we can understand BioPoiesis as a framework for addressing the politics of living and caring beyond the human, which is the case presented is embodied around Biospheric Domestic Index (BDI).

4.0 Conclusions

Building from a Metamodernist perspective, this chapter refers to the latest evolution of design practise which propose a viewing of the world that emphasizes a kind of integrated pluralism. This metamodern framework assisted on framing the four fundamental evolutionary periods of design; the pre-modern embodied by the craftsman, the modern embodied by the industrial designer, the postmodern embodied by the innovator, and an emerging paradigm, I have argued, embodied by the polygenetic designer at the intersection of design and biology.

Biology, then, structures the development of organisms in three fundamental stages; ontogenesis, epigenesis and phylogenesis. Ontogenesis is concerned with development of a single unit (a.k.a. the designer). Epigenesis is concerned with learning processes resulting from interacting with external or environmental factors (a.k.a. the environment-process). And phylogenesis is concerned with its evolution. This evolution can be discovered through phylogenetic inference methods that evaluate observed traits, such as sequences or morphology (a.k.a. traces (Traces as fundamentally related to impact of actions referring to accountability)). This genetic triad enables a progressive and evolutive perspective into what a designer could be, questioning in the process established *modus operandi*. This perspective enables an ontogenetic approach to design, which presents the designer and his/her/their designs as a metabolic system continuously evolving by simulating/projecting and interacting with himself and the environment. This repositioning enables a deontological position by integrating a prospective approach aiming to place design practise in the context of applied ethics at the intersection of emancipatory strategies and asymmetric relationships. The fundamental practise of design in this context is based on the co-production of systems aimed to decrease repression and enhance multi-species freedom, sustainability, liveability, responsibility and trust; an inter-natura, inter-species and inter-collective designer.

In this context, we proposed 'Biopoiesis' as a prospective design and research concept to map and discuss both our own work, and a wider field of related 'world-building' and 'worlding' practices in the context of *unthinkable worlds*. It aims for a design practise based on making life and making vitality. It is focused on the politics of living and caring beyond the human.

In this context, I am coining Pluripolarity as a more-than-human knowledge scheme. Pluripolarity refers here to the interplay between different modes of knowledge(s) beyond the human. Pluripolarity is an inter-ecological approach that understands knowledge generation and representation to be beyond human unipolarity leaning towards more than human perspectives. It aims to be developed decade to systematically address much debated questions about changes in society, for instance in relation to technological impact and ecology-at-large. Pluripolar representations aim to mediate the multiple ways in which these modes of knowledge(s) are combined in the investigative and prospective process of change.

One area of research in Pluripolarity that will need concrete and extended exploration is how these combined resources are used in different settings and among people with different cultural backgrounds, as well as how this affects translation and interpretation in studies and practices.

The case presented stages a preliminary exploration on how we may articulate a Polygenetic practise. It combined other species, and computational systems to build symmetrical relationships among the human, the digital, the flora, and the fauna, in what can be characterised as Pluripolar knowledge(s).

In terms of design research, as we transition design practise and research from a human-centred and discipline-based approach to an inter-natura, inter-species, and inter-collective model around Biopoiesis, the only discipline remaining is care and the design practise of making life and vitality focused on the betterment of ecology-at-large. This post-disciplinary context implies a *de facto* dissolution of multi-, trans-, and inter-disciplinarity. In this context we may challenge them and propose **Bio**, **Pluri**, and **Poly** as a new paradigm. An alterplinary model focused on creative practice from being "discipline-based" to "issue- or project-based (Rodgers & Bremner, 2011)(Rodgers & Bremner, 2013), which now need to integrate more-than-human elements, and knowledges.

The framework developed in this chapter presents a critical attitude for looking at the design world to evolve its practice, its theoretical position and its products. At this stage through the lens of philosophy, critical theory, and prospective design we can only draw temporary and initial conclusions. Time will continuously revise this proposition. From what we have seen we can foresee the critical issues that will need careful thinking, from this point further studies will determine the operationality of the proposed model.

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