

Bio-Brutalism; five case studies framing the emergence of new raw aesthetics at the intersection of material regeneration, environmental design, and crafts.

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As we move towards an environmental and regenerative paradigm for crafts, with new objectives, methods, and practices, questions arise regarding the aesthetics of these emerging forms. To address this issue, the main author developed a module aimed at exploring furniture design at the intersection of regenerative materials, structures, and aesthetics. In this context, five cases have been selected to frame the quintessential characteristics of these new raw aesthetics. These case studies showcase varying approaches, with some generating new aesthetic qualities by introducing novel processes, while others embrace a strictly analogue approach to highlight literal aesthetics. The resulting aesthetics have been categorised in this paper as Bio-Brutalism. This emerging aesthetics retains the essential elements of traditional Brutalism, such as stripped-down, raw, monolithic appearance, non-treated finished surfaces, and a commitment to preserving design heritage. However, it also diverges in significant ways, with three core elements identified: subtractive locality, time-based dynamic aesthetics, and nature-human hybrid collaborative processes.

Keywords: Bio-Aesthetics; Environmental; Regenerative practises; Brutalism; Crafts

1 Introduction

In this paper we explore the emerging aesthetics qualities of crafts as they converge with regenerative design. To address this issue, the main author developed a module aimed at exploring furniture design at the intersection of regenerative materials, structures, and aesthetics. In this context, five cases have been selected to frame the quintessential characteristics of these new raw aesthetics. These cases showcase new aesthetic qualities by introducing novel processes, or embracing a strictly analogue approach to highlight literal aesthetics. The resulting aesthetics have been categorised in this paper as Bio-Brutalism. This emerging aesthetics retains the essential elements of traditional Brutalism, such

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as stripped-down, raw, monolithic appearance, non-treated finished surfaces, and a commitment to preserving design heritage. However, it also diverges in significant ways, with three core elements identified: subtractive locality, time-based dynamic aesthetics, and nature-human hybrid collaborative processes.

1.1 Towards a *Craft*³

In a recent post by Fiona Herrod, an alumna of Design Academy Eindhoven, she reflects on the state of affairs regarding the school's graduation show in 2021. Herrod observes that while the school does not explicitly teach "craft", the graduation show was bursting with projects concerned with the future of traditional handmaking skills (Herrod, 2021). Herrod raises the question of whether ideas about *nostalgia* and *social progress* can coexist in the future of craft. This points to a continued interest in the intersection of traditional craft with new digital technologies. In a similar vein, the main author published a paper two years ago, showcasing two projects at the intersection of craft, technology, and upcycling. These projects utilized local waste as their primary input and employed traditional Japanese techniques or physics to build a new typology of products (Galdon et al, 2021).

Together, these analyses highlight the preservation and reinvention of traditional crafts through various design projects. The projects range from using digital technology to create virtual workshops and textiles to rejecting digitization in favour of a strictly analogue approach. Some projects aim to update traditional techniques while others focus on preserving the memory of disappearing crafts. The analyses demonstrate that technology can be both a threat and an opportunity for traditional crafts and that different approaches can offer exciting possibilities for the future of craft.

Craftsmanship has traditionally been defined as skilled work that values the pursuit of excellence for its own sake, emphasizing technical proficiency and execution (Frayling, 2011). The Crafts Council, the UK's national charity for craft, advocates that craft skills and knowledge enrich and uplift individuals (Crafts Council, 2022b). In contemporary discourse, however, craft has been repositioned as a process that explores and challenges technology, interrogates cultural and social practices, and questions philosophical and human values (Craft Research, 2022). Current craft practices are found in unexpected places and provide social, cultural, political, and ecological resistance while countering obsolescence (Macbeth & Barber, 2015; Chatterjee & Avelos, 2020; Castelblanco Pérez, 2022).

Philips and Galdon, in collaboration with Fantini (2023), propose a framework for the evolution of craftsmanship and design, distinguishing three main evolutions: *Craft*¹, *Craft*², and *Craft*³. *Craft*¹ is characterized by cultural heritage and the use of local materials, it can be associated with designers such as William Morris or John Ruskin. *Craft*² emerged in the 1980s and was exemplified by the work of Ron Arad, Tom Dixon, and Hella Jongerius, among others. This type of craft operated within gallery contexts, retail, or one-off articulations, and was characterized by a high level of conceptual and technical scope, in which designers used skills to achieve specific aesthetics that were capitalized in the gallery circuit through a valuation-scarcity-speculation triangulation. To understand the future of craft and design (*Craft*³), Philips, Fantini and Galdon organized a symposium entitled *The Cost of Change: new trajectories of production and consumption* that explored design's responsibility in the climate crisis. Among the speakers was Tony Fry, who offered an alternative to traditional models of craft and design, calling for a relational interaction between nature, the designer, and autonomy to recraft the self, rethink craft as a practice of sustainment, and see craft as a making in time. In this context, *Craft*³ emerges as a range of practices that align with ethical materiality and applied ethics,

with impact at the centre of its practice to reposition craft in the context of environmental remediation. This emphasis on ethical materiality and applied ethics can lead to new economies and approaches to material culture. From these insights and a review of emergent case studies, Philips and Galdon (2023) in collaboration with Fantini, developed the foundations of Craft³. (See Philips and Galdon (2023) for extended review and multi-level categorisation)

| CRAFTS 1.0 | CRAFTS 2.0 | CRAFTS 3.0 |
|----------------------|-------------------------|-----------------------|
| HERITAGE - MATERIALS | VALUATION - SPECULATION | IMPACT - ETHICS |
| MASTERING TECHNIQUE | MASTERING VALUE | MASTERING SUSTAINMENT |

Table 1. The evolution of Crafts. Philips, R., Galdon, F. (2023).

| CRAFTS 3.0 | | |
|-----------------------------|-------------------------------|--|
| DIMENSIONS | | |
| CONTEXTUAL KNOWLEDGE | ENVIRONMENTAL CONCERNS | AWARENESS OF PLANETARY BOUNDARIES |
| WORKING WITH NATURE | LEADING EXPERTISE | OBJECTS OF ENVIRONMENTS AND CULTURES |
| METHODS | | |
| MODULARITY | MATERIAL SOURCING | FUNCTIONALITY |
| USE AND RE-USE | ETHICAL IMPACT | HABITATS |
| INTEROPERABILITY | NEW MODELS MANUFACTURING | HIERARCHY OF USES |
| DEEP KNOWLEDGE | TRACES | LOCAL WASTE |
| REPRESENTATION | POST-INTERACTION | RE-USE |
| TRANSFERABILITY | IMPACT | CONTEXTUAL MODELLING & VALUE |

Table 2. Dimensions and methods of Craft³. Philips, R., Galdon, F. (2023).

As we move towards a regenerative paradigm for crafts, with new objectives, methods, and practices, questions emerge regarding the aesthetics of these emerging forms. To address this issue, the main author developed a module aimed at exploring furniture at the intersection of regenerative materials, structures, and aesthetics in greater depth. The resulting aesthetics have been categorised in this paper as Bio-Brutalism. In this context, the main author has selected five cases emerging from this module within the past two years to frame the quintessential characteristics of these new aesthetics.

2 Methodology

Case studies enable the exploration and investigation of a real issue within a defined context by using a variety of data sources (Baxter et al., 2008). This methodology allows design researchers to develop and to enhance “the capacity of comprehension and analysis of real problems, the capacity to propose and evaluate alternatives for the improvement of the problem considered, to work collaboratively, [and facilitates] their capacity of information management and synthesis of problems” (Herrera et al, 2016). In this context, we will use comparative studies. According to Bukhari (2011) a Comparative Study analyses and compares two or more objects or ideas to examine, compare and contrast them to show how two or more subjects are similar or different.

3 Cases

3.1 Case 1 – Will Eliot > Digested objects; Worm stool

The proposed stool was designed in partnership with mealworms that are unique due to their ability to digest polystyrene effectively. This aspect is particularly relevant considering the planet’s plastic waste crisis, of which polystyrene accounts for 30% of landfill volume. The stool was created in a month, using a bio-collaborative approach where the mealworms played an equal partner role in designing the piece of furniture. We may consider this partnership as an inter-species design collaboration focused on subtractive waste.

One of the fundamental elements was how to collaborate effectively with worms. In this context, worms were guided by injections of sugar water into the polystyrene, guiding the larvae into eating the polystyrene in pathways. However, the worms were also free to move in any direction they liked, leaving much of the “biocraft” to them. This process enabled partial control into the intended outcome.

This process was highly experimental and took several small-scale experiments to generate a number of designs cavities, which were then casted in wax. These wax models were 3D scanned and scaled up digitally to a full-size stool. The stool was finally fabricated in cardboard due to time constrains, and was assembled slice by slice by hand. Further developments will focus on exploring casting materials to operate in the context of regenerative practises via locally-sourced materials to create contextual aesthetics. The end result was a magnified view of the architecture created by the mealworm in the polystyrene, captured in the form of a piece of furniture as a representation of the potential of inter-species collaboration (Fig. 2).

By collaborating with other organisms, designers must let go of the need for control over the entire process. The process frees the designer to think more perceptively about what the goal of the design is and how to build and react to the actions of other entities, in this instance a mealworm.



Fig 2. Digested objects. Earlier experiments developing the process of collaboration with worms. Results of a systematic analysis of the impact of sugar water injections and time in the inter-species collaboration. The final version of the Worm stool. Will Eliot, 2022.

3.2 Case 2 – Hugo Garcia > ReTree

"ReTree" critically reflects on the unecological impact of Christmas. While traditionally viewed as a time for fostering fraternity and warmth, and as an occasion for sharing and enjoying time with loved ones, Christmas has increasingly become a celebration of consumerism. The seasonal production and commercialization of goods intended to last only a few weeks have reached unprecedented levels during this period, and the iconic symbol of such disposability is the Christmas tree.

Pine trees grow for an average of 7 to 8 years before being cut and sold at the beginning of December. Once placed in our homes, Christmas trees become the centrepiece of festive décor, occupying a prominent place in almost every household for two to three weeks. Unfortunately, following the conclusion of the holiday period, these trees are discarded and end up on the street as trash. This phenomenon exemplifies the lack of sustainability and consciousness that pervades contemporary society. At this point a fundamental question raised; What could we do as designers to change this behaviour?

This project started with a Christmas tree found on the streets of London at the beginning of January. In those days, streets were filled with these trees abandoned on every corner. In order to transform the Christmas tree into a stool, Hugo defined two rules: (1) All the processes would be made using hand tools that are affordable, easy to use and accessible. (2) Use only parts of the tree. This rule has two exceptions: The rebar reinforcement ties and the double-ended screw. These exceptions are aimed at simplifying the transformation process and make it more accessible. They are an alternative to weaving techniques requiring expertise and practice. The base of the tree is considered part of the Christmas tree.

Following these rules, the creative process is fundamentally based on intuition and observation, with no preliminary sketches involved. The approach is akin to stone sculpture, where there is no possibility of retracing one's steps. Every branch cut during the creation process represents a deliberate design decision that cannot be reversed. It is imperative to observe the tree closely and adhere to its inherent structural design, which serves as a guiding principle for determining which branches to remove or how to bend them. The final form is a combination of the tree growth, and the designer interventions to complete the process. This exercise can be regarded as co-designing with nature, requiring the designer to relinquish complete control over the final outcome and make compromises based on the tree's materiality (Fig. 3).

ReTree aims to repurpose Christmas trees and provide them with a second life. This initiative seeks to establish a new sustainable Christmas ritual, one that encourages families to reuse their trees and create something novel out of them. *ReTree* comprises a toolkit that includes a basic set of high-quality tools, such as secateurs, a hand saw, and a wire twister, all crafted from wood and steel. This toolkit empowers users to transform their Christmas trees into various objects, such as a stool, side table, or even a lamp. While *ReTree* is designed to coincide with Christmas celebrations to highlight the impact of obsolescence, it also aims to encourage users to participate in the circular economy by providing them with essential tools to independently repurpose unused objects or materials found in their homes. The overarching objective of the initiative is to foster greater awareness among users and society at large regarding unnecessary consumerism and the minor changes necessary to transform such objects into valuable resources.



Fig 3. Christmas tree on the street. Tools and elements for transforming the tree: Hand-saw, Secateur, rebar ties and twister, and double-ended screw. The final version of the Christmas tree stool. The stool is entirely functional and resists a person's weight without problems. Hugo Garcia, 2023.

3.3 Case 3 – Anna Tsiganchuk > Precious materials: Leaves stool

Anna approached her design by showcasing her responsibility in today's world of abundance, in which the role of the designer is to apply critical thinking in the decisions we make when designing or realizing ideas, as the resources and energy we utilize are scarce and precious.

During the design process, she looked at the paradigms of sustainability and regeneration by asking herself whether they mean replacing one element of the entire design system (i.e its building blocks, the materials, and the chains of manufacturing and distribution that come along with it.) She examined what is the true cost of a "greener" material: Does adding processes or additives to the sustainable design result in lower impact on the environment? Does sustainability mean a new method or a different perspective?

Arriving to the UK from a country with almost no rain, she was taken by the wealth of natural resources that are viewed in the UK as waste. This drove her to explore nature-based and locally sourced materials as her main resource for the creation of a stool. Leaves and fallen tree sticks are treated as garbage, when in reality, these are precious materials.

As a guideline, she did not manipulate the raw materials by adding ingredients or additional processes that require supplementary energy to transform them into something else. Their essence was already infused in them and her role in the creation was to discover it. The shape of the design emerged from the exploration and experimentation journey by revealing itself during the work: Attentiveness to the materials and their character defined the whole process.

She chose to minimize the design decisions to allow the materials to expose the character of the intended outcome. By stripping elements, like height, width and mannerism, the heart of the stool was revealed as the 3D cube/cylinder form around which every design is conceptualized.

The assembly process began with carving the stool legs from a timber found outside her apartment building. On top, she constructed a base with sticks tied together with a string. For the stool body she stacked leaves one on top of another and folded them to create one bundle unit held together by the same string. Bundles and string ties were the leading method of the design process. Finally, the top upholstery element was created from weaving a grid of sticks and tying them with a string in the meeting points (Fig. 4).

One of the magical elements of working with nature-based materials, is the inherent systematic value of nature's seasonality that comes with it. For instance, the changing colours of the materials throughout the seasons: Autumn produces; yellow or orange leaves, Summer; green ones and Winter; brown. This is a natural process that enriches the variety of the design and the visual element of the system. In this context time introduces a dynamic aesthetics into the output.

Locality of the materials present another variable in this system. The different types of leaves and sticks in other parts of the world will offer a variety of outputs. She started to inquire how would a global scale design system with these materials look like? How would the same stool output be like in Canada and China? These are questions to investigate further in this project. While keeping in mind the concept of showcasing locality and time into aesthetic qualities emerging from the intersection of design and environmental practices.

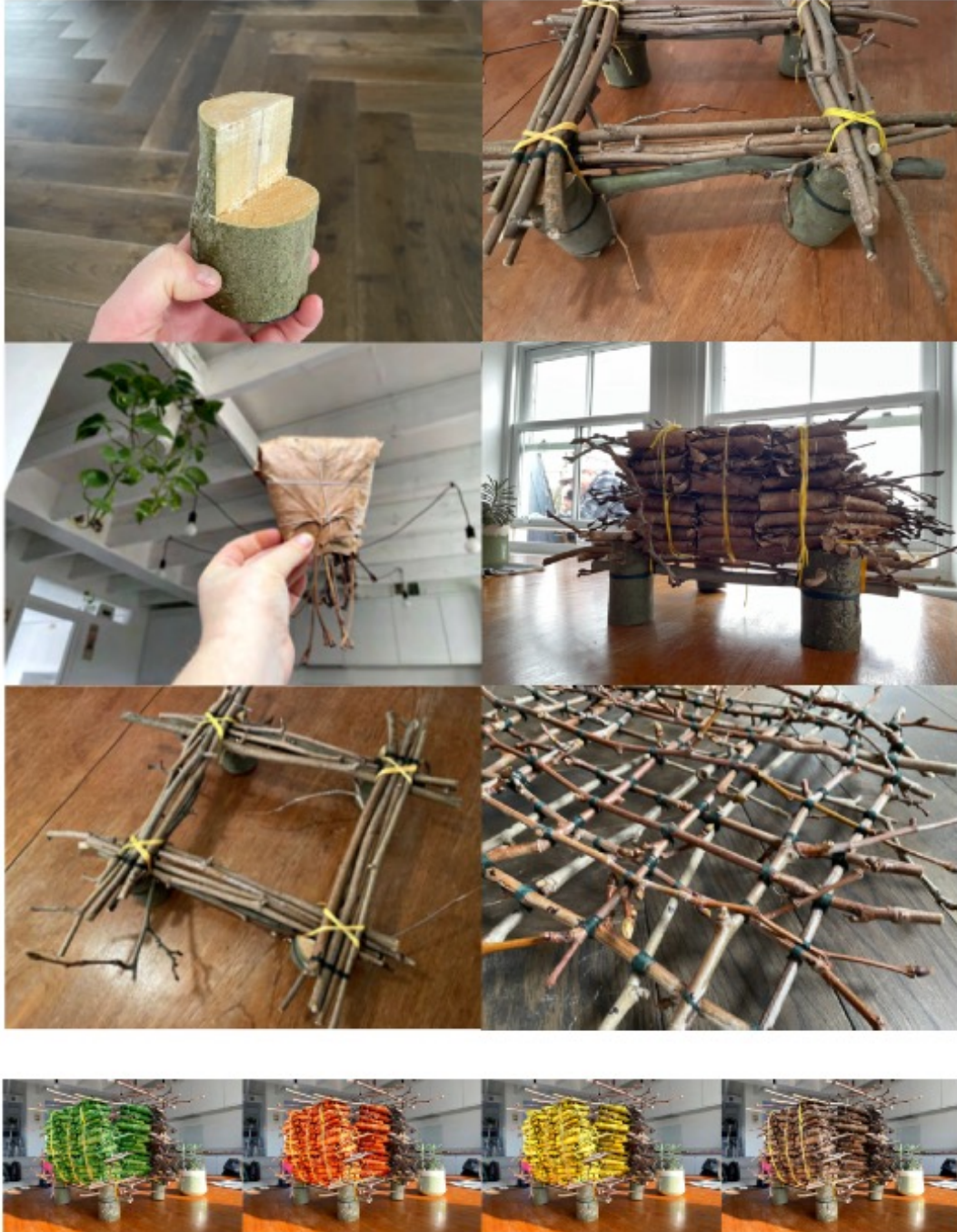


Fig. 4. Leaves stool. Preliminary experimentations developing the base of the stool with locally sourced branches. Development of a modular structure and experimentation with fasten systems. A graphic recreation of seasonality aesthetics; Spring, Summer, Autumn, and Winter. Anna Tsiganchuk, 2023

3.4 Case 4 – Shaoyu Wang > Fossil Stool

The process of creating a Fossil chair involves mixing silica sand and isomalt in powder form to create a single powder unit, which is then poured into a wooden container crisscrossed with Nichrome wires to define the frame of the stool.

The Nichrome wires are connected to 120V voltage and a current of 1.5A, which generates heat to melt the sugar and unify it with the sand, forming an approximated form of the stool. The entire wireframe needs to be completely covered with the mixed powder. This procedure reaches high temperatures, which allows the surrounding isomalt to melt and become the adhesive, which binds the surrounding sand together and adhere to the surface of the wire. The adhesion layer becomes thicker with the pass of time. After heating the wire for the desired time, electricity is stopped, and the chair is cooled down to room temperature before it can be taken out. At this time, the melted isomalt solidifies again and combines with the sand to form a harder material with a rough texture. This process may represent a novel approach to 3D printing technologies. This process provides some degrees of control, yet each time will provide a different output depending on powder mixture, heating and cooling time with room temperature playing a significant role in the heating and cooling process enhancing or decreasing form and structure (Fig. 5).

The resulting chair has a rough texture similar to a fossil and serves as a symbol of history and culture. It reminds us of the cyclical nature of life and our connection to nature.

The significance of this stool is not only to provide comfortable support, but also the history and culture behind it. Sand has played a significant role in human history and culture. It is a natural resource that has been used for various purposes, ranging from construction to artistic expression. The cultural significance of sand can be observed in various societies, where it is associated with religious, mythological, artistic, and traditional practices.

For instance, in ancient Egyptian culture, sand was a symbol of eternity and immortality. It was believed that the god of creation, *Atum*, emerged from the primordial waters and created the first mound of sand. Sand was used to construct the pyramids, which were believed to be gateways to the afterlife. In Chinese culture, sand has been used for various purposes such as creating sand mandalas for religious purposes, as well as for calligraphy and painting. Sand has also been used in traditional Chinese medicine for its healing properties. Sand plays an important role in Chinese culture and history. In Japanese culture, sand is an important element in traditional gardens, where it is used to create patterns and textures. These gardens are designed to evoke a sense of harmony and tranquillity. Sand is also significant in various forms of art. Sand painting is a traditional art form practiced by indigenous cultures in North America and Asia, where sand is used to create intricate designs and patterns, often with religious or spiritual significance.

The Fossil stool is seen by Shaoyu as a living being that has witnessed the rise and fall of civilizations throughout human history, representing a miniature natural monument or a fossil. Its creation from natural and locally sourced materials and its eventual return to nature serve as a reminder to humanity of our place in nature and the inevitability of our return to the earth. The Fossil stool is thus imbued with significance beyond its functional purpose, representing a link between human culture and the natural world.



Fig 5. Fossil stool. Experimentations developing the wiring technology to melt sugar. Heating process of the stool with locally sourced materials. Detail of the final output; the resulting chair has a rough texture similar to a fossil and serves as a symbol of history and culture. Shaoyu Wang, 2023

3.5 Case 5 – Harry Hosker > Weeping Willow Stool

This project explored the idea of “Balance in Nature” via tensile integrity in the context of environmental furniture design through Bio/Aesthetics. The idea of using tensegrity as a space of enquiry reflected an overarching principle of balance in nature, a fundamental element that works well with furniture design and promised an interesting constraint to work around.

Beyond representing balance, the goal of the project was to capture unique aesthetic qualities that certain trees species display. For instance, a willow has curved, strong, sporadic members complemented with flowing, flexible, skinny branches that form a mirage as they move in the wind. A Douglas fir, by contrast, has a direct growth path resulting in branches that are linear with needle appendages. These intrinsic characteristics resulted in a new set of constraints and possibilities to insert into the design process in order to develop a stool. The initial chosen tree to create a stool or any other piece of furniture, then, has consequences in its final aesthetics.

After this preliminary investigation, the guiding chosen tree was a willow. This typology, then, would guide the development of the intended environmental output whilst remaining aligned with an initial manifesto. It was decided at that point that all material was to be sourced from a single willow. This approach implies that all the structural and aesthetic component would emerge from this single unit. As the final design was a stool, this meant that the base, seat, supporting members and cordage was theoretically all to be sourced from a willow tree. Due to time constraints (four weeks), not all the materials used in the final product were sourced from a single tree, and so pieces of wood from various species were used. However, future iterations will focus on fully developing a stool from a single unit.

Subsequent research and ideation involved an investigation surrounding what physical design constraints were enforced by the proposed forms, as well as, what hyperlocal resources could be used to enable qualities such as preservation of the chairs’ decoration while remaining as close as possible to the intended outcome. Physical prototyping, materials exploration, and experimentation took the design from a basic structure progressively towards the final output. This prototyping process allowed for an exploration of structural elements such as torsional and compression strength of the solid members to be tested and played with the limitations of working with foraged wood sourced locally from various forests and parks. These testing processes also enabled the identification of limitations of materials properties to understand how far these materials could be pushed, guiding changes in the design that increased the stability and structural integrity. Aesthetic elements were explored and integrated in a very literal approach to represent its provenance. These aesthetic qualities are dynamic, and will vary depending on trees, seasonality, and time used (Fig. 6).

Although the final product did not fully meet some goals regarding singular material use, it created an exploratory space to test its validity. Its final output exemplifies the general concept and, allows the public to gain insights into the idea and principles behind the work. Both constructed stools withstand the weight of someone sitting on them, but lack stability. This was a desired feature originally, as it forces the user to consider their own balance with nature, and had to be purposeful in their weight placement. This aspect is an intrinsic feature when working with wild wood in which the designer does not impose its full will but embraces it. This element should be integrated when designing in this context. As an investigation, the project was very productive and future iterations will produce evolved, and more representative pieces that further embrace Bio/aesthetics.



Fig 6. Weeping Willow Stool. Experimental process developing the stool with locally sourced materials. The prototyping process allowed for an exploration of structural elements such as torsional and compression strength Detail of the final outputs. Harry Hosker, 2023

4 Discussion

4.1 Towards Bio-Brutalism

Brutalism emerged in the mid-20th century as a movement that rejected the ornamental and decorative aspects of earlier architectural styles in favour of a more stripped-down, honest approach. The term "brutalism" comes from the French term *béton brut*, which means "raw concrete," a material that is often associated with the style (Calder, 2016). This architectural movement gained widespread popularity in the 1950s and 1960s and is characterized by its use of raw, unadorned concrete, block-like forms, and its emphasis on function over form.

The origins of brutalism can be traced back to the architectural theories of Le Corbusier, a Swiss-French architect who believed that buildings should be designed to meet the functional needs of their occupants. This approach is exemplified in his famous *Unité d'Habitation* apartment complex in Marseille, France, which features a modular design, exposed concrete, and an emphasis on communal spaces.



Fig 1. *Unité d'Habitation*. *Design Icons*. BBC. Jonathan Glancey, 2013

Brutalist architecture became popular in the post-World War II era, as cities around the world were rebuilding and in need of new housing and public buildings. Brutalist structures were often used for social housing projects, universities, and government buildings, and their raw, monolithic appearance was seen as a symbol of progress and modernity.

One of the most famous examples of brutalist architecture is the Barbican Estate in London, a massive complex of residential buildings, offices, and public spaces. Designed by architects Chamberlin, Powell and Bon, the estate features exposed concrete, sharp angles, and a modular design that allows for

maximum flexibility and functionality. Another well-known example of brutalism is Boston City Hall, designed by Kallmann McKinnell & Knowles in the 1960s. The building's raw concrete facade and geometric shapes are intended to convey a sense of strength and stability, while the interior spaces were designed to be open and accessible to the public.

Despite its popularity in the mid-20th century, brutalism fell out of favour in the 1970s and 1980s (Dalrymple, 2009). In recent years, however, there has been a renewed interest in brutalism as a unique and important architectural style; see *Brutal London* (Zupagrafika, 2015), *This Brutal World* (Chadwick, 2016), as well as the *Atlas of Brutalist Architecture* (Phaidon, 2018).

One of the reasons for the renewed interest in brutalism is its aesthetic appeal. Many people are drawn to the raw, unadorned look of brutalist buildings, which they see as a refreshing departure from the often-overwrought designs of earlier architectural styles. The use of concrete and other industrial materials also appeals to many people, who see it as a symbol of modernity and progress.

In terms of design, we may associate these key elements of stripped-down, honest approach, raw, monolithic appearance, non-treated finished surfaces to Droog design. Droog is a Dutch design collective that emerged in the 90s and was characterized by its experimental, conceptual and minimalist approach to design, often exploring the boundaries between art and design. Droog has been highly influential in the world of design. The collective was founded by Bakker and Ramakers and quickly gained a reputation for its unconventional designs (Ramakers, 2002).

The concept of 'anti-form' is a key principle of Droog Design, which entails rejecting conventional forms and aesthetics in favour of experimental and unconventional designs. Additionally, the use of humour and irony is another important aspect of the collective's work, with many designs being playful and subversive, challenging traditional preconceptions about design. For instance, Tejo Remy's 'Chest of Drawers' is designed to resemble a stack of drawers. Droog Design also employs unexpected materials and techniques in their creations, incorporating innovative manufacturing processes and technologies. Rody Graumans' "85 Lamps" chandelier is an example of this approach, featuring bare light bulbs suspended from a simple metal frame.

However, neither Brutalism nor Droog Design have operated under the current environmental and regenerative paradigm, which is focused on ecological impact and explores the boundaries between design, biology, ecology, and chemistry. This aspect represents a departure from traditional practices in design with an emphasis on the conceptual and art-led models such as the ones developed by the Dutch collective, as well as, from current attempts in architecture through Eco/Brutalism (Bowler, 2023).

4.2 Framing Bio-Brutalism

The key elements of Brutalism; stripped-down, honest approach, raw, monolithic appearance, non-treated finished surfaces, and the need to preserve our design heritage still remain in full within the Bio-Brutalist paradigm. However, some other aspects significantly differ from it.

One of the fundamental differences is the partial loss of control by the designer. In all cases presented in this paper, the designers were forced to embrace the wildness and rawness of the materials and/processes used to transform them into stools. They could implement some control but not full control upon the object. This element gave rise to hybrid Bio/Aesthetics which depart from the full

control of Brutalist designs in which the designer could implement its full will into materials via geometrical models and industrial processes (e.g., forged concrete) to generate outputs.

The second main aspect of difference was the selection of materials. In the cases presented, environmental and regenerative processes implied a careful sourcing of materials from a subtractive perspective (existing waste or materials) operating locally. This element gave rise to organic, contextual and temporal Bio/Aesthetics which depart from the extractivist, universal and de-localised model presented in Brutalist designs in which the designer could use materials as his/her/their will from anywhere in the world.

The third fundamental difference is the variable of time. Time plays a fundamental role in Bio-Brutalism aesthetics in which decay and seasonality adds variability into the aesthetic qualities of the product. Depending on where, when your intervention is applied or for how long it is implemented designs reveal a difference aesthetic quality. This is very different from Brutalism in which concrete colours and shapes remain invariable in time.

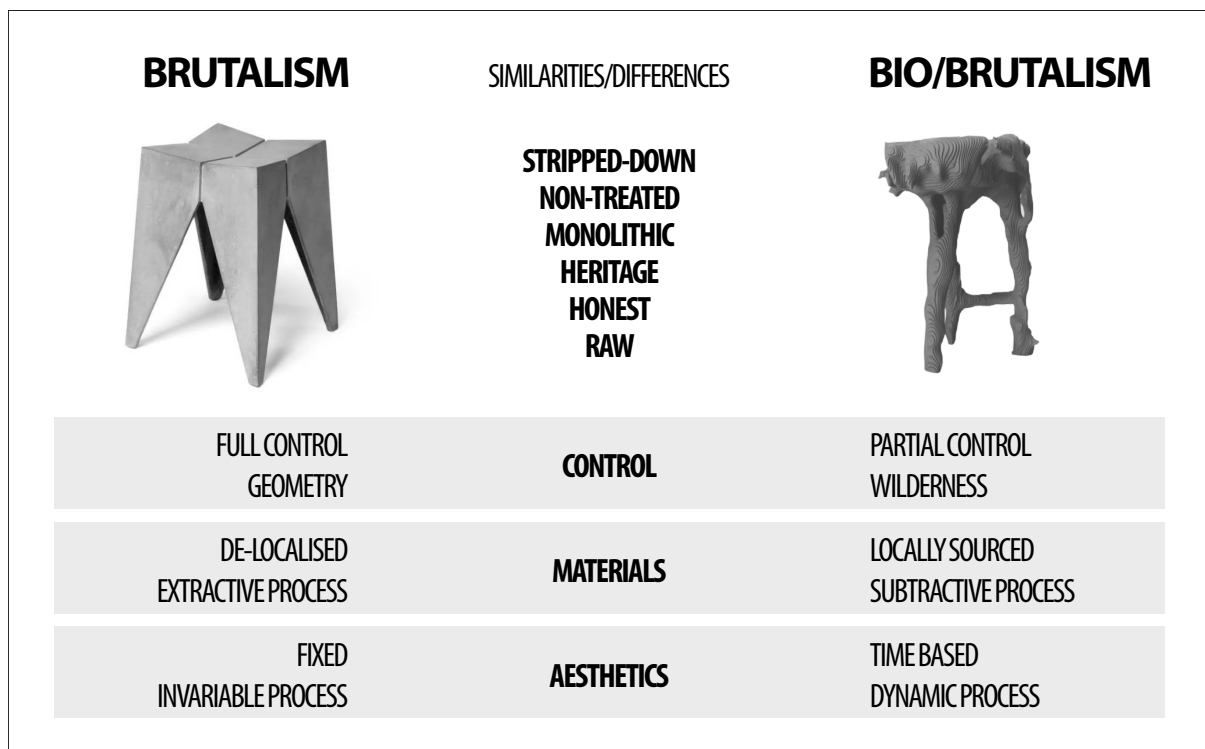


Fig 7. This diagram presents a comparative study addressing similarities and differences between traditional Brutalism and Bio-Brutalism. Fernando Galdon, 2023.

Finally, the projects showcased in this paper represent a spectrum of aesthetics possibilities covering from the literal to the conceptual and from the cultural to the technological in the context of Bio-Brutalism.

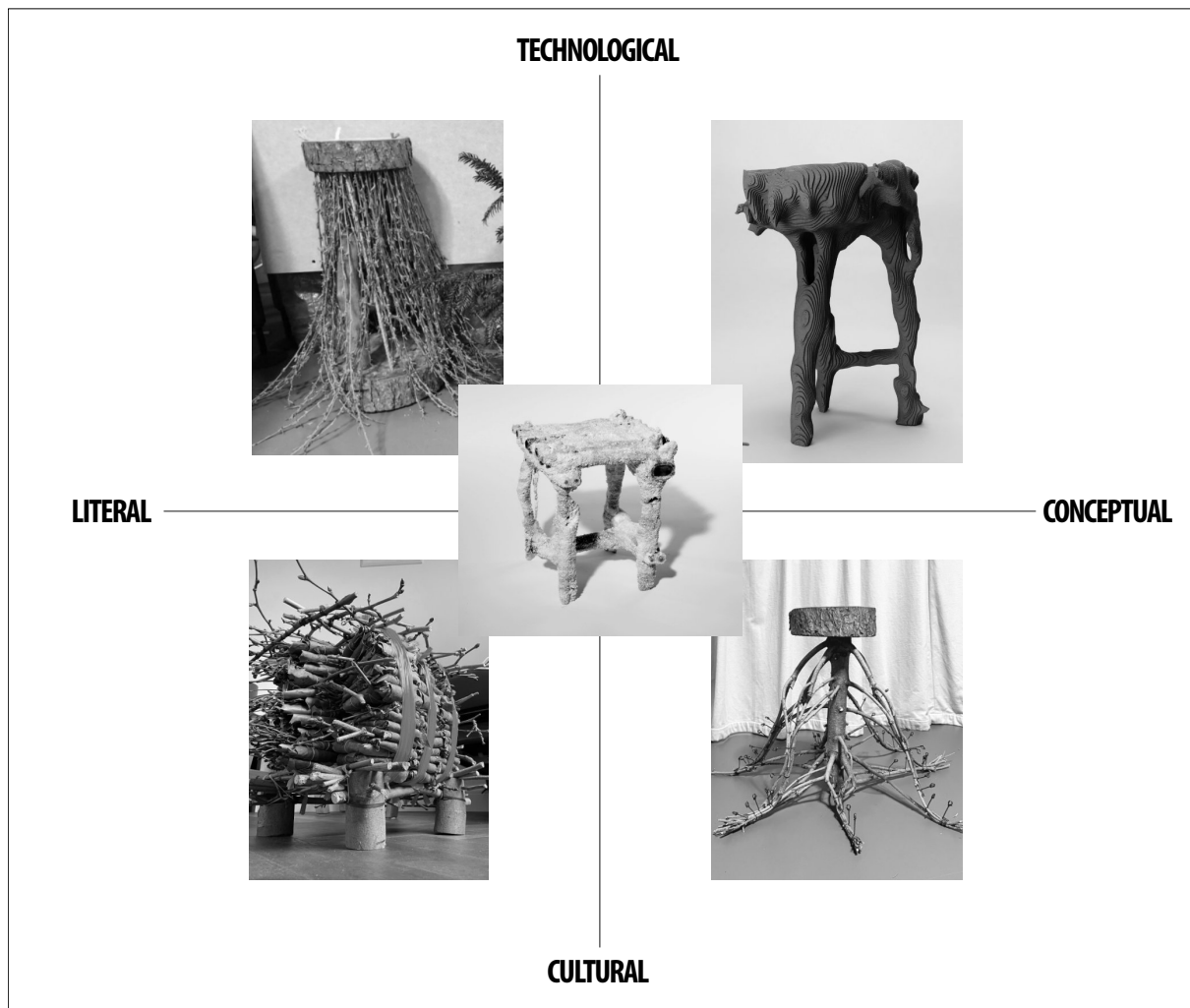


Fig 8. This matrix represents a spectrum of aesthetics covering from the literal to the conceptual and from the cultural to the technological in the context of Bio-Brutalism. Fernando Galdon, 2023.

5 Conclusions

Alight an emerging discussion in design academic circles regarding the re-emergence of craft and their intersection within regenerative practises, in this paper we explore the emerging aesthetics qualities of crafts as they converge with environmental design. The projects showcased vary in approach, with some developing new aesthetic qualities by developing new processes, while others embracing literal aesthetics in favour of a strictly analogue approach. The projects presented demonstrate that environmental paradigms can be an opportunity for traditional crafts, and that different approaches can offer interesting ways towards a new future for craft at the intersection of emerging environmental practises, which we refer in this paper as Bio-Brutalism.

Furthermore, we have also witnessed the preservation and reinvention of traditional techniques and technologies. Some projects have developed new technologies like heat wire 3D printing or sugar water quasi-trajectories, while others embrace traditional techniques and processes in favour of a strictly analogue approach. Some projects aim to update traditional techniques while others focus on

preserving the memory of disappearing crafts. In these processes, designers embraced the uncontrolled growth of trunks, leaves, branches, or the integration of other species as a new course of action to complete designs collaboratively with wilderness. This notion together with the sourcing of materials locally, and the integration of time dynamics represents a new *modus operandi* at the intersection of nature, environmental practises, and design.

The emerging new aesthetics still operates with its quintessential elements of stripped-down, honest approach, raw, monolithic appearance, non-treated finished surfaces, and the need to preserve our design heritage. However, some other aspects significantly differ from traditional Brutalism. We have identified three core elements; subtractive locality, time-based dynamic aesthetics, and hybrid nature-human collaborative processes. Finally, the projects showcased represent a spectrum of aesthetics covering from the literal to the conceptual and from the cultural to the technological.

If William Morris embodied a new ideal of cultural preservation in his defence of the *Craft*¹, and Ron Arad or Tom Dixon rearticulated this ideal to operate within a market-led society via the value-driven creative economy which led to *Craft*² and the intersection of crafts within the gallery circuit, the emergence of *Craft*³ generates a new political identity aligned with current initiatives such as the Green Deal with the main focus placed on **sustaining** and the creation of new feelings and new ways of feeling the world. An *Ethico-Aesthetic Paradigm*, as Theodore Reeves-Evison (2015) would suggest, in which design interventions represent a fundamental point of access for seeing how this relationship forms and changes. In this context, Bio-Brutalism emerges as one [of potentially many] possible aesthetic representations at the intersection of design, crafts and environmental practises, challenging in the process existing orthodoxies.

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