

After the digital – re-materialising digital ecologies of craft

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Abstract

New economies of making in post-disciplinary and post-industrial climates are pushing the traditional boundaries of the craft industries. This article examines recent artistic practices exploring and experimenting at the bleeding edge of art-science-technologies, where artwork is critically crafted, combining digital with physical materials through hybrid forms of hands-on-making. New materials and technologies are being incorporated into contemporary craft and new modes of making are revealed as we witness a move away from modern-craft to an era of post-craftwork. Electronic media sits at the heart of these developments, but in contrast to modernist dematerialisation of art and the dominance of screen essentialism in art production and in daily life, post-craftwork engages with digital technologies in ways that rematerialize data in physical and hybrid spaces and artefacts. The authors draw on new materialism philosophy in consideration of digital material agency, cutting across posthuman, transhuman, and more-than-human paradigms, to examine post-craftwork through examples of six artworks that embody the creative thoughts and insights of their makers, instilling them with social and spiritual value. Re-imagining material conditions and technological futures may offer potential to reconnect culture with nature.

Keywords

Digital Craft, Technology, New Materiality, Vibrant Matter, Art, Data, Digital Materiality, Post-craftwork

Anti-materiality / Bleeding Edge Technology

‘The Dematerialization of Art’ appeared in the journal *Art International* in 1968 heralding a future in which objects could become obsolete. In this article, Lucy Lippard and John Chandler defined dematerialised art as ‘idea’ or ‘action’ and coined the term ultra-conceptual art [1]. Dryanski proposed this line of thought may have extended from the discovery of radioactivity in 1896 and the paradigm shift in physics regarding mass and energy in the theory of relativity (1905-15). Dryanski saw parallels in the conversion of matter, where the sensation of matter is replaced by concept, and the physicality of matter is replaced by energy, time and motion [2].

The avant-garde are often early adopters of new technologies, advances such as the invention of radio in the 1920’s questioned the future of the book and opened exploration into how to harness the energy of a message now that the

vehicle of transmission appeared redundant, and the ideas were freely released from the page [3]. The infatuation with technology in the 1960’s saw the symbols of mass culture reflected in art investigating materials and techniques through non-object-based practices of performance or situation that Allan Kaprow coined *Happenings* [4].

Electronic media appeared to follow along similar lines, in response to developing communications technologies, into what has been called ‘vibratory modernism’ [5] and, in the digital age ‘vibrant matter’ [6]. The artworld embraced anti-materiality as globalisation and communication technologies moved contemporary art away from materiality, and prioritised the mental and discursive, in exchanges across vast distances [7]. Deleuzian rhizomatic metaphors champion fluidity, instability, and interconnection and prompt reflection on notions of time, place, and distance that technologies have the potential to preserve and disturb [8]. Concepts of local and material are ruptured when screen-essentialism renders engagement to remain at surface level and information is “disembedded from its material carrier” [9].

The current climate crisis has brought to light the realisation that this historical period has fostered our disconnection with nature, at least in the Euro-Western tradition. If we acknowledge the limitations of dualistic thinking of subject versus object, mind versus matter, concept versus making, artificial versus nature, a more productive analogy is to overlay an ecological model to the artificial. Gregory Bateson’s writing on cybernetics proposes exactly this [10]. In the words of Ezio Manzini... “Western thought, [...] is forced to discover complexity, to discover something that was always there, to be sure, but that the finalizing consciousness, caught by the hybrid of its technological success, did not want to see, the circularity of systems” [11].

In addition to rising interest in ecological models, there is a materialist turn, a wave of cross-disciplinary scholarship challenging a perceived neglect or diminishment of matter viewed as passive and meaningless. New materialism conceives of matter as active, vibrant, and lively, and attributes agency not only to human, but non-human and other-than-human actors.

When we think of ‘technology’, it is a term used often in association with electronic devices such as computers [12] but it equally pertains to all kinds of tools and systems. Similarly, the word ‘digital’ etymologically has its foundation in the digits, i.e. the fingers [13]. Both ‘digital’ and

'technology' are attached to histories and futures that span across the ages.

The latest technologies are referred to as cutting-edge, but bleeding-edge art/science/technology is a more apt term to indicate the novel ways post-craftwork adopts new technologies and hybridises them with an ethics of hand making. Attentiveness to material agency and ecological sensibility are enlivened through making. The focus on materials and making in crafting objects could represent a reversal of the traditional relationship of subjects and objects [14]. A more productive analysis is to see them as equal entities in ongoing and relational renegotiations.

Artist Takayoshi Terajima is a fourteenth-generation Japanese rice-farmer, the cyclic processes of cultivation inform his work and its technological production. Terajima replaces material dependant traditional engraving techniques with digital data that dematerialises it (FIG. 1). He combines the random nature of hand craft with the predictability of digital technology. Sequentially he reverses, decreases, or increases the size of the digitised data, moving back and forth between materialization and dematerialization through processes that embody a memory of the previous work and influence the creation of the next one. Through this never-ending cycle, hand etching, photographing, manipulating, printing, hand etching... (repeat), he aims to create expanded jewellery that connect past, present and future that transcend time and space. In the most recent iterations of this project AI technology alters the image and is combined with traditional engraving.

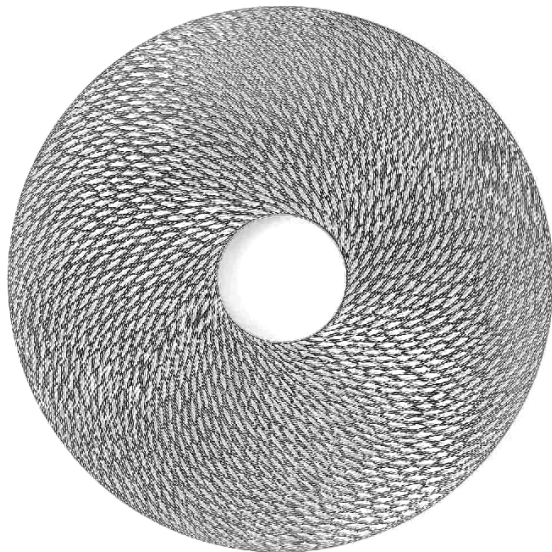


Figure 1. Takayoshi Terajima: Re: No. 1-3, ©Terajima 2023.

Data as material

Data privileges a certain way of knowing, we question its meaning or its accuracy but rarely consider its existence.

[15]. For artists like Terajima, data is conceived as material to be crafted.

Data gains meaning as relational material, always asymmetrically active and receptive simultaneously. This is explained well by Karen Barad's performative materialist notion of intra-active [16]. Just like the famous double split experiments where light appears as a wave or a particle depending on how it is observed, data is similarly fungible; it attains meaning when it is materialised in relation to contexts. Brianna Wein proposes investigating 'material vibrancy' through the collection of data and 'dwelling with embodied data' to be attentive to the attributes of a space [17]. Digital materialisation is embodied data, that can generate different forms of knowledge, with which we live and make meaning, "materialization can be an act, a process, and an experience of data analysis, it can be its manifestation and it can be its outcome" [18]. Computers may be great repositories of information, but they are less adept at capturing or reproducing sensual qualities of a material artwork [19]. In Terajima's work the introduction of Machine Learning (ML) increases uncertainty. From a post-phenomenological perspective, a defining material attribute of ML technology is ML uncertainty, which can be harnessed as a design material. In Terajima's etched surfaces uncertainty represents potential design opportunities. The iterative materialisation and dematerialisation of working surfaces, form patterns that mediate human-ML interactions, they are not deterministic nor neutral, they act through a co-constituting relation in time and space. The ML algorithms generated enter and alter the work. "ML uncertainty can lead to patterns shaping the world they are meant to represent," [20] a phenomenon described as 'pattern leakage' or "the propensity for the learner patterns of ML models to be projected into the world" [21]. Consideration of ML uncertainty as material, and its 'affect' through 'pattern leakage', expands design's current preoccupation with ML as a tool to generate explanations [22]. The 'slippage' evident in the uncertainty of predictions can of course lead to system failure or breakdown, but alternatively, be harnessed as generative and productive.

Sculpting with Data

Technology is typically viewed from two perspectives, use and making, 'how things work' and 'making things work' and these concerns are left largely to the inventors, engineers, and repairmen whose role it is to keep the technologies in the service of human needs. We tend to overlook the patterns that emerge through the praxes of making. The technologies work for us but also act upon us, they remake the world. This is paid little attention in the human drive to innovate, it is so overlooked that Langdon Winner described it as technological somnambulism – where we "willingly sleepwalk through the process of reconstituting the conditions of human existence" [23]. From the perspective of material culture studies, the relationality of digital materials lies in the infrastructure and technology, in the materiality of the content and the context. This anthropocentric view

posits value as human consumption of the digital. Lanzeni and Pink [24] urge us to reassess this value proposition, by promulgating that the true value of digital material lies not in the monetary, or use value of the products it creates, but in the possibilities and openings it affords.

Matter is not stable, it is vibrating and constantly shifting, our relationship with it is not something that we choose to opt in and out of, it is a vital lived relation [25]. Technology can magnify or shrink our perspective, record traces, and recognise patterns beyond the threshold of human senses, it can distort time and space and enable access to the vibrations that move within the solidity of things [26]. The materiality of rhythms and movement emerges through relations between actors, human and non-human. Elizabeth Grosz eloquently states “Art is where the becomings of the earth couple with the becomings of life to produce intensities and sensations that in themselves summon up a new kind of life” [27]. Through the activity of making

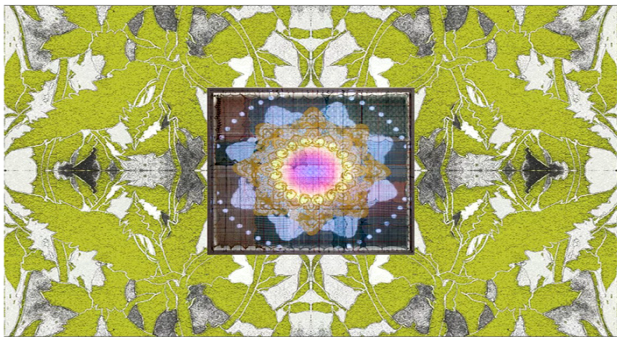


Figure 2. Bi Rongrong, Recoding-PatternXI-Led FabricIII ©Bi2023

one confronts and addresses technology as a lifeform. Artist Bi Rongrong seeks to reveal new and organic connections by inter-twinning traditional, hand and machine, weaving and knitting processes that rub together with dynamic animations, decoding and encoding data reinterpreted through embedded LED pixels (FIG. 2). Future textiles become part of the texture of daily life and the digital devices and technologies slip into rhythms of co-composition shedding “their tool-like quality to become part of our very humanity” [28].

Digital materiality has the capacity to emerge and take shape in shifting circumstances [29]. It’s fungibility and fluidity enable its value to be co-constituted through action and assemblages of things, people, attitudes and in networks of “imagined social relations between humans, non-humans and future scenarios” [30]. Artist He Dameng blends photogrammetry, 3D printing, and augmented reality in artwork that explores the entanglement of virtual and real worlds (FIG 3). A bronze statue appears grounded and clear, contrasting the overlaying virtual environment which is vague and abstract. The ‘virtual’ crowds our imagination, yet we are surrounded by nothing. This artwork illustrates modes of contemporary social cohesion that operate as isolated islands, connected by cultural interaction through the internet.

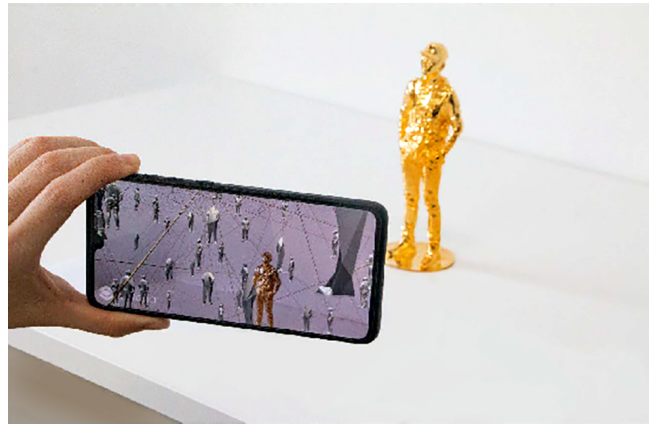


Figure 3. He Dameng, Algorithm God. ©He2020

“In this post-industrial era, the excessive use of technology reshapes people’s senses and perceptions either by alienation and control or by offering them new possibilities to learn about the world and themselves” [31].



Figure 4. Su Yang, State of the Insectoid ©Su2022

Artist Su Yang sees the proliferation of technology to be dulling our senses, making human perception monotonous in comparison and in this sense distancing us from real nature. Yang’s wearable technology, speculates that future intelligent wearables will merge with the body to become new ‘organs’ as interactive devices to foster connection between the body and nature (FIG. 4).

Stephanie Springgay promulgates that vibrant materiality takes shape as rhythm, its potentiality is both virtual and actual, the vibratory and virtual micro-movements have ‘affect’ and take shape through co-composition of patterns [32].

Acknowledging data as media to be crafted, prompts us to consider the reciprocal nature of crafting itself, which is always in dialogue with material, it doesn’t deny the agency of material. The art of a creative practitioner is therefore to respond to what is generated, to be open to view things from different perspectives in response to the agency of the data or its electronic augmentation through digital tools. This is a process-led form of design-oriented research that engages the body and the brain, Matt Ratto calls it ‘critical making’ – a process of making the abstract realm of



Figure 5. Tricia Flanagan TETE (Tree Energy Translator Empath) ©Flanagan2022

concepts tangible to foster connections between the corporeal body and cognitive knowledge [33]. Through new and old art and craft processes post-craftwork possibilities and artefacts are emerging.

Data as Co-creator

Human ecology is closely enmeshed with other entities, acknowledging this already blurs the hegemonic borders of anthropocentrism. Co-design, co-crafting and co-production with more-than-human agencies alter biopolitics as they operate with consideration of the enmeshed networks between technologies and interspecies relationships, in doing so opening new knowledge systems as alternatives to the current capitalist mode that dominates design practice [34].

Speculative scenarios based on more-than-human futures are mapping alternative pathways. Nonhumans partake in these processes by way of doing and acting [35]. For example, through participatory design methodology, Ida Nilstad Pettersen proposed the tree as a method and frame to consider social and technological urban ecosystems [36]. Emilija Veselova and Idil Gaziulusoy believe we must urgently respond to the needs of other entities due to the critical unsustainability of our socio/technical/ecological systems and propose a bio-inclusive ethical framework for design [37]. They highlight the need to employ multidimensional mental models to be open to who or what to include as potential stakeholders when designing for sustainability [38].

Artist Tricia Flanagan creates speculative wearables and cultural probes to glean data about ecological biodiversity. By augmenting trees with wearable technologies, she creates communication devices which map and visualise biological systems, for example listening deeply to signals from trees to consider and reflect on what they may tell us. The

wisdom of trees often encompasses many human lifespans, so perhaps we may learn something by deep listening on country. Flanagan traces the electro-chemical signals from trees and visualises this communication as light patterns that flicker across a garment (FIG. 5). Data that is gleaned from the natural world can in essence reconnect us to the vitalism of natural systems and do so in ways that go beyond biomimicry. Data can open perspectives into different timescales and different visual spectrums, going beyond the sensing capacities of the human. In this way, we can work to develop empathetic relationships with materials and foster kinship with country. Of course, it is very difficult for us to experience the world from perspectives beyond human capacity, for example, timescales very much slower than the ones we live in, or ones that come head long into conflict with our notions of our self – based on cartesian or dualistic ideas that see the self as an individual and nature as something other. Dualist conceptions of nature are no longer useful. It is only productive to consider matters of complexity where fundamentally there is no separation between meaning-making and the mechanical. “The future is one of continued meaning-making by natural beings within the natural world, involving the necessary acquisition, or creation, of new knowledge, with respect to a biophysical stock that is finite” [39].

Media theorist Marshall McLuhan predicted that the effect of electric technology on the ‘literate West’ was to nullify the distance between the ‘fragmented westerner’ and all the ancient oral cultures on earth [40]. Sixty years later indigenous relationalities, [41] with complex oral patterns and networks of kinship and interdependence, are being listened to with a renewed sense of urgency. In a workshop exploring ways to listen and converse with materials Pedro Vieira de Oliveira offered a fresh perspective as a voice from the

'global south'. He proposed Sonic Fictional Design, as 'design from the ear view' and a way of relating to materials from a decolonialised perspective [42]. Culture once estranged us from nature, but art and nature have always been connected, [43] and we are now going back to it.

Object as Data Visualisation

The process of materialisation transforms immaterial entities into tangible forms or physical manifestations [44]. So, what is the role of the artefacts that are generated through this process of collaboration with data? Sigitas Guzauskas compared semiotic analysis and data visualisation, by mapping the natural phenomena of rainfall. Attempts were made to represent the rich sensual experience of rain by reinstating what was abandoned when the rain was codified into mathematical data. The results were the creation of a living moss map and its life support structure of a light and water system, and a 2D map featuring abstract graphic design [45]. Data visualisation through material artefacts record and hold the moment in time. They are like archaeological finds for the future. "Art is an emotional memory of the world" [46]. The vitality of craft embodies the human ideal to live a poetic life, through both the beauty of nature and the spiritual rhythm originating in the relational engagement with materials [47].



Figure 2 igure 6. Jingwen Yuan, Decoding: Selected Poems of Du Fu (1/2), ©Yuan 2021

Artist Jingwen Yuan transforms data patterns gleaned from analysis of ancient Chinese poetry into jewellery crafted from titanium, pure-silver and steel (FIG. 6). In the work the information entropy formula is used to map the difference between ancient and modern Chinese versions of the poems. The patterns that emerge are laser etched on titanium plate. Materialising data in artworks can create aesthetic experiences that reveal new knowledge and alternative insights, communicating directly through somaesthetics. Encoded data in artefacts act as effective knowledge carriers, making meaning within variable contexts and with various social agents. Recipients engage with knowledge and insights, as

accumulated or slowly emerging, but far less instrumental in manner than raw data [48]. Digital technology appears to be 'dematerialising' the world, yet after the digital the re-materialisation of the digital ecology of place through post-craftwork might serve to illuminate and amplify the patterns and rhythms that connect us with the material world. Could this be read as a revolutionary praxis, a way to reveal our kinship with other agents and a reversal of process of dematerialisation that had us believe in mind over matter? Technologies that engage with relational engagement have existed prior to electronic technologies, think of American Indian Wampum as Hypertext [49], Aztec codex rhetorics [50], and Inka Khipu as binary compositions and memory aids [51]. Data visualisation in the material form of "textiles serve as a medium for storing, connecting, and coding data" [52], as means to communicate information from the maker to the receiver. Our stumbling block appears to be an unwillingness to accept the agency of technologies with affect, that would enable symbiotic relationships to evolve, rather we enslave them to work for us.

Conclusion

Current institutionalised ways of understanding the world rationalise its complexity and degrade the rich ensemble of technological, sociological, and biological ecologies that support being in the world. Re-materialising technological data comes as a kind of reversal by enriching potential relations and entanglements. In terms of non-static manifestations, this represents a paradigm shift to new forms of vivacious craft materials to design with. Technology augments our capacity to sense the world at macro and molecular levels, enabling engagement with materials traditionally considered dormant and stable to be felt and conceived in vibrant new ways [53]. As the blending of bio, technical and social spheres intermingle, it is easy to perceive how technologies can be understood as life forms [54]. Blurring lines between digital and material, being and making, happen in simultaneity as co-existent and co-constituting in the Everywhen phenomenon [55]. Human connection to the technology of craft – the sentimentalism of tradition and the free will of post-industrial – share similar tropes in their concern for human physical and mental restoration and their desire for a return to a plain and pure life [56]. The potential of electronic data, including artificial intelligence, to expand and augment our connection with the ecology of others, offers hope to develop meaningful connection for futures of sustainment.

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