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To cite this article: Merete Lie (2022): New techno-natures: the future of human reproduction in sci-art, Science as Culture, DOI: [10.1080/09505431.2022.2141106](https://doi.org/10.1080/09505431.2022.2141106)

To link to this article: <https://doi.org/10.1080/09505431.2022.2141106>



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Published online: 04 Nov 2022.



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# New techno-natures: the future of human reproduction in sci-art

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## ABSTRACT

In the fields of sci-art, bioart and speculative design, contemporary artists are creating experiential visions of the future based on trends within science. Two artworks with futuristic figurations of human reproduction, Pinar Yoldas' *Designer Babies* and Ai Hasegawa's *I Wanna Deliver a Dolphin/I Wanna Deliver a Shark*, serve as the point of departure for revisiting the eternal nature-culture debate. Hasegawa's work explores relations to other species in the radical figuration of humans giving birth to sharks and dolphins. Yoldas plays with the notion of bioscientists as playing God, giving genetically modified progeny god-like features, while critically showcasing the potential of genetic engineering. Contemporary sci-art stages experiments and encounters of technoscience and human biology, thus experiments with the very 'facts of life'. These sci-art works involve critical perspectives on the technoscience of assisted reproduction including surrogacy and genetic engineering. Still, they configure nature not as threatened but as dynamic, responsive, and continually undergoing change. By expanding the perspective on human reproduction through surprising and mind-expanding figurations, they address emerging technologies as a shift to new techno-natures, entailing the ongoing merging of natural biological processes with emerging biotechnologies.

## KEYWORDS

Sci-art; bioart; speculative design; assisted reproduction; naturecultures; techno-natures

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## Introduction



**Figure 1.** Ai Hasegawa, from *I Wanna Deliver a Shark*. (Reproduced by permission of the artist).

This project approaches the problem of human reproduction in an age of over-population and environmental crisis. With potential food shortages and a population of nearly nine billion people, would a new mother consider incubating and giving birth to an endangered species such as a shark, tuna or dolphin? This project introduces a new argument for giving birth to our food to satisfy our demands for nutrition and childbirth and discusses some of the technical details of how that might be possible. (Ai Hasegawa)<sup>1</sup>

Recent developments in biotechnology are matters of concern and debate, but there are more than scientific answers to the future of emerging biotechnologies, such as assisted reproduction. Artists are reworking the past and present and refiguring the scopes of the future. The Japanese artist Ai Hasegawa creates new visions of human reproduction by reframing questions that have surfaced in the wake of assisted reproductive technologies (ARTs). Her projects trigger imaginations of alternative futures, in this case by exploring humans' relationship to technology and their capacity to save endangered species (Figure 1).

STS has for long challenged the ontological divide of nature and culture with proponents arguing in favour of the neologism of naturecultures, thereby renouncing the idea of a pure nature distinct from human culture (Haraway, 1991, 2008, 2016; Latour, 1993, 2004). Emerging biotechnologies most clearly bring to light how technologies blend in with human life processes, including the basic process of human reproduction. While ARTs have radically changed the process of human reproduction and triggered new perceptions

of the nature-culture distinction, the procedures used in fertility clinics are framed as providing a helping hand to natural processes while their technoscientific aspect is downplayed (Thompson, 2005). Thompson calls this *strategic naturalisation*, acknowledging reproductive medicine as simply an assistance to nature's natural functioning. In the analyses of the practices of bioartists, with a little twist, the term employed here is *strategic de-naturalisation*, pointing to ways in which bioartists are picking up trends within reproductive science and using strategies of twisting, turning and de-familiarizing to help us see them anew.

Still, while STS and cultural studies point to ways in which emerging biotechnologies destabilise the nature-culture distinction, what is traditionally perceived as nature still functions as a model for people's understanding of new technologies of reproduction (Thompson, 2005). It is not easy to grasp and conceptualise such radical changes in human biology, particularly when the most powerful biotechnologies appear as utterly abstract. Genetics, for example, is expressed as codes that operate on a microscopic level invisible to the human eye and on a nearly unimaginable scale. We may then turn to works of art because they allow communication on another scale than science communication, literally on a human scale, using a phrasing familiar to anthropology (Barth, 1978). Artists create material artefacts or other forms of visual representation that are concrete and appear to spectators on an imaginable scale.

Within the field of sci-art, artists are creating experiential visions of the future based on the possibilities opened by ARTs. Sci-art is a broad category that along with bioart and speculative design address novel technoscience and often adopt science practices to aesthetic ends. The work depicted above, *I Wanna Deliver a Shark*, is an example of speculative design. Artwork of speculative design takes technoscience as the point of departure for imaginations of new futures, whether in the form of material sculpture or web design. Sci-art more generally, may produce visions of the future through shock effect or, maybe equally as effective thanks to slight modifications in advanced technoscience that is already familiar. Paraphrasing social anthropologist Levi-Strauss (1963), the following analysis of sci-art is based on the proposal that sci-art works are 'good to think' and, moreover, illustrate the STS maxim that 'it could always be otherwise' (Bijker and Law, 1992).

The works of art chosen for analysis are Pinar Yoldas' *Designer Babies* and Ai Hasegawa's *I Wanna Deliver a Dolphin* and *I Wanna Deliver a Shark*. They have been selected on the basis of their radically challenging perceptions of human reproduction as a natural event. As such, they make an interesting point of departure to reconceptualize biotechnology's relation to what was generally perceived as natural biological processes. De-naturalisation, such as a shark embryo in a human womb or a fantasy embryo of genetic modification, means radically questioning what is natural about human reproduction, leading to the impossible question of the nature of the natural in present day.

The analysis will focus on the ways in which the selected works present human reproduction, as a mystery, a wonder, or as scary or threatening. It also looks at how they play with technoscience against the bio-natural in perceptions of human reproduction. This leads to the following questions: in which ways does the art of speculative futures critically question new technoscience in human reproduction? By creating surprising and unknown techno-futures, how does this art address the notion of nature – will they just leave the notion of the natural behind or let it reappear in new shapes?

The strength of art is its posing of novel perspectives on the taken-for-granted and its triggering of new questions. The aim of the analysis is to explore the artists' creations of speculative futures in order to follow their aim of opening the mind to new perspectives on techno-futures and techno-natures.

What follows is a brief inventory of questions regarding the future of human reproduction and an account of how I found my own way into the intersection of reproduction and art. Then comes an overview of some concepts related to sci-art, bioart and speculative design. The analytical strategy that follows is grounded in Western culture's nature–culture distinction as it has surfaced in the literature on assisted reproduction in STS and feminist studies. Other useful concepts in the study of bioart and speculative design are the notions of imaginations and potentiality. The analyses will be summed up in the conclusion and feed into a discussion of what bioart and speculative design may contribute to opening the mind to alternative futures. The tentative answer to the questions is that the artworks contribute with critique but first and foremost with new perspectives that bridge nature-culture gaps and project what may be termed 'techno-natures'.

### **Science futures/art futures**

The future of human reproduction is uncertain. In Europe, concerns have emerged over low birth rates, while on a global scale, worries about overpopulation and lack of resources continue to surface. Still, there is a common perception of parenthood as a stage in the life course, ensuring continuity between generations and serving as an image of stability (Ellingsæter *et al.*, 2013). At present, most suitable to describe the situation is the notion of stratified reproduction whereby some groups of people are empowered to reproduce, and others disempowered (Colen in Ginsburg and Rapp, 1995). In affluent Northern countries where this study is situated, public discourse circulates ideas about the failure of human reproduction while raising a red flag about overpopulation elsewhere due to higher birthrates in the South.

There are also worries about the increasing demands for assisted reproduction. In this context, emerging biotechnologies feed uncertainty as to the biological future of humankind but paradoxically also belief in new diagnostic

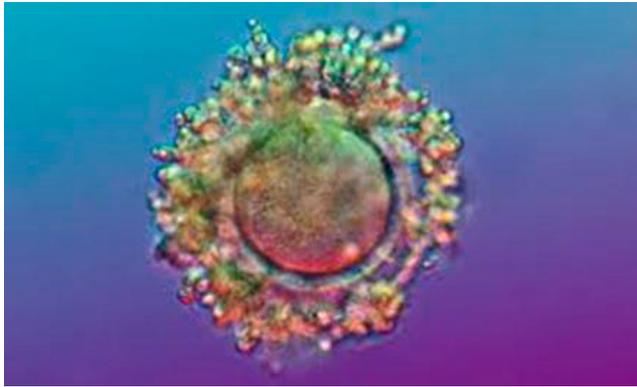
tools and cures. Science news speaks of novel developments in assisted reproduction: from IVF to ICSI, surrogacy, mitochondrial transfer with ‘three parents’, embryo donation with ‘four parents’, and egg freezing in order to delay childbearing (e.g. Franklin, 2013; Lie and Lykke, 2017; Waldby, 2019).

With the title *After Nature*, Marilyn Strathern (1992) claimed that new reproductive technologies were shaking the ontological status of nature, and consequently of what for humans is basic and undisputable. Cloning, gene editing, reprogramming of cells for the production of stem cells – these are examples of new biotechnologies that undermine the idea of human bodies and reproduction as products of nature (Franklin *et al.*, 2000; Landecker, 2007; Rose, 2007). Latour (1993) has noted how nature remains mobilisable in human efforts to maintain a divide between nature and culture. Franklin (2013) agrees to such flexibility in order to grapple with change but proposes the notion of ‘biological relativity’ to denote how people respond to the changes brought on by ARTs. Moreover, Landecker (2007) concludes from her research on tissue culturing, that is, the growing of living cells outside of live bodies, that biotechnology has changed what it means to be human in the radical sense that biology has become technology. This is exactly what has followed from the development of reproductive technologies whereby gametes, tissue and stem cells have become technologies for research, including methods for ‘making life’ such as synthetic life, digital life and bioengineering (Mackenzie *et al.*, 2013). This calls for novel ways for mobilising public attention, challenging science stories and asking new questions. Within societies that increasingly see all aspects of illness or dysfunctions of the body as foreseeable and/or curable, bioart may function as one way to explore the fragility of the body. Art is, in contrast to science, a way of exploring what is not (yet) there and what one (still) does not possess knowledge about.

My interest in bioart stems from studies of ARTs related to medical imaging technologies facilitating the merging of gametes outside of the body (Lie, 2012, 2015). The development of medical imaging technologies has resulted in the creation of new means to visualise the body’s interior (e.g. Treidler *et al.*, 1998; van Dijck, 2005), which is now accessible to the eye on a molecular scale. Images of this scale have become available to the public in high resolution and bright colours. My research on ARTs led me to a fascination with images of egg and sperm cells that proliferate in the media and the thin line between science and art.

Medical images, like this one by gynecologist and photographer Yorgos Nikas, are reworked for popular science and commercial image galleries. Artists have also taken up the reworking of gamete images, such as *Untitled (sperm)* by Kiki Smith<sup>2</sup> and *fluids, frozen sperm ii* by andres serrano.<sup>3</sup>

There are many reasons for a fascination with cell imaging: the power associated with gazing into the habitually unseen and into the beginning of life is palpable. The aesthetics of presentations like the one below (Figure 2),



**Figure 2.** A human egg at ovulation. Photo: Yorgos Nikas. (Reproduced by permission of the artist).

enhanced with glow and colour, are a result of a meticulous process beginning with the harvesting of samples and ending with image editing. The work behind this end product is, however, seldom presented.<sup>4</sup> The image of the human egg cell presented here is a result of a lengthy preparation of the sample followed by the use of photo editing techniques bringing out a perfect circular shape. The use of contrasting colours and the pearl-like appearance of the corona radiata draw attention to the mystery and beauty of an egg cell. Moreover, depicting it as a singular cell independent of a human body indicates new possibilities for human reproduction by suggesting that all you need are two gametes.<sup>5</sup> All reference to reproduction is imbued with a potentiality that adds to the wonder communicated by such an image. The mystery and beauty of cell images triggered a wondering of how artists have worked with gametes, genetics, and prospects of reproduction.

The interplay between science and art can be seen throughout history in collaboration between artists, art theorists and scientists (e.g. Galison and Jones, 1998; Anker and Nelkin, 2003). For centuries, scientists and artists have used the same technologies and even borrowed from one another in the wake of advancements in either field. The development of perspectival drawing, geometry and photography are notable examples (Kemp, 2006). Today, sci-art and bioart work with questions posed by new developments within technoscience. Sci-art is a broad term that encompasses art that engages with developments in science, aiming at enlightening and questioning normative ways of thinking and possible outcomes, for instance, by creating scenarios of scary futures, alternative futures, or twisting and turning of so-called 'science as usual'. Many artists are working in collaboration with scientists, and often across the fields of sci-art, bioart and speculative design (e.g. Calvert and Schyfter, 2017).

The term bioart generally refers to artists practising in laboratories who work with biological material (Reichle, 2009; Mitchell, 2010). Bioartists work with emerging biotechnology as a generator of possible cultural expressions. By engaging

directly with living biological material, bioartists often aim to trigger embodied experiences from the audience. The bioart lab founded by Suzanne Anker in 2011, has attracted various art students who have the opportunity to work with live as well as preserved specimens and use technologies like microscopes, incubators and a 3D bioprinter.<sup>6</sup> An example of bioart that attracted much attention is the glowing rabbit *Alba* by Edouardo Kac: “GFP Bunny” is a transgenic artwork that comprises the creation of a green fluorescent rabbit (“Alba”), the public dialogue generated by the project, and the social integration of the rabbit.<sup>7</sup> The rabbit, which glows phosphorus green, has been called into question as it is thought to be the result of actual genetic modification but more importantly, it spurred ethical debates around creating art that involves the genetic modification of living organisms to create living artwork.<sup>8</sup> The bioart lab *SymbioticA*, run by Oron Catts and Ionat Zurr, states the following aim: ‘With an emphasis on experiential practice, *SymbioticA* encourages better understanding and articulation of cultural ideas around scientific knowledge and informs critique of the ethical and cultural issues of life manipulation.’<sup>9</sup> This emphasis on raising critical questions through art is also emphasised by da Costa and Philip, who coined the term *Tactical Biopolitics*, situating such practices at the intersection of art, activism, and technoscience (da Costa and Philip, 2008).

As for speculative design, live biological material is not involved, and artists engage with the future through speculative design objects and/or computer designs. According to Auger (2013), one strategy is to use available technology but different ideologies, thus shaping designs that are seemingly familiar. The designer may for instance look for unnoticed details in the mundane and ordinary as a means of forging a link between the familiar and the uncanny, which designer and artist Pinar Yoldas does effectively through the use of exaggeration. The aim is to create something that opens the mind to the extraordinary – such as a shark foetus in a human womb – an example that connects to the available technology of surrogacy but sends the audience off towards an unknown future.

### ***De-naturalisation***

I love this Alan Kay quote, “if you want to predict the future, you have to invent it.” I invent futurities and to narrate them I take the position of a storyteller using a diverse spectrum of media. Today we need creativity and imagination more than any other time in our known history. (Pinar Yoldas)<sup>10</sup>

In the quote, imagination is presented as a creative tool to explore the future. Jasanoff’s (2015) concept of sociotechnical imaginaries designates imaginaries as collective achievements. They are visionary but also build on cultural traditions, embedding the imaginaries in the past and on tacit assumptions, in processes of collective sense making. Art works may, however, transcend the culturally accepted and display visions opening the mind up to the unexpected. The artwork presented here inscribes visions of the future into shared meaning

making. In the one case, this concerns culturally specific but also shared associations to animals, and in the other case Greek deities of the past.

The notion of potentiality is key to understanding visions of the future of reproduction (Martin 2013; Taussig *et al.*, 2013). Emerging biotechnologies are in their essence potentialities, seemingly limitless and hardly foreseeable, much like the potential of gametes to create new life. Discussing potentiality as a (potential) analytic concept, Taussig *et al.* (2013) argue that in studies of emerging technologies, potential can be studied not only as a quality but also as a prism for understanding. They trace its root to the Latin *potens*, referring to power and force, thus suggesting that emerging technologies inhabit a potential force to disrupt traditional categories and distinctions.

Established cultural distinctions dividing biology from technology, and in basic terms, nature from culture, have for long been challenged in STS (Latour, 1993, 2004) and feminist theories (e.g. from Ortner, 1974, to Butler, 1990, and onwards). Associated to the pair nature and culture are dichotomies such as male and female, body and mind. Haraway's original take on the issue of dichotomies is not only show that the traditional divisions have been made and therefore can be broken down but, as Latimer (2017) says, to also shift attention and ways of thinking them; in other words, to acknowledge their connectivity to enable a re-thinking or a re-inventing. Naturecultures is a neologism bridging the ontological divide between nature and culture (Latour, 2004; Haraway, 2008). It renounces the idea of a pure nature, displacing it with a relational understanding whereby what is understood as a natural phenomenon is a result of ongoing purification processes for establishing and retaining categories that distinguish human from non-human. The notion of naturecultures denounces such a human-centric perspective and replaces it with an understanding of humans in vital relationships with other live species and including technologies as part of what it means to be human.

Human reproduction has for long been associated as 'the most natural of all' and, as mentioned, Thompson (2005) shows how ARTs have been followed up by a re-naturalisation strategy in the fertility clinics. What was earlier referred to as strategic naturalisation means explaining technoscientific phenomena and procedures, such as ARTs, in a biological idiom with the effect that it appears as simply normal and unproblematic (Thompson, 2005). Here, the notion of strategic de-naturalisation denotes leaving traditional natural and biological idioms behind and instead give one's imagination free rein in what nature can do and be.

Figuration is a method Donna Haraway uses for re-inventions that disturb science-as-usual and the idea of development as defining progress. Her figures are material-semiotic creations: the human-technology cyborg and human-animal in the notion companion species (Haraway, 1991, 2008). Haraway's well-known figure of the cyborg acknowledges technologies as a possible means towards a new politics of gender, reproduction, and race (Haraway, 2016). The potential for change in new technologies has similarly driven the artwork to be analysed here.

In their speculative futures of human reproduction, Hasegawa's works re-unite humans and animals whereas Yoldas manipulates a core symbol in western culture, namely the Greek deities. The deities symbolise the beautiful and the beastly and serve as recognisable expressions of the desirable over despicable features and characters. As with animals, some may evoke feelings of closeness and familiarity, others danger and distance but both are shared cultural symbols upon which imaginative futures may be built. The following section will present ways in which these artists are working with figurations of the future of reproduction, at once re-calling established cultural symbols and reworking them by associating them to new technologies. In the following, works of art will be studied as figurations materialising imaginations of potentialities in reproduction.

### **Pinar Yoldas: *Designer Babies***

Pinar Yoldas is a multidisciplinary designer/artist/researcher who teaches visual arts at University of California-San Diego (UCSD). Her educational background is in the fields of science, architecture, and art. Her works of art bring several concepts and academic fields into conversation: ecosystems, the Anthropocene, and feminist technoscience, configured in a variety of media. *Designer Babies* features nine small 3D-printed sculptures, one for each month of pregnancy, and their various qualities are modelled after Greek deities. The point of departure concerns the possibility of genetic engineering,<sup>11</sup> which begs the question as to what constitutes the most desirable qualities for human beings?

The *Designer Babies* project (2013–) is grounded in early debates concerning assisted reproduction, which was viewed by some as tampering with nature. An example of an early volume of cultural studies of assisted reproduction was entitled *Babies in Bottles* (Squier, 1994). This was a popular term for IVF babies, along with so-called test-tube babies, a term that evokes scientists creating babies in laboratories. Squier identified many fanciful depictions of babies in bottles during the early stages when ARTs were introduced and while popular expressions in the debate were 'experimenting with nature' and 'playing God'.

The artist Suzanne Anker reminds us that there were already, and still are, an abundance of babies in bottles. These are the embryos and stillborn babies used by science and preserved in the medical museums. The photos of [Figure 3](#) were taken at the Vrolijk Museum in Amsterdam where they have served as educational material but simultaneously stimulated spectacular wonder (Anker, 2017).

The Water Babies series serves as a reminder that studying life processes and experimenting with life are old-established activities. Human reproduction has been a mystery hidden within the body and medical scientists have been working to uncover the mystery and study the development of the fetus. During the last century, the stages of cell maturation, conception and growth of the embryo have been identified and visualised to the public thanks to new techniques of microscopy, photography, preparation and colouring.<sup>12</sup>



*Suzanne Anker*  
*Water Babies Series* (2004)  
12 inkjet prints on watercolor paper, 96 x  
110" (24 x 36" each)

**Figure 3.** Suzanne Anker, from *Water Babies Series*. (Reproduced by permission of the artist).

Uncovering the mysteries of nature has run parallel to biotechnical achievements for altering the process of conception, by IVF and other methods, and new technologies of surveillance and treatments of the embryo. Within the field of assisted reproduction, genetics is an emerging field both as basic and clinical research. This includes PGD (pre-implantation genetic diagnosis) meaning that with IVF treatment, embryos may be tested before they are inserted in the womb. A more radical step is to follow up with genetic modification, a step that points towards the gloomy notion of designer babies with qualities such as looks, intelligence and future health risks ‘on demand’.



**Figure 4.** Pinar Yoldas: *Designer Babies*. (Reproduced by permission of the artist).

	<i>Hermes</i>	<i>Artemis</i>	<i>Aphrodite</i>	<i>Calculus</i>	<i>Iliad</i>	<i>Athena</i>	<i>Kronos</i>	<i>Kassandra</i>	<i>Acon Borca</i>
BIRTHDATE	2022	2039	2037	2042	2037	2030	2030	2030	2028
BIRTHPLACE	CAYMAN ISLANDS	PORTLAND	LOS ANGELES	NORTH CAROLINA	BERLIN/GERMANY	FLORENCE/ITALY	DUKE UNIVERSITY HOSPITAL	ANN ARBOR/MICHIGAN	BEIJING/CHINA
PARENTS	Shared heritage: 7 RICHEST FAMILIES COMBINED	NIKE CORPORATION	HEATHER AND JENNIFER (ALIST HOLLYWOOD ACTRESSES)	PHYSICIST & MUSICIAN	CLASSIFIED	DANIELA SCIBELLI	CLASSIFIED (DARPA)	DR. ALBERT & DR. ADRIAN (FOUNDERS)	MORTAL PARENTS
DISTINCTIVE QUALITIES	HEIR TO 7 FAMILIES	ATHELETE/ WARRIOR	BEAUTY	MATH, MUSIC	LANGUAGE	DEXTERITY, SURGEON, PINAIST, PAINTER, MASTER OF TOUCH	PERCEPTUAL TIME WARPING	EMPATHY, CLAIRVOYANCE	LONGEVITY
GENES	GONADS FROM HIS 7 PARENTS	HMG2 /GDF5- UGCC/ FTO/DRD4	SLC24A5/MFSD12/H ERC2/HRF4/PAX3/F OWL2/GDF5- UGCC/MC1R/HMG2/ MC1R/HMG2/	?	FOXP2	HMG2	APOE FOMO IGF-1 P13KSLC24A5/MFSD12/HERC2/HRF4/PAX3/FOXL2	FOXO IGF-1 HMG2	APOE FOXO IGF-1 P13K
SANCTUARIES	PALACE, RICHES	FOREST/OUTDOORS	HOTEL ROOM	ABSTRACT SPACE,TRON	LIBRARY	PANTHEON	GALAXY	DARK WATER	REDWOOD TREE
SYMBOLS	WINGS	DEER/ BOW	PEACOCK/ ORCHID	DODECAHEDRON	DICTIONARY	OLIVE TREE, OWL	TRILOBITE	CRYSTAL BALL	GINGKO LEAF
									

**Figure 5.** Pinar Yoldas: Designer Babies. Chart. (Reproduced by permission of the artist).

Yoldas' figurations of designer babies have been put on display for the public in many places and in different versions, below (Figure 4) taking the form of babies in bottles. The sculptures, 3D-printed models, are based on the individual characteristics of Greek deities, what may be interpreted as a humorous reference to playing God with ARTs and genetics. Each one of the deities, Aphrodite, Artemis, and Kassandra, symbolise certain qualities worshipped by humans. Yoldas explains that the creation of deities is based in her own childhood where she grew up surrounded by ancient Greek ruins: 'As an Aegean I wanted to bring back these stories in a new form, which embraces the latest advancements in biotechnology.'<sup>13</sup>

Each one of the deities has been designed to match the traits of a particular god or goddess. The chart (Figure 5) displays the projected birthdate for the babies, where they will be born, and their highly varied, but human, parentage. They all have an ID chart telling which genes have been edited to enhance each one's distinctive qualities. The overarching themes for enhancement are defined as time, talent and power, leaving to the spectator to ponder how these are working together or struggling against each other. The actual genetic enhancement of individual deities affects qualities such as beauty, fitness, empathy, memory, intelligence and popularity. But, according to Yoldas, the vital questions remain: What are the qualities that we all collectively desire? And why?<sup>14</sup> Which traits would prospective parents yearn to improve for their progeny? If one could in fact choose desirable qualities, isn't this an impossible choice? Does it include, or influence factors such as happiness and a good life?

Yoldas' designer babies configure potentialities of progress and improvement by enhancing human qualities that are generally acknowledged as positive ones, such as beauty, fitness, and intelligence, all associated to the figure of Artemis (Figure 6). The design of most of the babies is, however, not in accordance with expectations to a good-looking baby. This is so, even in the case of

Afrodite, the goddess of beauty. If height is desirable for instance, and especially a long neck, still the figuration of HiCortex lacks the qualities of beauty and fitness. Through the strategic de-naturalization of a *test tube baby*, partly by the simple trick of exaggeration, Yoldas aims to make the audience question the qualities that people only superficially agree upon. Re-designing a baby according to certain norms of beauty is a strategy for questioning what beauty means as well as potential future resources for achieving its standards (Figure 7).

Dreams of perfection are addressed in science by promises of new cures and longevity. Sci-art practices include meddling with futuristic dreams of a perfect body for instance by creating techno-freaks and -monsters (Orning, 2017). Examples of this are works by Patricia Piccinnini whose creations in silicone are depictions of humans in close relationship with hybrids and other



**Figure 6.** Pinar Yoldas: Designer Babies. Artemis. (Reproduced by permission of the artist).



**Figure 7.** Pinar Yoldas: Designer Babies. HiCortex. (Reproduced by permission of the artist).

monstrous inventions.<sup>15</sup> Piccinnini's particular take on this is the benevolent image of monsters and hybrids, inviting the audience to make friends with these new creatures. Similarly, Yoldas' divine babies in test tubes might appear as scary monsters but rather address the audience as fragile beings in need of care to survive.

Designer babies and test tube babies are terms that point towards the potential consequences of meddling with naturally attributed human qualities and 'playing God' with the *potens* of genetic engineering. In Yoldas's version, she is playing with gods, whereby genetic engineering associates to the opening of Pandora's box. Her figures are designed according to criteria that are generally considered to be positive and reflect common desires. A twist is enacted by strategic de-naturalisation, creating babies that are 'too much of a good thing'. Yoldas employs de-naturalising effects, in the sense that human qualities are focused, singular and exaggerated for each individual. Within a western cultural heritage, the Greek deities serve as cultural symbols of human nature, reflecting human features as well as human ideals and morals. The cultural symbols of gods and goddesses illuminate human qualities that are not hampered by natural constraints – they exceed them, thus reflecting human desire for enhancement. The deities are figurations reflecting both the human desire for, as well as the potential to achieve, enhancement of physical features and human qualities, and it says that even the deities may go wrong in these matters.

### ***Ai Hasegawa: same sex and cross-species procreation***

The Japanese artist Ai Hasegawa has produced several works of art experimenting with new ideas of procreation, inspired by novel technoscience and often created in cooperation with scientists. Her figures of speculative design often point to potentialities that may appear scary but the figures are also benign, like Yoldas' deities. The works *I Wanna Deliver a Dolphin* and *I Wanna Deliver a Shark* are figurations that take audiences by surprise and spur novel and unbounded reflections. As an introduction to her work with human reproduction comes first briefly a presentation of two projects dealing with near-to real futures, both aimed at triggering discussions of emerging biotechnologies.

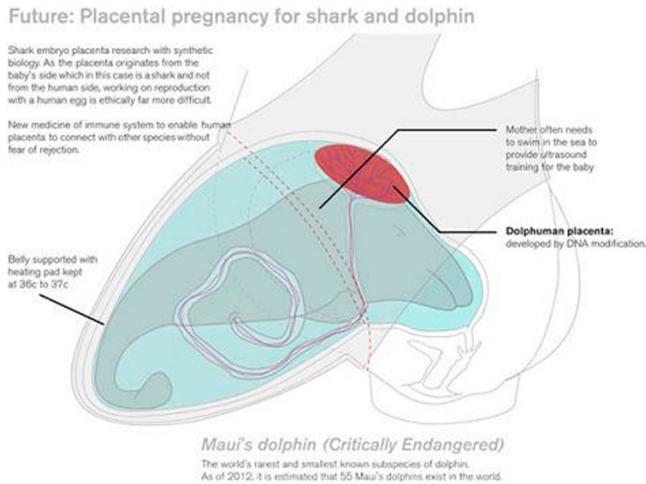
The speculative design projects, *Virgin Birth Simulator* and (IM)POSSIBLE BABY are figurations in video and stills, addressing the technologies of cloning and re-programming of stem cells. *Virgin Birth Simulator* depicts the offspring of a single parent in the shape of a clone of the mother. Cloning is here associated with a static depiction of two identical figures in traditional Japanese outfits, only the mother is taller than the child. In the following project, (IM)POSSIBLE BABY, there are two genetic parents of the same sex. Among same sex couples, a dream scenario might be a future with the possibility to make offspring with their combined genetic inheritance rather than with a 'third partner' for sperm or egg donation.<sup>16</sup> This process would imply

gene editing and reprogramming of gametes or, alternatively, reprogramming of skin cells to stem cells and subsequently to gametes.<sup>17</sup> Hasegawa's project, (IM)POSSIBLE BABY, CASE 01: ASAKO & MORIGA displays a family in an everyday setting, seated around the dinner table. There are two women, one Japanese and one European, and two children, busy with a meal and attentive to one another. On the wall behind them, however, there is something out of the ordinary, namely prints of the four persons' genetic codes and specifications of what this means for bodily characteristics such as height, muscles, obesity, etc. There are several pictures of this family, like ordinary family photos but all the pictures include genetic information in the background. Taking a closer look, the viewer can see that the children differ from the grown-ups in that they are made of silicone. Still, in contrast to the figuration of cloning, with a de-naturalising effect of static and frozen figures, the depictions are lively and project the potential of ordinary everyday life. The project also featured a film on Japanese television following the whole process, a documentary that includes interviews with scientists and the involved couple on the topic of ethical implications.<sup>18</sup>

Hasegawa's projects start from imaginations of biotechnical futures but they work these through in cooperation with scientists, whereby the technical implications are studied in detail. Working closely alongside contemporary science makes her figurations all the more topical for debates around bioscience and modifications in human reproductive processes. Whereas the project (IM)POSSIBLE BABY works with imaginations of possible futures in the context of commonplace everyday life, the artworks *I Wanna Deliver a Dolphin* and *I Wanna Deliver a Shark* are more radical figurations of future human reproduction where women might have the opportunity to gestate across the species barrier.

Ai Hasegawa's *I Wanna Deliver a Dolphin* and *I Wanna Deliver a Shark* are two artworks that display models of a woman's uterus with a dolphin (Figure 8) or shark baby inside (Figure 1). The two works of art have several components including models, charts, videos and meticulous (fake) descriptions of how to adapt processes to the human reproductive system. There are detailed specifications of how to prepare the uterus for receiving and nurturing a foreign species.

The figuration below (Figure 8) depicts a human uterus and includes detailed specifications as to the modifications to be made. These modifications, carried out thanks to methods of synthetic biology, allow for the growth of a dolphin-human placenta by modifying the immune system to prevent the rejection of the placenta. Bioengineering is combined with prescribed activities including swimming in the sea for the ultrasound navigation training of the fetus. The artworks include stills and videos (Figure 9), with an actor giving birth to a dolphin robot under water, and finally, feeding the dolphin baby and sharing its life in the sea.



**Figure 8.** Ai Hasegawa, from *I Wanna Deliver a Dolphin*. (Reproduced by permission of the artist).

The woman giving birth serves as a surrogate but also as a caring mother. The process mimics human reproduction, including a natural birth under water. The birth under water recalls the movement for natural birth outside of hospitals, whereas the specifications for modification of the uterus and placenta recall the procedures of ARTs – specifically the development of gestational surrogacy. Gestational surrogacy means that egg cells from another person are fertilised and implanted in the uterus of the surrogate and her body will be prepared to receive an embryo of different origin, like that of the human surrogate and the dolphin embryo. In the work, the surrogate mother and progeny emerge as two nearly unchanged species, human and animal.



**Figure 9.** From Ai Hasegawa: *I Wanna Deliver a Dolphin*. Still from video. (Reproduced by permission of the artist).

Hasagawa's work explores the unbounded potential of a female uterus for reproduction, or more precisely, for novel production. This novelty includes the paradoxical combination of addressing two contemporary challenges: a possible future food shortage and the protection of endangered species. One way of addressing the puzzle is by asking if giving birth to an edible animal will give it more value and protection – still acknowledging human activities such as overfishing are the cause for the animal's endangerment. Such paradoxes add even more to the imaginary potentiality of these artworks. Sharks and dolphins are animals that are 'good to think' as metonyms for human qualities. The dolphin symbolises benevolence whereas the shark brings together a strength and courage, or even terror. It leaves the question open as to whether humans will devour the shark or if it will be the other way around, and which way will serve to protect the endangered species.

Animals used to serve as models for original, natural ways of life and were displayed in museums as figurations of natural family life and sexual reproduction (Haraway, 1989). The combination of human, animal and technology in Hasegawa's work creates a figuration that bridges conceptualisations of nature-culture and of humans and other live beings. Hasegawa addresses the link to non-humans by including both animals and technologies, as Haraway's figuration of the cyborg, most tellingly depicted in the illustration by Lynn Randolf where the animal is connected both to the brain and hands of the human, and both are attached to the computer keyboard.<sup>19</sup> In a similar vein, Hasegawa's work points towards a new notion of nature telling not only about human proximity to other species but also indicating the potentiality of new techno-natures.

Hasegawa's animals evoke feelings both of closeness and danger but more than that, her work may serve more openly as a vehicle for the mind and open for the question of the nature of the natural. It questions the naturalness of human reproduction by de-naturalisation practices, linking reproduction to other cultural categories such as food and prey, addressing food shortage and the extinction of species, and dissolving boundaries of humans, animals and technologies. Her work speaks of the boundless potentialities of reproductive science. Modification of the birth process is presented in terms of contemporary technical procedures, only the process is modified, like the way one speaks of *assisting* reproduction in fertility clinics. Building on acknowledged science and familiar medical practices gives Hasegawa's work a special character. The point of departure is well-established medical science combined with figurations of humans and animals with each species seemingly unaffected by the novel unification.

A first response may be to take these works as irony, but their beauty and meticulousness interpellate the spectator in a serious way. The artist addresses serious themes including overpopulation, food shortage and endangered species, and proposes to solve, or at least help them along, with one solution. The reconfiguration of the familiar with fantasies of bioscience is what results in mind-expanding explorations. *I Wanna Deliver a Dolphin* and *I*

*Wanna Deliver a Shark* strike an extraordinary balance between using strategic de-naturalisation combined with the familiar, by imitating the growth of a fetus inside the womb and a natural birth.

### **Conclusion: future techno-natures**

The argument set forth in this paper is that art may be effectual as sociotechnical imaginaries and vehicles for the mind. The potential and *potens* imbued in particular technosciences surface when they are figured as artifacts, images and videos of seemingly factual (yet fake) products such as genetically modified babies and procedures for cross-species reproduction (Taussig *et al.*, 2013). Sociotechnical imaginaries are visionary but may owe their effect to embedding them in cultural icons of the past and present (Jasanoff, 2015), such as here, with technoscience figurations associated to animals and ancient deities. Sci-art, bioart and speculative design are experimenting with nature, such as here, with prospects of new life-giving processes connected to reproduction. Thus, the artworks question cultural perceptions of natural facts and processes – perceptions of what they are and what they might be.

Returning to the questions asked, firstly, in which ways does this art of speculative futures critically question new technoscience in human reproduction? And secondly, how do these artworks address the notion of nature?

The analytical concept applied in the empirical analysis is de-naturalisation, inspired by Thompson's concept of re-naturalisation to denote practices in assisted reproduction whereby the technical aspects are downplayed and presented as minor assistance to natural processes (Thompson, 2005). Whereas naturalisation implies that procedures appear as self-evident and unproblematic, de-naturalisation is a strategy of breaking the illusion of natural and therefore self-evident processes. De-naturalisation strategies applied in these artworks include the combination of exaggeration and crossing of lines while seemingly following established technical procedures. This implies reversing what STS researchers have pointed out as purification processes whereby cultural categories may remain separated, and most basically, that of nature from culture (Latour, 2004; Haraway, 2008). De-naturalisation practices in these artworks effect a blurring of traditionally distinct categories. Yoldas is experimenting with god-like features in her creations of progeny and thus transgressing the limits of nature in physical body features, as well as blurring the line between the mortal and divine. Hasegawa crosses the border of human and animal by a seemingly easy cross-reproduction assisted by the technologies of surrogacy, and the work plays with the notion of human reproduction as 'the most natural of all' by its display of a natural birth under water and motherly care for the progeny.

The artworks are playful but also critical in the sense of pointing out possibly scary prospects of technoscience novelties of assisted reproductive technologies

and genetic engineering. When Yoldas plays with the notion of bioscientists playing God and give technically modified progeny god-like features, the work is clearly critical to the science she adopts. By including the key symbols of ancient deities the figures also refer to beauty and generosity. But although the sculptures embody both beauty and beastly features, the message remains one of warning. Whereas Yoldas is clearly critical to the dangers of genetic engineering with her figurations of genetically modified progeny, Hasegawa's art is more ambiguous. Her works have a playful and creative rather than critical approach to reproductive technologies. The process of gestation and birth brings seemingly happiness and a successful result and even more, it expands the positive effects by including a concern for endangered species and food shortage.

While students of reproductive technologies tell that we are beyond the notion of a natural body (Oudshoorn, 1994; Franklin, 2013), these artworks are not pointing to the end of nature but rather expanding its meaning. The term of naturecultures referred to earlier, replaces the notion of nature as static and bounded with processual and relational thinking (Haraway, 2016). Hasegawa's work explores such relational approaches to other species in the radical way of giving birth to sharks and dolphins and sharing their way of living in the ocean. Although Yolda's work has a more critical approach to the possibilities of genetic engineering and the notion of designer babies, Yolda says that she wants to give the deities a new form that *embraces* the latest advancements in biotechnology. Thus, the work of both artists point towards a shift to techno-natures, meaning a notion for the ongoing merging of natural biological processes with emerging biotechnologies.

Nature has served as a primary inspiration for art throughout history. Nature is beautified but also deconstructed, as in modernism and surrealism, and sometimes depicted with an alienation effect posing humans in contrast to their surroundings. Contemporary bioart and sci-art experiment with nature and human biology, thus with the very 'facts of life'. An understanding of nature as stable and unchanging may function as an impediment to novel imaginations, except for scary imaginings of nature as threatened. Sci-art and speculative design may, however, configure an understanding of nature as dynamic, responsive, and continually in change.

## Notes

1. <https://aihasegawa.info/i-wanna-deliver-a-shark>, accessed 15.04.2020.
2. [http://www.missomnimedia.com/wp-content/uploads/2010/07/K.Smith5\\_.jpg](http://www.missomnimedia.com/wp-content/uploads/2010/07/K.Smith5_.jpg), accessed 14.09.2020.
3. [http://andresserrano.org/images/series/bodily\\_fluids/Frozen\\_Sperm\\_II@0,3x.jpg](http://andresserrano.org/images/series/bodily_fluids/Frozen_Sperm_II@0,3x.jpg), accessed 14.9.2020.
4. The question of the truth value of science imaging has been a recurring matter of discussion in social studies of science (Lynch and Woolgar, 1990; Coopmans *et al.*, 2014).

5. I have earlier analysed the production of cell images as an act of entification whereby the cells appear as independent bio-entities (Lie, 2012), and how this contributes in the domestication of assisted reproductive technologies (Lie, 2015).
6. <https://bfafinearts.sva.edu/facility/bio-art/>, accessed 06.12.2021.
7. <http://www.ekac.org/transgenicindex.html>, accessed 07.05.2022.
8. <http://www.ekac.org/gfpbunny.html>, accessed 07.12.2021; and Kac, 2007.
9. <https://www.symbiotica.uwa.edu.au/>, accessed 06.12.2021.
10. <http://talkingaboutart.de/nature-cultures-interview-with-pinar-yoldes/>
11. See e.g. Kirksey (2020), on twin babies modified by CRISPR technology.
12. For instance, by the photos of Swedish photographer Lennart Nilsson, from the 1960s onwards.
13. <https://www.dezeen.com/2018/09/28/designer-babies-genetically-modified-istanbul-design-biennial-pinar-yoldas/>, accessed 17.02.2022.
14. Ibid.
15. <https://www.instagram.com/patricia.piccinini/>, accessed 26.01.2022.
16. See e.g. Lie *et al.* (2011).
17. Successful experiments are reported with mice, e.g., BBC News 11.10.2018 <https://www.bbc.com/news/health-45801043>, and ScienceDaily May 2, 2019, accessed 26.01.2022; <https://www.sciencedaily.com/releases/2019/05/190502143437.htm>, accessed 26.01.2022.
18. <https://dspace.mit.edu/handle/1721.1/107564>, accessed 17.02.2022.
19. Front page, Haraway (1991).

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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