

## ABSTRACT

bioDesign is designing with biology. Its implementation is so expansive it reaches from architecture to medicine. Our designs reflect the way we think the world is or how it should be—“Nothing comes without its world, so trying to know those worlds is crucial” [9]. The design choices that we make envision and materialize alternative worlds and possible futures. So, what worlds and futures that bioDesign make?

bioDesign incorporates an ‘ecological’ perspective towards sustainability. Biological systems sustain themselves, but as we make use of them they cannot be neglected, they require care. “[To care is]... a species activity that includes everything that we do to maintain, continue and repair “our world” so that we can live in it as well as possible. That world includes our bodies, our selves, and our environment, all of which we seek to interweave in a complex, life sustaining web” [10].

Feminists are committed to ‘seeing the unseen’ and to ‘care for the neglected’. Feminist thinking, such as situated knowledge and assemblages, can help us (re)consider “what [are we] really caring for, why, and at what cost to whom?” [8]. Feminism provides tools to help us (re)think the worlds that we embed in our bioDesigns, and (re)imagine the bioFutures that we want to inhabit.

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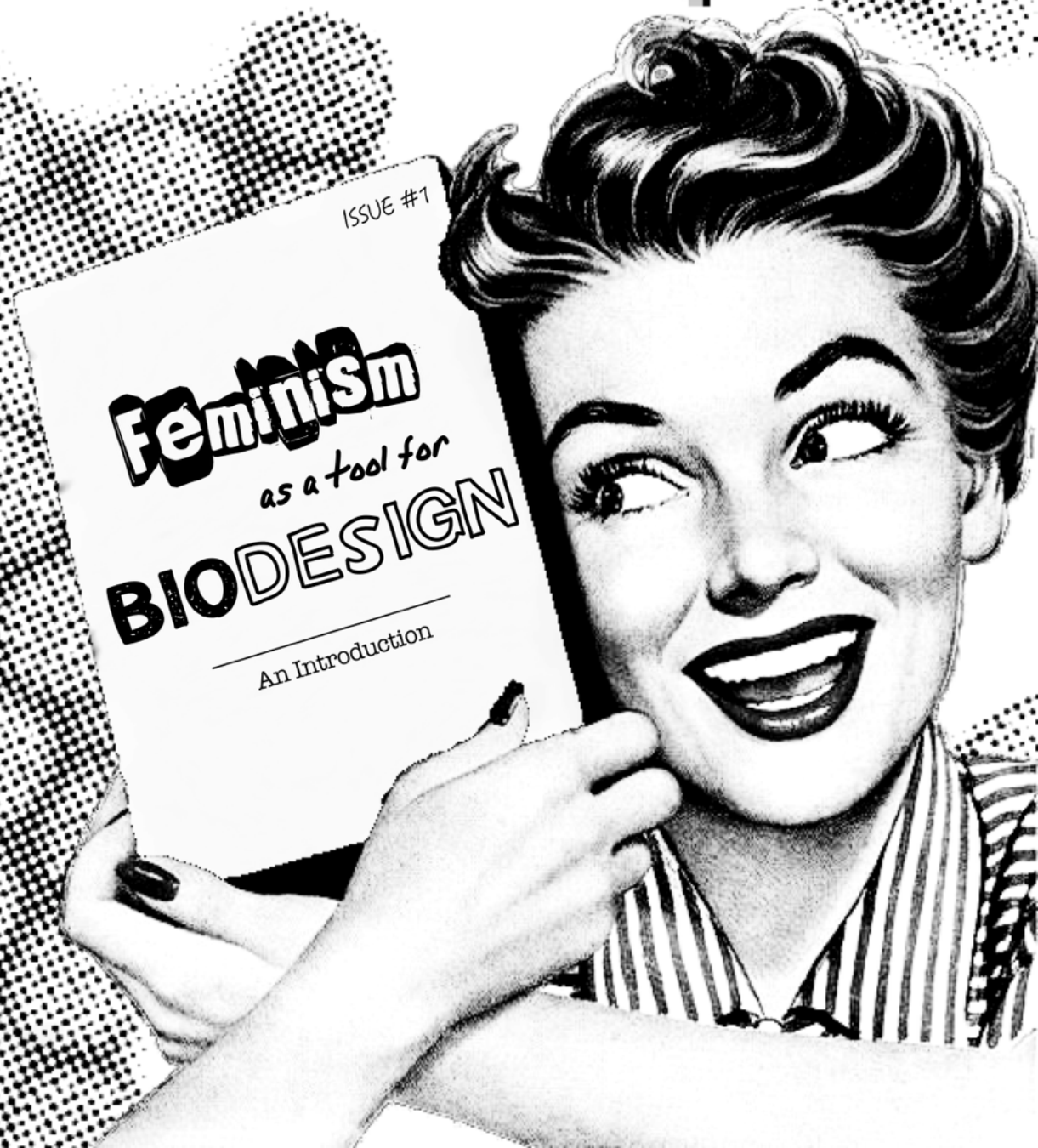
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SMASH THE PATRIARCHY



## BIODESIGN

bioDesign<sup>1</sup> is design with biology. It is capable of envisioning (future) applications of bio(techno)logy. In bioDesign we design bioEntities<sup>2</sup> and design with them; designing their properties, behaviors, and functions<sup>3</sup>. But how do we design with biology? What is design?

Design has been defined in many ways, often as a discipline, a process, or an artefact. I focus on design as the (re)conceptualizations and the making of “new” things. Designs reflect our ideas and intents of how people (should) think and behave and how things should be and for what purpose. Designed artefacts are informed by and intervene in the world. They are influenced by culture, politics, and identity<sup>4</sup>. Our design choices can reproduce or disrupt paradigms in our society. When we design we envision and materialize different realities, alternative worlds, possible futures. Critical approaches to design<sup>5</sup> visibilize the ideologies and assumptions embedded in designed objects, in order to make more informed design choices.

So we ask: What worlds and futures do we make with bioDesign? Will we reproduce the designed worlds of extraction and waste of the Anthropocene<sup>6</sup>? Or will our bioDesigns be

centered on sustainability? Can bioDesign promote an ethic that cares for humans, non-humans, and the environment?

One of the tenants of bioDesign is that concepts such as sustainability will be embedded in bioDesigned artefacts because bioDesign incorporates an ‘ecological’ perspective that recognizes diversity, interdependancy, vulnerability, adaptability, and recyclability [1]. Unlike other matter, bioMatter is part of sustainable systems. The bioMatter we use in bioDesigns requires care to maintain it and keep it healthy. Whether it is our bodies, foods, clothes, shelters, neglect disrupts these systems and others they connect to.

The concepts of ‘neglect’ and ‘care’ have been well studied and developed by feminists. So we turn to feminist theories to rethink the worlds that make and the futures that can be made with bioDesign.

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<sup>1</sup> bioDesign follows “bio[X]”. See bookmark for an incomplete list.

<sup>2</sup> bioEntities can include bioBeings (humans, bacteria, dandelions), bioComponents (genes, muscles, metabolic pathways), or bioMaterials (silk, wood, milk).

<sup>3</sup> Respective examples include to: modify the DNA of apples for draught resistance, train dogs to sense glucose levels in diabetics, and use trees as support pillars for constructions.

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<sup>4</sup> Like, gender, ethnicity, race, class, age, ability, religion, sexuality, and geography.

<sup>5</sup> Approaches like Values in Design, Critical Design, Reflective Design, Critical Engineering, Tactical Media, etc.

<sup>6</sup> The Anthropocene is the current geological time characterized by the alteration of earth systems by human activity (atmospheric, geological, hydrological, biospheric).

## FEMINISM

Feminism recognized ‘women’ as being oppressed and has advocated for equal rights and recognition in all aspects of life. As the concepts of “sex (biology)” and “gender (social)” were deconstructed, feminists asked ‘new’ questions about how the social and natural world are constructed in ways that perpetuate systems of oppression and subordination. Feminist contributions can help us rethink the ideologies and assumptions embedded in bioDesign.

One contribution questions the assumptions inherent in knowledge production. Most societies have produced knowledge from androcentric<sup>7</sup> points of view deemed as ‘natural’ and ‘universal’ at the expense of subjugating standpoints from ‘others’<sup>8</sup>. Feminists recognize knowledge can never be ‘neutral’ or ‘objective’, it is situated in history, ideology, social location; it is always partial. Feminists begin inquiry from neglected perspectives to ‘see’ the assumptions made by the dominant paradigm and generate new knowledge [2,3].

Second contribution. Feminists highlight how androcentric societies value ‘masculinity’ as superior to ‘femininity’ resulting in patriarchal hierarchies. These hierarchies are based on dichotomies; breadwinner/nurturer, rational/emotional, and active/passive. These dualisms are genderized as

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<sup>7</sup> Placing males or masculine interests at the center and presented as the “normal” and “standard” frame of reference.

<sup>8</sup> Othering is the process of classifying people into “us” and “them”. This divide can reinforce and reproduce structures of domination.

<sup>9</sup> See bookmark for an incomplete list of gendered dualisms.

systems of domination and subordination, which extend to other bodies, spaces, and concepts: such as: mind/body, human/animal, culture/nature, and so on<sup>9</sup>. Feminists challenge and transgress these binaries by creating hybrids (natureculture) and assemblages that reflect their entanglements. By subverting these ‘polarities’, the asymmetrical relation between them blurs and breaks, unfolding new knowledge, practices, and futures [4,5].

Feminists are committed to ‘seeing the unseen’ and ‘caring for the neglected’. As we (re)think the worlds that we embed in our bioDesigns and (re)imagine the bioFutures that we want to inhabit, feminism can help us see how sustainability and care is embedded in bioDesign. By using bioMatter in bioDesign we need to ‘care’ for it because it is essential to its biological and social existence. Caring is an affect, a practice, and an ethic [6]. But care has also consequences for knowledge production: caring requires ‘knowing more’ about what you are caring for [7].

With feminisim, we can “think with care” [6] using situated knowledge and assemblages to help us (re)consider “what [are we] really caring for, why, and at what cost to whom?” [8].





