

Abstract

The new climatic regime demands a reevaluation of development to address entrenched anthropocentric power structures. The concept of the more-than-human expands our understanding of the complex relations that define our world. Technology mediates human-nonhuman relations but is influenced by existing power dynamics. Within the design for sustainability framework, systemic design shows promise in guiding socio-technical systems toward sustainable development. However, it often reinforces existing power dynamics and tends to overlook marginalised human and nonhuman entities. This highlights the need for systemic design to assess its practices and overcome its “ontological blindness” critically.

The aim of this research is to advance a systemic design framework for the circular bioeconomy that integrates multispecies ethics into the development of industrial insect-rearing systems. By combining pragmatic constructivism with a post-humanist perspective, this study addresses the neglect of insects' ecological and cultural roles within Insect Biorefineries (IB). Using a methodological bricolage that includes environmental enrichment, multispecies storytelling, and collaborative autoethnography, the research explores the political roles of Black Soldier Flies (BSFs) as active agents.

The research provides three key contributions: 1. Methodologically, it defines a hybrid approach using sensory ethnography to capture non-human agency; 2. Analytically, it establishes a taxonomy of BSF capabilities that moves beyond productivity metrics toward a holistic understanding of interspecies wellbeing; 3. Practically, it offers a decision-making framework (utilising the Choquet integral) to design habitats and human-BSF organisations that foster mutually beneficial relationships. Ultimately, this work positions designers as mediators in the Anthropocene, transitioning from extractive industrial logics to regenerative, more-than-human value systems. While power imbalances persist, the study promotes caring relationships that dismantle rigid human-nonhuman separations, encouraging a critical transformation of power dynamics in technological systems.