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THE SCIENTIFIC LAB AS STUDIO/THE STUDIO AS SCIENTIFIC LAB: EXPLORING PRACTICE-LED MICROBIAL BIOART IN A DECOLONIAL CONTEXT

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This paper discusses the field of bioart, which explores the intersection of art and biotechnology. It raises questions about life, bioethics, and environmental interactions. The author's praxis involves hands-on experimentation with living and non-living materials in scientific labs, resulting in artistic outcomes. The concept of "intra-action" is explored, emphasising a reciprocal relationship between the artist and the material. The paper highlights the increasing collaboration between artists and scientists, leading to the establishment of bioart labs and art-science programs. The author's own bioart praxis involves working with bacteria and yeast to create biofibers resembling human skin, which are then used to produce casts referencing colonial histories. The challenges and experimental nature of working with living materials are also discussed.

Introduction

What constitutes life? Who controls life? What are the bioethical implications of life manipulation? What will be the consequences of such biotechnological interventions? How will these biotechnologies affect interactions with the environment? How can we create with consideration and care? How to think and practise with life otherwise? Can we imagine other forms of living and non/living[1] beings prompting different practices and patterns of thinking that, rather than allowing us to live as we do, will change us instead? How to live with contamination and its risks? By bringing new methodologies and materials into the artistic realm, how can artists play a role in critically and creatively shaping our current situation of ecological precarity?

These are but some of the phenomenological questions that I have found myself asking over the past six years, during which I have been working under the umbrella term "biological art" or "bioart." Bioart can be defined as a "cultural, humanities and art based practice that deals with the technologies, issues and physical materials of biotechnology" (Franklin 2014, 52). It involves artmaking practices involving the application of the life sciences or biotechnologies, known as "wet-biological practices" (Catts and Zurr 2008; Da Costa and Philip 2008; Hauser 2008a), and is often, but not exclusively, conducted in scientific laboratories using (and abusing) approved scientific processes and protocols. Working in a scientific lab offers artists an experiential hands-on approach, where they can engage with living and non/living forms and work *with them* to produce artistic outcomes. Implicit within these art forms is the physical presentation of biological life or its processes (Catts 2009, 1) through the use of living and non/living matter as artmaking media. Artworks can make use of media such as cell tissue culture, extracted DNA, bacteria, yeasts, invertebrates, insects, mycelium, plants, and animals.

My praxis, which is located in a fertile node straddling art and microbiology, has led me to discover that bioart research is grounded in the making process, which entails experimentation, risk and innovation. It involves finding ways of working with existing biomaterials and producing new ones; introducing speculative ways and methods of working with living and non/living matter; and using interdisciplinary approaches to arrive at research findings that are rooted in practical activities and processes. This experiential, hands-on approach allows for forms of engagement with living and non/living forms that entail working *with them* to produce artistic outcomes. Such hands-on practice is usually connected to simultaneous processes of thinking, creating methodologies that encompass thinking while doing and doing while thinking. For me, this focus on process that works in tandem with theory is closely aligned with Practice-Led Research (PLR) approaches within the creative arts, as it allows for creative experience of the multi-species exchanges and collaborations that often remain solely within the realm of the theoretical.

In the preceding paragraphs, I have specifically used the phrase "with them" to differentiate between the use and manipulation of organisms to one's own artistic ends, and a more reciprocal relationship between the artist and microbial matter, where experimentation is, ideally, undertaken not to achieve control, but rather to allow for attentiveness to, and collaboration with, the organisms' propensity to transform. This reciprocal relationship can be related to Karen Barad's notions of "intra-action" and "intra-activity" (2003). Pointing out that the term "interaction" makes dichotomous distinctions between subjects and objects, Barad coined the term "intra-action" that, she argues, dissolves the "constructed boundary between the 'object' and the 'agencies of observation'" (Barad 2007, 817). Barad also converts the term "agency" into "agentiality," which she proposes as a "doing" and "intracting"; an unfixed, non-anthropocentric process of enactment. As she suggests:

> It is through specific intra-actions that a differential sense of being is enacted in the ongoing ebb and flow of agency .... 'Intra-action' underscores the agency of matter; matter is a substance in its intra-active becoming – not a thing but a doing, a congealing of agency ... a stabilizing and destabilizing process of intra-activity. (Barad 2007, 817, 151).

Matter is thus understood as a discursive production in which the materialisation of bodies and the production of meaning are interdependent. This intra-active, hands-on approach raises issues of Bio-philosophy, Bio-politics and Bio-ethics, as well as questions pertinent to contemporary situations such as human relationships to the environment (climate change, pollution, health, sustainability, and the COVID pandemic) and their links to what Françoise Verges terms "the Racial Capitalocene" (2017).



Figure 1: Donna Franklin, Fibre Reactive, 2004. *Pycnoporus coccineus*, silk, wood, Perspex. 198cm x 70cm x 70cm. Photographer: Robert Frith. Copyright permission courtesy of SymbioticA).

At the Interface between Art and Science

As Mark Roughley, Kathryn Smith and Caroline Wilkinson note, collaborations between artists and scientists are increasingly becoming a feature of the global artistic and academic landscape (2019, 226–227). Traditionally, art and scientific disciplines have been seen not only as unconnected but as diametrically opposed. In this historical perspective, art is usually employed in the service of science, with artists using their skills to illustrate scientific, medical or biological ideas and forms, such as in botanical drawings and anatomical illustrations.

However, life – and by this I mean living and non/living matter – is becoming a raw material and a subject for artistic production. This is manifest in interdisciplinary approaches taking the form of art-science collaborations that have emerged in the global North over approximately the last 30 years. Here, artists and scientists collaborate to explore the creative possibilities presented by the intersection of these two fields, in which art and science are situated as equally valid knowledge systems.



Figure 2: Leora Farber, 2018. Cellulose fibre. Photographs: Anthea Pokroy

From the early 1990s, bioart – as a form of artistic and scientific practice – has grown from a niche interest in which formative works were produced by bioartists such as Orlan, Stellarc and Edouardo Kac, to a legitimate field of creative and theoretical research. Internationally, exhibitions such as *semipermeable* (2013, Sydney) and *Fermenting Feminisms* (2019) (among many others); global art-science exhibition spaces such as ARS Electronica, Experimental Digital Arts (EDA), Arts Catalyst, ANAT, SymbioticA and the Science Gallery. Moreover, contemporary bioartists such as Anna Dumitriu, Anicka Yi, Donna Franklin, Neri Oxman, Oron Catts, Ionat Zurr, Pia Interlandi, Tal Danino, Peta Clancy, Helen Pynor, Lia Giraud, Heather Barnett, Tarsh Bates and Kira O'Reilly feature prominently in the global art arena (Figure 1). These interdisciplinary creative collaborations have also given rise to the establishment of dedicated bioart labs[2] and art-science postgraduate degree programmes in Higher Education institutions, notably in Europe, the United Kingdom, the United States and Australia. While artists are often limited to writing for journals that focus on Visual Culture or Art History, working at the interface between science and art offers practitioners more platforms for the publication of textual outputs, in journals that specialise in art-science collaborations such as *Leonardo*, *Antennae*, and *Breathe*. Given the synergies between bioart and PLR, journals that specialise in PLR approaches to praxis like the *Journal for Artistic Research (JAR) and Ellipses [...] Journal for Creative Research* add to the range of publication platforms.



Figure 3: Leora Farber, 2018. Cellulose fibre. Photographs: Anthea Pokroy

Because the range of art-science collaboration encompasses a plethora of diverse practices and media, in this paper I focus on work produced under the umbrella term

"biotechnological art" or "bioart," while acknowledging that the term is contested.[3]

Transformative Encounters

I now turn to my bioart praxis, which, to date, has involved the use of pathogenic bacteria, yeasts, mycelium and *Physarum polycephalum* (slime mould). In bioart practices, emphasis is typically placed on process and materials, but for me, these are not ends in themselves. I wish to stress that meaning and matter intersect; that *matter carries meaning*, so that matter and discourse are integrally conjoined. This relation is, as Helen Palmer and Vicky Hunter put it, a form of "worlding": "Worlding is a … blending of the material and the semiotic that removes the boundaries between subject and environment, or perhaps between persona and topos" (2018). It involves "a radical dismantling of the boundaries between human and nonhuman agencies, the social and the natural, and above all between matter and discourse" (Oppermann 2014, 56). The translation of matter into visual form can therefore be seen as a critical and creative visual response to theoretical debates taking place in contemporary scientific discourse, as well as in the visual arts and Humanities, and in the intersections between them.





Figures 4 & 5: Leora Farber, *disquieting domesticities/ vestiges of violence (or, the ghost in the house)* installation, 2021. Cellulose fibre, lightbox. Photographs: Michael Hall





Figures 6 & 7: Leora Farber, *intimate presences/affective absences (or, the snake within)* installation, 2020. Cellulose fibre, lightbox. Photographs: Anthea Pokroy

For example, theoretically speaking, my bioart praxis brings together a combination of current debates in a range of discourses across the sciences, visual arts, visual culture, and disciplines in the Humanities – specifically post-humanism, post-anthropocentrism, and New Feminist Materialist theory; as well as feminist Affect theory, Spectral studies (specifically Derridean Hauntology), Settler colonialism, and decoloniality. I draw on the writings of Deleuzian feminist philosophers such as Rosi Braidotti (2002; 2006; 2013), Claire Colebrook (2014), and Elizabeth Grosz (2008; 2011), as well as New Materialist Feminist scholars such as Barad (2003; 2007; 2012) and Donna Haraway (2003; 2008; 2010), who, like post-humanist theorists, offer non-anthropocentric approaches to ontology. These theorists consider life as material and processual, dynamic, indeterminate, and enacted through multiple connections and interactions; an excessive force of transformation in which the human and non/human are enmeshed. The Western notion of humanity is considered a concept that can be reconstituted in ways that favour multiple forms of humanity in trans-species alliances that are based on diversity, complexity, and hybridisation, and an ethics of engagement with the non/human based on empathy and care.

For me, bioart praxis, and specifically the enmeshed, intimate engagement with living and non/living material matter that it allows for, offers a space for readings of the work through any or all of the abovementioned, seemingly diverse theoretical fields. Yet although they offer multiple lenses through which meaning may be discerned, collectively they present an overarching theoretical paradigm that is underpinned by the decentring of the white, heterosexual male human subject, and of Eurocentric notions of speciesism, thus calling into question the hierarchical binary oppositions – such as 'human' and 'non-human,' 'self' and 'other,' mind and matter, subjectivity and objectivity – upon which Western discourse is based.

In 2017, I began experimenting with a biofibre which grows from the symbiotic action of the bacteria *Gluconacetobacter xylinus* and yeast, which feed off a mixture of tea and sugar, forming a gelatinous, cellulose-based biofilm that floats on the container's air-liquid interface. Once the biofilm had grown to the desired thickness, it

was removed from the liquid, cleaned and dehydrated. The dried biofibre remains in organic stasis and regenerates if rehydrated. In its dried state, the biofibre bears an uncanny resemblance to discarded human skin (Figures 2 and 3).

From 2017 to 2019, I conducted practical research into the scientific properties of bacteria and yeast to develop the growth of the biofibres. This involved extensive experimentation, which was time and labour intensive, and carried a high risk of failure. I carried out a series of tests, observing how these caused variations in the biofibres' growth patterns, density, colour and structure. For example, I grew them under different environmental conditions; used various kinds of tea; substituted honey for sugar and introduced materials such as cotton wool into the biofilm for tensile strength. Once I had working knowledge of these growth procedures, I used the dried biofibre as a material to produce casts or 'impressions' of domestic objects, chosen specifically for their references to English and Dutch colonialism in South Africa. (Figures 4, 5, 6, 7)

Working with a medium that is both material and, given its translucency and lightness, seemingly immaterial, became a way of thinking and working through the hauntings of colonial histories via storied matter. The impressions reference various design styles, periods and surface patterning. They include items taken from Chinese porcelain and English bone china; some feature blue and white patterns of Chinese origin, such as the willow pattern, which the British copied in their production of eighteenth-century porcelain, and the Dutch reproduced in their 'Delft blue' porcelain. These designs have become domestic 'classics' in many post-settler colonies. The impressions thus resonate as spectral traces of colonial and apartheid legacies that haunt domestic interiors and broader individual and collective imaginations in postcolonial South Africa. They carry hauntological resonances of British and Dutch Imperialism and colonialism – the very mechanisms that drove the enculturation of capital. If read against this historical backdrop of dispossession, exploitation, displacement and precarity, the impressions may recall uncanny spectres of disquietude, vestiges of violence that continue to inhabit domestic spaces.

Use of the biofibres as a casting material also involved considerable experimentation. There are no training manuals, workshops, or online courses that one can attend to learn how to work with living or non/living material – everything depends on trial and error, play and, finally, a conscious decision to 'let go' of preconceived ideas of what constitutes 'success' and rather to embrace 'failure.' The research methodology is therefore explorative, an investigative process in which variables result in unpredictable outcomes rather than prove a predetermined hypothesis.

The steep learning curve included learning to work *with* (rather than *against*) the mutable qualities of the material: its unforeseeable behaviours, its propensity to change structure, colour and form over time and or react unpredictably when other substances were applied to it. Another challenge was how to make the impressions keep a semblance of shape and form once removed from the object – they tended to collapse because the material, even when relatively thick, was not strong enough to support a 3D form. External factors such as moisture in the air caused the material to become soft and soggy, whereas in dry weather, it became brittle. Another challenge was how to work with the fragile material without it breaking, tearing or fragmenting. I specifically worked with biofibres that were less than 1mm in thickness, as these conveyed the optimal sense of weightlessness, immateriality and translucency. The processes of growing the biofilms, feeding them, ensuring that the room temperature was consistently set at 27 degrees centigrade, watching for signs of contamination, cleaning them, drying them, coaxing them onto and extracting them from the object and painting onto their surfaces thus necessitated extreme care at every stage. To invoke Harraway's term for the process of opening oneself to others, to become an agent, and to care, I was "*response-able*" to them (2008). I experimented with finding ways of delineating pattern on their surfaces using painting, printing and drawing techniques, building up surfaces into relief, scraping away or piercing the material,



Figures 8–11: Leora Farber, experimental drawings with bacteria on agar in petri dishes, 2019. Photographs: Anthea Pokroy

and using patterns from paper serviettes, which formed a physical and metaphorical 'tissue' or 'membrane' over the skin. Many of these processes refer to domestic practices historically associated with women and support feminist and gendered readings of the work.

My experimentation with biofibres made me curious to see if working with bacteria as media could be extended. This led to my collaborating with the microbiologist, Prof Tobias Barnard (Director, University of Johannesburg Water and Health Centre, Faculty of Health Sciences), who introduced me to a technique of painting with pigmented bacteria onto agar in petri dishes. I also did a residency at the SymbioticA Centre of Biological Art, University of Western Australia, which enabled me to work in a certified level 2 Physical Containment (PC2) microbiology lab in the School of Biomedical Sciences. Here, I extended the work done in Prof Barnard's lab from flat 2D bacterial drawings in petri dishes into 3D casts of domestic objects made from bacterial agar. (Figures 8-11)

I found the experience of working in a scientific lab simultaneously challenging, stimulating, alienating and intimidating. It gave me the freedom to explore techniques and practices usually reserved for scientists in an artmaking context. I was trained in lab practices, given access to equipment and facilities that would otherwise have been unavailable to me as an artist and provided with scientific and technical expertise tailored to the specifics of my project. However, as an artist accustomed to working in a spontaneous manner that involves messiness and imprecision, working in a PC2 microbiology lab opened up a new world to me – one governed by strictly defined practices, protocols and procedures that needed to be vigilantly adhered to so as to ensure absolute distinctions between sterility and contamination. These protocols centre on issues of containment and control over pathological microbes that exhibit "disobedient behaviours": they threaten to become dangerously uncontrollable, having the potential to override borders and boundaries, to 'take over' and to 'contaminate.' I became hyper-aware of how, in the hyper-regulated environment of the lab, every action necessitated self-regulation and self-control.

The work I produced comprised impressions made from a mixture of agar and bacterial nutrient, onto which live, pigmented pathogenic bacteria were painted. Inscribed into, imprinted onto, or infused with the jelly-like substrate, the bacteria grew unpredictably and uncontrollably in response to the patterns or surface applications that I attempted to create for them. Occasionally, they grew according to the patterns that I had delineated for them, but mostly, their movement – which could be described as "haptic performativity" (Bates 2019, 36) – was so extreme that I could not recognise the initial pattern that I had rendered. In time, I came to realise that, unlike conventional artmaking media, bacteria are not inert matter but have their own agency and life force. Thus, rather than being the product of my creative efforts alone, the work became a collaboration between the microbes and myself. My intra-actions with the microbes could be read as 'transformative encounters' that happened 'with' the agencies of the microbes in a dynamic process of intra-activity. I became a co-author, a participant in an organic, unscripted, sometimes asymmetric collaboration that necessitated my relinquishing of artistic autonomy and control. (Figures 12–15)



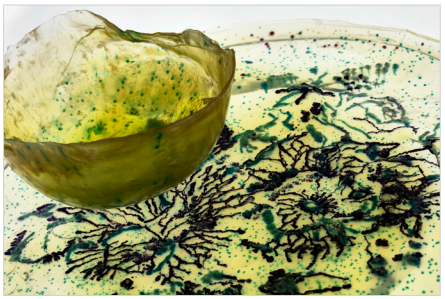






Figure 12–15: Leora Farber, cultured *colonies/colonial cultures*, 2021. Agar and bacteria. Photographs: Bo Wong

During the making process, I was intensely aware of my embodied relationship with the organisms themselves. Despite the rigid scientific protocols I adhered to, and despite my knowledge of their being pathogenic, my interaction with the microbes comprised unsettling yet pleasurable sensual intimacies and corporeal entanglements. I experienced a sense of enmeshment with the microbes through sight, smell and tactile experience. My intra-actions with them could be read as corporeal entanglements

that disrupted conceptions of myself as an autonomous, contained, and unified subject. Experiencing this sense of dissolution of the ego, of the boundaries between self and other, made me acutely aware that this was an intraspecies form of practice that, for me, generated new modes of coexistence. The repeated 'eruption' of the microbes into vibrantly coloured communities offered an opportunity to reflect on my entanglements with the invisible multitude of ecologies that shape the world in ongoing processes of intra-activity (Barad 2003, 823). I was also reminded of Marietta Radomska's concept of uncontainability as that which "exposes the excessive character of life: its potential for surplus and transformation that cause life to exceed both the material boundaries of entities and the conceptual frames and established meanings" (2016, 32).

The translucent casts appear as though made of layers of exposed subcutaneous tissue. Devoid of a protective epidermis, the material matter seems ethereal, almost spectral. They restlessly oscillate in-between states of emergence and becoming; life and death; materiality and immateriality; human and non/human; presence and absence; being and non/being; form and formlessness. Radomska's remarks on the work of other bioartists are applicable here:

> Bioartworks help us to uncover these porosities and blurred boundaries: they expose life as becoming … as non-teleological processes of change, and as intensities that do not compose an external force enlivening inert matter but, instead, are constitutive of matter as such. Uncontainable life is not modelled after the life of the human or any other organism and thus, it is not limited like the life of discrete entities. Rather, uncontainable life dwells in the sphere of the in-between: it is processual, dynamic, and multiplicitous. (2016, 32)

In 2021, I produced five videos in which photographs and video footage of the work made with biofibre and in agar were edited using animation techniques. Animation was used to imaginatively simulate the growth of the microbes while suggesting the mutability of the material and its ability to transform. As noted above, in their material states, the impressions already occupy an ever-changing, liminal space of becoming, slipping in-between corporeality and ephemerality. This sense of liminality is heightened as they are transposed into the video medium, which foregrounds the transientness of light, time and space. In their filmic reiterations, the impressions appear and disappear across the screen as ephemeral, ethereal, transient forms (which often dissolve into formlessness); they become fleeting semblances of presence which simultaneously unfold into absence. Through these precarious 'things' that are barely things, one is invited to try and grasp the ungraspable – fugitive, fragmented remembrances of familiarity, strangeness, comfort, dis-ease, intimacy, distance, vulnerability, trauma, complicity and loss. Translating the material forms into moving images became another way of breaking boundaries between artistic disciplines, prompting me to think about how such translations can go beyond documentation and necessitate reconsideration of the work as a new piece. (Figure 16) (Figure 17) (Figure 18) (Figure 19) (Figure 20)



Figure 16: Leora Farber, 2020-2021, *ghosted matter*, video still. 21:14. https://movingcube.uj.ac.za/watch/leora-farber-ghosted-matter-phantom-hurt-and-other-chimera/extract-of-ghosted-matter-2020-2021/



Figure 17: Leora Farber, 2021, *phantom hurt*, video still. 8:00. https://movingcube.uj.ac.za/watch/leora-farber-ghosted-matter-phantom-hurt-and-other-chimera/extract-of-phantom-hurt-2021/

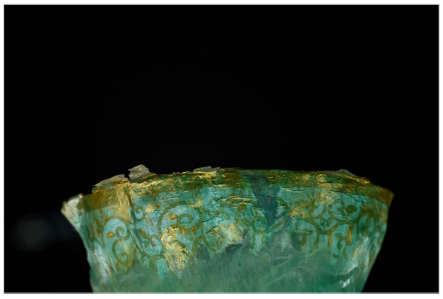


Figure 18: Leora Farber, 2021, *chimera*, video still. 10:05. https://movingcube.uj.ac.za/watch/leora-farber-ghosted-matter-phantom-hurt-and-other-chimera/extract-of-chimera-2021/

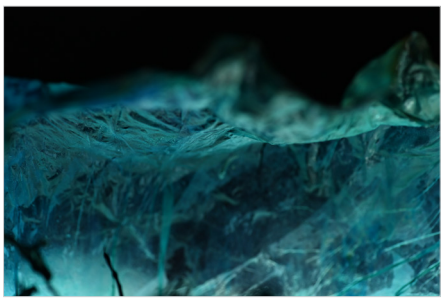


Figure 19: Leora Farber, 2021, *chimera*, video still. 10:05. https://movingcube.uj.ac.za/watch/leora-farber-ghosted-matter-phantom-hurt-and-other-chimera/extract-of-dark-matter-2021/

Reflecting on my engagements with bioart over the last six years and the challenges these have presented has led me to realise that the work has been important in

pushing boundaries on many fronts. As a multi-dimensional, self-initiated, curiosity-driven inquiry that necessitates high investment and the strong possibility of risks, it entails being open to new ways of approaching the material and making process. These involved letting go of artistic autonomy and agency, and placing myself in a vulnerable position where I experienced a loss of control and a blurring of differentiation between self and not-self. The many practical and artistic challenges I faced were sustained by curiosity, perseverance, determination, and an inherent belief that the process would lead to meaningful encounters, with moments of excitement fuelled by discoveries.

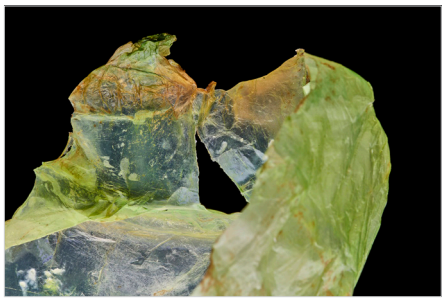


Figure 20 :Leora Farber, 2021, *animacies*, video still. 08:12. https://movingcube.uj.ac.za/watch/leora-farber-ghosted-matter-phantom-hurt-and-other-chimera/extract-of-animacies-2021/

There are several bioartists working internationally with bacteria and biofibres, notably UK-based bio-artist Mellissa Fischer, who produces "microbiological portraits" – casts of her body and face over which bacteria taken from her skin grow;[4] Suzanne Lee, the creative director of Bio-Couture – a London-based company which investigates the making of clothing through the use of biofibres;[5] and Australian bioartists Donna Franklin and Gary Cass, whose *Micro/'be'* project investigates the practical and cultural application of biofibres to explore forms of futuristic dress-making and textile technologies.[6] The *Micro/'be'* garments are grown by aerobic fermentation wherein colonies of *acetobacter* bacteria produce a biofilm as they convert wine into vinegar. (Figure 21)



Figure 21: Gary Cass & Donna Franklin, 2008. *Alterations, Micro/'be'* Fermented Fashion. Metallic print 69cm x 58cm. Model: Jennieka Chattelle,

In South Africa, it seems that many artists are working with themes of post-humanism but few are working with biomaterials or microbes (or with biotechnological processes in general) in a sustained, critically engaged way. This leads me to think that as bioart seems to be relatively unestablished in South Africa, and on the African continent in general, it offers enormous potential as a field of PLR-based praxis in this country. Its value lies in the ways in which it identifies and develops new or unexplored materials, media and subject matter for creative applications; introduces innovative research techniques, strategies, and modes of thinking; and impels artists to consider the implications of presenting organic materials in gallery contexts. Working with microbes also opens up possibilities for other types of technological mediation such as time-lapse and macro photography, microscopy, as well as Virtual and Augmented Reality.

With the conviction that bioart holds enormous potential to bring about innovative scientific, biotechnological, and scholarly knowledge in visual arts and design practices, and in the South African academy, Professor Tobias Barnard and I have established the Creative Microbiology Research Co-Lab. We have set up a dedicated bioart laboratory in the Faculty of Art, Design and Architecture, University of Johannesburg, which functions as a space for MA and PhD students, Post-Doctoral Fellows and Artists-in-Residence to conduct hands-on 'wet biological work,' and for interdisciplinary collaborative projects to take place. Our aim is two-fold: first, to explore how artistic involvement can sit alongside biotechnologies by using a reflexive bioarts praxis model located across the contexts of education, arts and the public sphere to mitigate processes of systemic colonisation. The second aim is to see whether, if introduced critically and in ways that draw on practices originating in the Global North but specifically orientated to the South African context, bioart could promote different, decolonial ways of thinking about what it means to be human, and play a part in revisioning ways of intra-acting with the environment.

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Notes

1. Rather than the term 'non-living,' which sets up a binary opposition between that which is living and that which is not, I adopt Marietta Radomska's use of the term 'the non/living,' in which the components of 'non' and 'living' are separated with a slash (2016, 35). For Radomska, the slash indicates a material processuality of both the organic and inorganic, and points to the enmeshment of the living and non-living. Furthermore, as she notes, the 'non/living' refers to the ambiguities that accompany bioscientific definitions of life – for example, the status of agents such as viruses as life forms are not clear (they need a host cell to replicate, which means that they do not reproduce, which is one of the criteria for an organism to be considered a form of life), while the term also draws attention to the ambivalent entwinement of living and dying (35).
2. Biolabs in universities include:
   • Biofilia Base for Biological Arts, Aalto University, Helsinki. https://www.aalto.fi/en/research-art/biofilia-as-a-fertile-ground-for-research-and-experiment
   • Bio Art Lab, School of Visual Arts, New York. https://bioart.sva.edu
   • Swiss Artists in Labs programme, Zurich University of the Arts. https://www.artistsinlabs.ch/en/residency_programs
   • Institute for Art and Technology, John Moores University, Liverpool. https://www.ljmu.ac.uk/research/centres-and-institutes/institute-of-art-and- technology?utm_medium=301_Redirect&utm_source=/research/centres-and-institutes/art-labs
   • MIT Media Lab. https://www.media.mit.edu
   • Coalesce Centre for Biological Art, University of Buffalo. https://www.buffalo.edu/genomeenvironmentmicrobiome/coalesce.html
3. Given the diversity of the 'genre' in medium and intention, many artists disagree with the use of the term, arguing that it is "reductive" (Catts 2014) or should only be considered as a point of academic departure (Hudson 2014). Given that there are marked differences in approach, media, and content, bioartists frequently object to being lumped together within a single movement. Moreover, their work is differentiated by major philosophical differences: "Some see their work celebrating science – even contributing to it – while others are critiquing a technological dystopia" (Voigt, cited in Franklin 2014, 55). As Jens Hauser notes, 'bioart' is a "proliferating and mutant term … and cannot be nailed down" (2005, 1) because the artwork produced constantly changes in response to developing biotechnologies and scientific practices. I agree with Hauser's observation that the concept of fluidity is inherent in bioartistic practices (2008), and in my praxis, I use the term 'bioart' to refer to the use of wet biology' and the life sciences in an artmaking context.
4. See https://www.vice.com/en/article/53n7d3/living-art-meet-the-woman-making-sculptures-with-bacteria-from-her-skin
5. See https://www.ted.com/speakers/suzanne_lee https://www.designboom.com/design/suzanne-lee-biocouture-growing-textiles/ https://www.designboom.com/design/suzanne-lee-eco-textile-fashion/
6. See https://www.mediamatic.net/en/page/196209/fermented-fashion