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KITCHEN CULTURES

Multispecies Co-creation with Invisible Cultures in the Kitchen

A practice-based thesis submitted to the University of the West of England in partial fulfilment for the degree of Doctor of Philosophy in the Faculty of Arts, Creative Industries and Education

January 2024

by Kaajal Modi

3D3 Doctoral Training Partnership
Digital Cultures Research Centre | Science Communication Unit

Supervised by: Professor Teresa Dillon (Director of Studies)
& Professor Emma Weitkamp

Digital Cultures Research Centre

SCU | science communication unit

Figure 0: Kitchen Cultures, 2020

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Figure 2: Eating (as) Ecology tasting workshop, Arts Catalyst, Sheffield Mind, August 2022

Abstract

This thesis outlines the development of a practice framework for *multispecies co-creation* in the kitchen. This framework is presented as a tool for public engagement that can be used by co-designers and researchers to engage women from the Global Majority as a way to collaboratively explore how nature and culture interrelate through domestic practice. I argue that engaging in co-creation through food and fermentation with migrant women can be a way to explore the more-than-human relationships my collaborators negotiate in the kitchen as tacit, performative and embodied knowledges on *multispecies entanglement*. This is a form of co-creation that engages with both the human and ecological as co-constitutive of microbial and geographical ecologies, as a practice of *sympoiesis*, or becoming-with others. I further argue that these practices figure their own multispecies cosmopolitics that are alive and responsive to their conditions, and that have been adapted to context through migration. This is a feminist ontology that I have called *aunty knowledge*. *Aunty knowledge* is tacit, in that it lives in the act of fermenting, cooking and eating, performative, in that it emerges through practice, and it is embodied, in that it can be registered and shared through the senses. Understanding these practices as relational of nature-cultures can attune us as designers to the politically-activated dimensions of the legacies of food cultures as we work in these *more-than-cultural* spaces.

As a result of COVID-19, the work further draws inspiration from diaspora media practices as ways to facilitate communication and intimacy over distance. Reflecting on conversations and investigations I engaged in with other artists, designers and researchers working with microbes, as well as eight women from the Global Majority in the UK, I develop a series of artistic multimedia outcomes. The multimedia outcomes are intended to invite public encounters with *aunty knowledge* through their own tacit, performative and embodied modes. I use these to reflect on *multispecies co-creation*, and the conceptual affordances it offers us, in terms of its potential to underpin more situated, nuanced and plural ways of co-designing with women and femmes from the Global Majority. By situating myself as a facilitator of these interactions, I argue for an explicit political positionality by designers who choose to work in the areas of social good or social innovation, or through multispecies making and food- or eco- practices. The framework is further situated through a series of recommendations for co-designers who are working in this space, that encourages critical reflection on our complicities within and responsibilities to the others (human and otherwise) with whom we might design using experimental and experiential modes.

Acknowledgements

All research projects are a collaborative enterprise, but this one was more collaborative than most. Firstly, I need to thank my supervisors Teresa Dillon and Emma Weitkamp for their guidance, their support and their endless patience with my need to explore every tangent, and for gently guiding me back to the subject matter whenever I strayed too far.

To to my kitchen cultures collaborators Eklass, Soha, Rinkal, Vee, Sibutseng and Pepa; thank you for making me wake up excited every single day of our collaboration, and for all of the intimate, powerful, and poetic moments shared. Thanks also to the incredibly talented Asmaa Jama for making the poetry possible.

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Thank you to Eryka Szymanski, for starting me on my fermentation journey, and pointing me towards a more generative conceptualisation of conviviality. To Sandor Katz, the most generous fermentation revivalist in existence; to Inês Neto dos Santos, for the conversations that allowed me to develop my thinking; to Maya Hey, for keeping it political; Lauren Fournier, for being the first one to say it; WhiteFeather Hunter, for unintentionally helping me resolve my framework with her definition of 'co-creation'.

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For Fatima; my sister, co-conspirator, my kin-spiration. I literally could not have done this without you, and I wouldn't have wanted to.

For Tommy; thank you for your unwavering support and belief in me, even when I wavered. Your strength, your integrity, and your commitment to creating a better world inspires me every single day. I'm not sure I tell you that nearly enough.

And finally, thanks to my more-than-human companions: Lady (who was right there with me almost to the end) and Stevie Nicks (a cat). And to the microbes, of course.

Glossary

Anthropocene

The Anthropocene is an unofficial unit of geologic time, used to describe the most recent epoch in Earth's history when human activity started to have a significant impact on the planet's climate and ecosystems. The word comes from anthropo- from the Ancient Greek ἄνθρωπος (anthropos) meaning 'human' and -cene from καινός (kainos) meaning 'new' or 'recent'. Scholars of the Anthropocene differ on their understanding of when this era started, with some counting it as being from the industrial revolution, and others arguing that it should be from the start of European colonisation and slavery. As many scholars have now argued, 'anthropocene' is an unsatisfactory term as it treats 'humanity' as a homogenous entity that dominates the entire planet rather than a heterogeneous collection of diverse cultures, many of whom have been exploited alongside planetary resources. Suggested alternatives include Anthropocene, Capitalocene, Plantationocene, Chthulucene (Giraud, 2019; Yusoff, 2018; Haraway, 2015, 2016).

Co-creation (see also Co-design)

i. Collaborative Design (co-design) or Participatory Design

ii. Suggestion by the feminist witch and fermentation designer WhiteFeather Hunter that co-creation is a more appropriate term than collaboration when working with nonhuman others, as collaboration implies conscious choice and agency (see Appendix A).

Co-design (aka Collaborative Design or Participatory Design)

In co-design, participants (or 'stakeholders') are invited to cooperate with designers, researchers and developers during an innovation process. Co-design requires the end user's participation: not only in decision making but also in idea generation (Sanders and Stappers, 2008)

Design Research

Design research was originally constituted as primarily research into the process of design, developing from work in design methods, but the concept has been expanded to include research embedded within the process of design, including work concerned with the context of designing and research-based design practice (Cross, 2006). Design Research is broadly placed into three categories: Research-in-Design (RiD), Research-for-Design (RfD) and Research-through-Design (RtD) (although most projects employ more than one of these) (Sanders and Stappers, 2008; Frayling, 1994)

Fermentation

Fermentation is the transformative action of microorganisms. Fermented foods

and beverages are those that have been created by the transformative action of microorganisms, and that turns out to be a vast number of important foods and beverages (Katz, 2012). The word can also mean to agitate or excite (Katz, 2020).

Global Majority

A term used to refer to people who are 'Black, Asian, Brown, dual-heritage, indigenous to the global south, and or have been racialised as 'ethnic minorities'. Globally, these groups currently represent approximately eighty per cent (80%) of the world's population making them the global majority' (Campbell-Stephens, 2021)

Global South

Refers broadly to the regions of Latin America, Asia, Africa, and Oceania (Dados and Connell, 2012).

Human Exceptionalism

Human exceptionalism argues that as beings who have unique and exceptional qualities, humans are responsible to other humans in ways they are not for other life-forms. The corollary of that is the idea that instrumental use of other beings is acceptable in the pursuit of human wellbeing (Giraud, 2019; Haraway, 2008).

Metabolic Intimacy

A term used by Annemarie Mol and John Law to refer to exchange between the materials and imaginations of humans and animals in agriculture and farming. It is an intertwining, a making of links. (Law and Mol, 2008)

More-than-Human

A term used in critical human geography as a way to remind researchers that the non-human world not only exists but has causal powers and capacities of its own (Castree, Kitchin and Rogers, 2013).

Multispecies Cosmopolitics

The need to engage with what Isabelle Stengers calls 'cosmopolitics', the concept of a world politics based on shared democratic values, as part of our multispecies 'becoming with'. This is a way to learn to be 'response-able' to other critters while bearing the 'mortal consequences' of each decision we make over animal bodies and worlds (Haraway, 2008, 2013, 2016; Stengers, 2004).

Multispecies Entanglement

A speculative theory of human-animal relations that foregrounds our relationship to the other organisms with whom we 'become-with' (including plants, animals, insects, birds and microorganisms) (Haraway, 2008). The

purpose in emphasising entanglement is to 'move beyond discourses of human exceptionalism, which can be used to justify practices that are damaging to those deemed nonhuman, other-than-human, or less-than-human (Giraud, 2019). The concept draws inspiration from quantum entanglements, where 'to be entangled is not simply to be intertwined with another, as in the joining of separate entities, but to lack an independent, self-contained existence' (Barad, 2007)

Multispecies Gastronomy

Multispecies gastronomy refers to food-based practices through which we might imagine ethical relations to the more-than-humans with whom we share our food web, particularly those that are less visible such as bacteria and yeasts. (Donati, 2014)

Nature-cultures

A term that signifies the inseparability of the natural and the cultural against an ontological split largely supposed in modern traditions. Naturecultures as a mode of thought is a cosmology that affirms the breaking down of boundaries of the technological and the organic as well as the animal and the human – whether this is considered to be a historical phenomenon, an ontological shift and/or a political intervention (Haraway, 2010; Puig de la Bellacasa, 2010).

Ontology

Ontology concerns claims about the nature of being and existence. In social research, thinking about ontology refers to beliefs about the fundamental nature of reality, in particular social reality. Questions of ontology are central to the questions asked in social research, to the concepts we use, and the steps taken. The concept of ontology is closely related to the concept of epistemology, which is a way of knowing the world ('ontology', n.d.). The Ontological Turn in social research relates to discourses on how to organise ourselves around and communicate with the constituents of complex and contested world(s) (Todd, 2016) (see also Pluriversality).

Pluriversality

Western assumptions about the character of the world tend to distinguish between nature, the natural, or the physical on the one hand, and culture, people, and their beliefs on the other. This One-World World is detrimental as it only supports one way of knowing and being in the world (Law, 2015). Pluriversality is the idea that instead of a One-World World we should cultivate a world of many worlds, referencing the Zapatista slogan of 'A world in which many worlds can fit'. Pluriversal worlds can account for multiple onto-epistemologies, and offer us alternative modes through which to co-exist with nature (de la Cadena and Blaser, 2018; Mignolo and Walsh, 2018).

Practice Research (aka Practice as Research or Practice-led Research)

All research involves some form of practice and the idea of practice as research has emerged in many disciplinary contexts. According to UKRI, practice research is usually characterised by the production of outputs in non-text-based forms including artefacts, performances, and exhibitions (McCallum and Duffy, 2023). (see also Design Research)

Research through Design (RtD)

Research through Design (RtD) is an approach to conducting scholarly research that employs the methods, practices, and processes of design practice with the intention of generating new knowledge (Stappers and Giaccardi, 2017; Frayling, 1994). (see also Design Research)

Social Design

Social design highlights design-based practices towards collective and social ends, rather than predominantly commercial or consumer-oriented objectives. It operates across many fields of application including local and central government, as well as policy areas such as healthcare and international development. It is associated with professional designers, students, staff and researchers in Higher Education Institutions (HEIs) and also promoted and practised by some public sector bodies, funders, activists and non-profit and commercial service providers (Armstrong *et al.*, 2014).

Symbiosis / Symbiogenesis

Symbiosis (from Greek συμβίωσις, symbíōsis, "living together", from σύν, sýn, "together", and βίωσις, bíōsis, "living") is any type of a close and long-term biological interaction between two biological organisms of different species, termed symbionts, be it mutualistic (where both organisms benefit), commensalistic (where one organism benefits, and the other is left unchanged), or parasitic (where one organism benefits to the detriment of the other). According to Biologist Lyn Margulis, 'Symbiosis is not a marginal or rare phenomenon. It is natural and common. We abide in a symbiotic world.' (2008). She suggests that in nature we might see a symbiogenesis that brings together unlike individuals to make large, more complex entities.

Sympoiesis

Sympoiesis (from Greek sún, together, and poíēsis, production) means collective creation or organisation. Haraway's notion of sympoiesis builds on Margulis' 'symbiogenesis' as a way to understand our relations as intrinsic to our being, arguing that this 'becoming-with' is how all living systems operate (Haraway, 2008).

Figures

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Recipes

Poetry

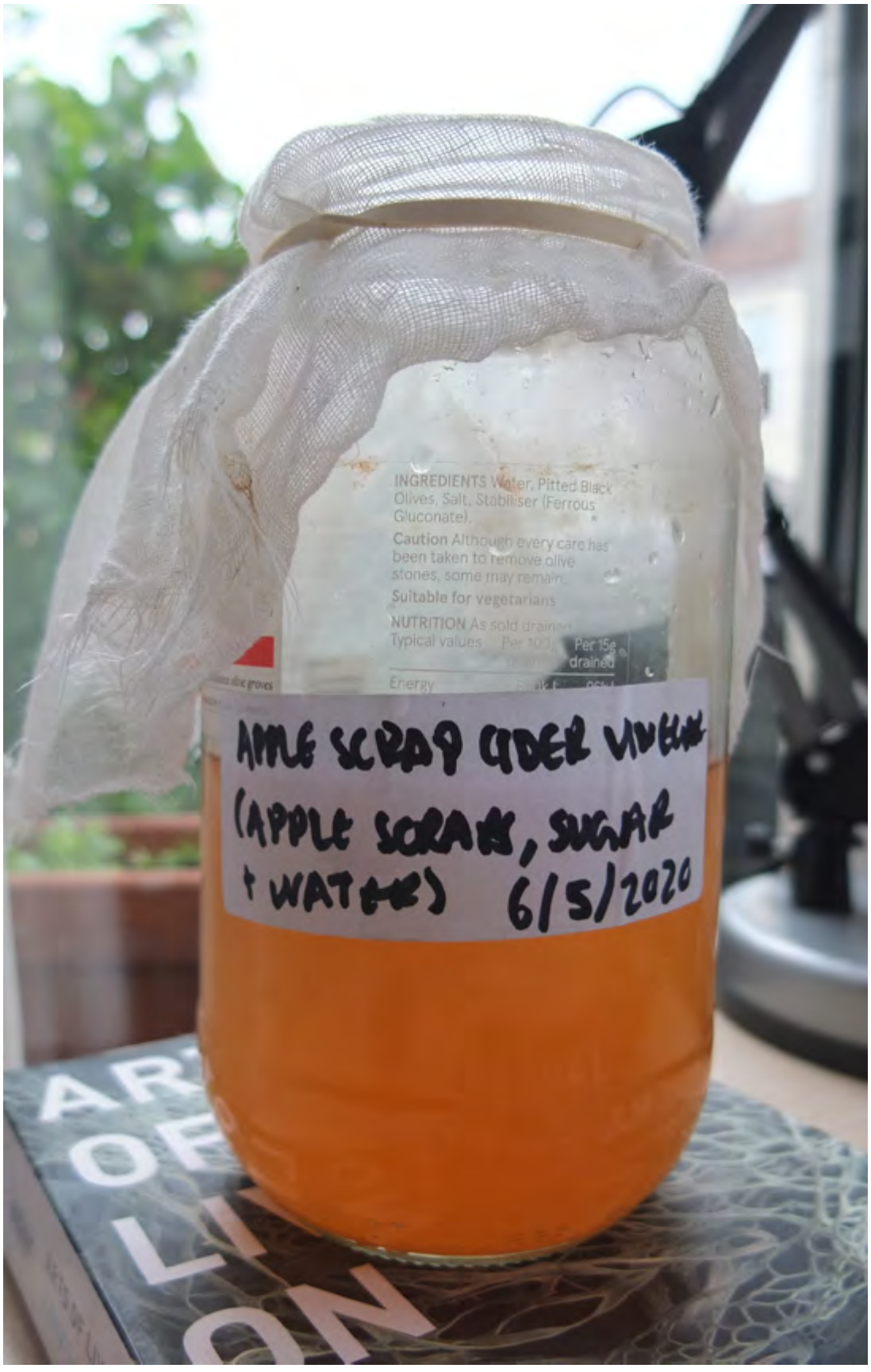


Figure 2: Apple scrap cider vinegar, started in May 2020 (over lockdown).

Links to Practice Documentation

Kitchen Cultures

Recipe & poetry book

https://kaajalmodi.com/kitchen-cultures-eden

Speculative Soundscape

https://kaajalmodi.com/sonic-cultures-radio-arts-catalyst

Eating (as) Ecology Workshops

https://kaajalmodi.com/eating-as-ecology-tasting-workshops

Fermenting Food Futures

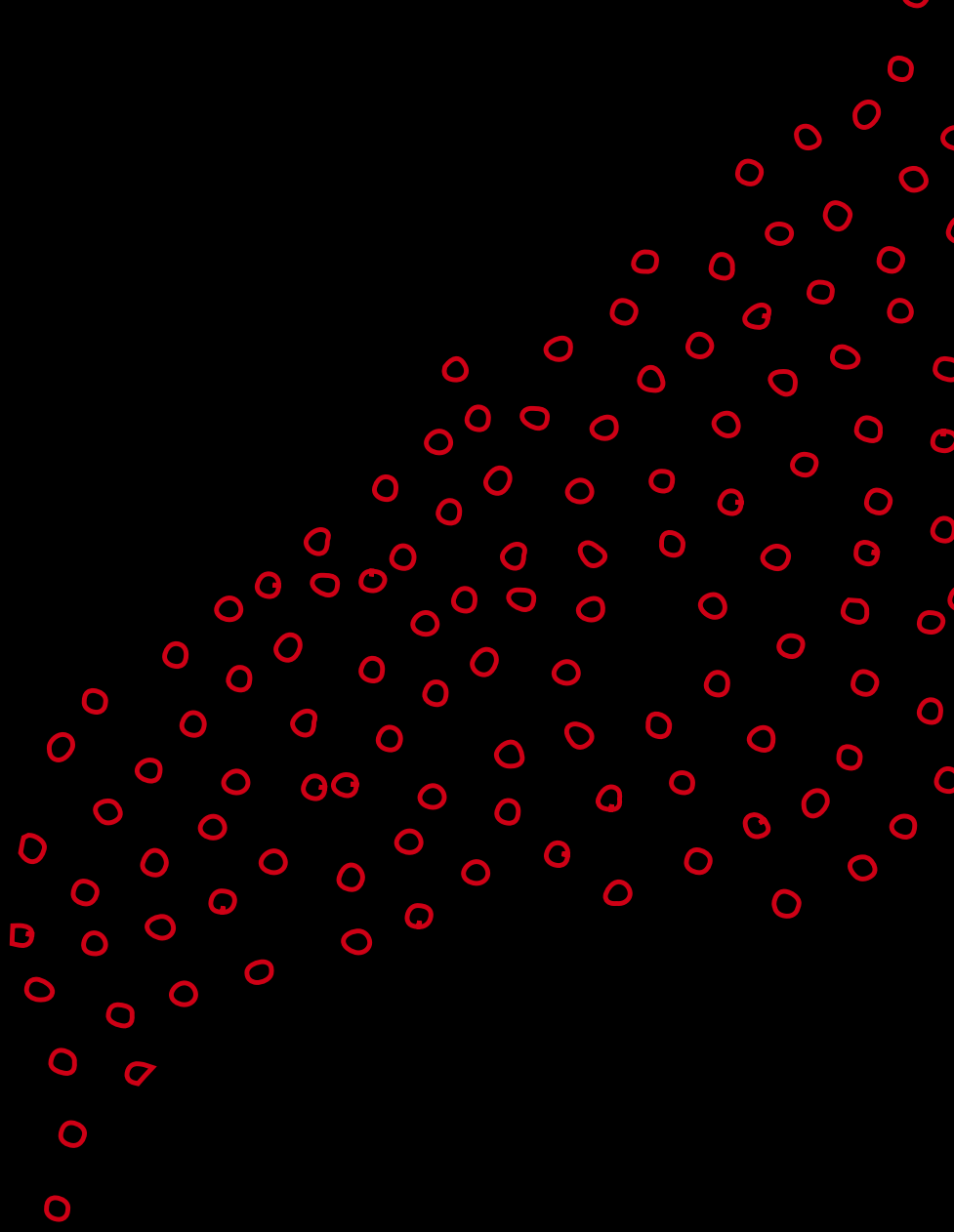
https://kaajalmodi.com/fermenting-food-futures

The Kitchenette of Future Dust

https://kaajalmodi.com/kitchenette-of-future-dust

Appendices provided as a separate document.

Figure 3: Soha's Grandmother Shaheen's fig and rose jam, 2020



Introduction

Multispecies co-creation & Aunty knowledge

1.1 Multispecies Cultural Practices in the Kitchen

Through this thesis, I develop a design-led and arts-inspired research practice working with food preservation techniques as materialities and metaphors through which to explore how culture and climate interrelate in global cuisines. In co-creating contexts for making with women from the Global Majority, I seek to explore how food practices have evolved and are adapted to context as an act of agential negotiation of human/microbial cultures by my collaborators in their own kitchens (albeit within a defined framework). These also work alongside the choices my collaborators make to 'maintain' their cultures by choosing (often imported) foods that they find familiar or delicious. I use this practice as a prototyping ground for a co-design framework I have called *multispecies co-creation,* as a 'more-than-cultural' exploration of the forms of knowledge held within everyday domestic practices of the kitchen with 'invisible' communities of humans and microorganisms. *Multispecies co-creation* negotiates the more-than-human, in the form of my human collaborators, the foods we are cooking, the ambient microbes in our environments and the ecosystems these organisms entangle us with. In so doing, I argue that we can learn much about how these human cultural practices have co-evolved alongside microbial and geographical ecologies. I suggest that fermenting with the microbes on our foods, in our kitchens, on our hands, and in our bodies, is a form of tacit *relationality* that emerges *through practice*. I argue that these practices figure their own *multispecies ontologies* that are alive and responsive to their conditions, and that have been adapted to context through migration as a practice of survival. Through making interventions that invite new hybrid and 'heretical' (Katz, 2019) recipes as collaborative practice of making together, the work co-produces new forms of knowledge about the relationship between these 'invisible' communities that can only emerge (and therefore only be understood and represented) through practice.

The first half of the thesis reflects on a series of practical experiments on food and fermentation which I conducted over 2019-21. These include my reflections on other works that are exploring climate and culture through food and conversations with artists, designers and researchers working with fermentation and food that reflect a view of the field in which I am seeking to situate myself. Following this is an overview and reflection on my own individual practice in my kitchen and as part of two residencies: one at *Medialab Prado* in Madrid, and the other at *We the Curious (WtC)* in Bristol. These investigations culminate in an online research residency with the *Eden Project* in the summer of 2020, called *Kitchen Cultures*, where I worked with a chef, a poet and six other women from the Global Majority in the UK to recover and develop recipes to 'reduce food waste' in the home. The outcomes for *Kitchen Cultures* include:

- poetry written by Global Majority collaborators using food metaphors;

- a series of recordings of conversations about food, culture and ecology (which later became a 'speculative' soundscape that was shared with people to listen to alongside the recipes);
- a set of recipes (which were further developed into a series of online hybrid and in-person workshops that frame eating as a practice of embodied ecology);
- suggested activities that invite more conceptual and embodied reflections on all of these.

In the second half of the thesis, this practice is reflected on as a framework for *multispecies co-creation*. I argue that this framework offers conceptual richness in terms of its potential to underpin situated, nuanced and plural ways of co-designing with women and femmes from the Global Majority. As a way of negotiating ecologies that can be embedded alongside kitchen practices from around the world, *multispecies co-creation* is a way to explore the tacit, relational, ecological and cultural knowledge that is embedded in the way we cook for and feed others. This knowledge is *performative*, in that it emerges through the practice of cooking, and it is *embodied*, as it is registered through touch, smell and taste. Specific acts of food fermentation, as everyday, yet deeply complex forms of multispecies entanglement, materially enact practices of caring for and with microbes. Yet working with food in any form is a multispecies practice that negotiates other organisms (the plants, animals and fungi we eat), and microbial environments. This is a way to care for the human others whom we feed, as an explicit practice of something Donna Haraway calls the act of *sympoeisis*, or 'becoming-with' (Haraway, 2016). These entangled *natural-cultural practices* reveal instances of what I have called *aunty knowledge*, as ways in which we might create pluriversal worldings (Leitão, 2023; de la Cadena and Blaser, 2018; Escobar, 2018). *Aunty knowledge* is a feminist ontology of the Global Majority diaspora; it frames the forms of material care, such as growing, cooking, fermenting and feeding, as well as the forms of domestic storytelling that are engaged in usually by women in a community as a way to maintain more-than-human cultures (Shiva, 2009; Avakian and Haber, 2005).

Designers and cultural theorists have long held that design and culture are mutually constitutive, and that to understand this relationship we must engage in co-creation as an act of co-producing meaning with our stakeholders (Manzini, 2016; Du Gay *et al.*, 2013; Julier, 2013; Balsamo, 2011). I suggest that by utilising experimental and experiential modes in the kitchen, co-designers might attend to these practices in the form of the interdependent kinships in which our human collaborators are entangled through cooking and eating. This is knowledge that incorporates the natural and cultural in ways that become tangible and sense-able through fermentation. In so doing the work creates new forms of 'transformational world-building' that look beyond

the cultural homogenisation that has been the global legacy of colonialism and imperialism (Leitão, 2023, p.17). Co-creation is a creative act facilitated by the designer, as someone who bridges the cultural gap between stakeholders. In finding modes through which to facilitate the knowledge and agency of both my human and more-than-human collaborators, I argue that designers must position ourselves politically as we work towards social transformation, particularly when we are working through multispecies / ecological practices. I argue that these transformational modalities, which are embedded within the domestic space, are rich lines of practice for designers who are looking for more-then-human reference points. Chapter 6 therefore outlines a practice framework and a series of recommendations for co-designers that shares critical reflections on how we negotiate our complicities with and responsibilities to the others (human and otherwise) with whom we co-create.

The methodology developed by myself and my collaborators is one way to explore the cultural and ecological knowledge held within food practices, and the ways that these interrelate, using food preservation and fermentation as a collaborative encounter between humans and microbes. I argue that *multispecies co-creation*, as a practice of making together, with Global Majority women in the kitchen can be a way to draw out tacit, subtle, relational knowledge to do with culture and ecology. The work addresses what I perceive to be a gap in the literature and practice in co-creating with (human and non-human) others, particularly others from whom we might be (temporally, culturally, geographically) distant. This knowledge is: *performative,* in that it emerges through practice; *embodied,* in that it can be registered and shared through the senses; and it is *cultural* and *ecological* (and often it is both). The above is an ontological framework that I have called *aunty knowledge. Aunty knowledge* incorporates multispecies ecological knowledge on the one hand, and the cultural practices that have allowed diaspora communities to survive (albeit in transformed ways) on the other. These *natural-cultural* knowledges are linked through food *practices* in the migrant kitchen, as practices of care and sustainability that are responsible for maintaining both human and ecological (often microbial) cultures.

1.2 Research Questions

Through this practice-based research project, I ask:

1. How do we as design researchers develop a practice of making through food with Global Majority women as a way to draw out tacit, subtle, relational knowledge on the ways in which culture and ecology are entangled through practice?
2. How can attending to kitchen practices that are tacitly negotiating the multispecies (whether through the food used or the kitchen microbes cultivated/wiped out) attune us as researchers to how women in diaspora

communities maintain their cultures through practices of more-than-human care?

Since ways of knowing and practicing multispecies entanglements can go unspoken when working across differing cultures, often due to uncertainty and slippage with language (on the part of both collaborators and facilitators), and of the differing ontologies that underpin them, a third question the research asks is:

3. How do we develop a multimedia re-presentation of the tacit, subtle and performative forms of knowledge that emerge, that can facilitate further encounter outside of the research context, and invite their own ecological co-productions?

1.3 Research Outcomes

The research took place over the period of January 2019 to December 2021, and outcomes comprise:

- *Multispecies co-creation* as a *practice framework* for design research that can be used to explore how tacit, performative and embodied knowledges on *nature-cultures* are negotiated in the kitchen by women from the Global Majority diaspora (See Chapter 6). As a result of COVID-19, where these interactions couldn't take place in person, I further draw inspiration from diaspora media practices as ways to facilitate forms of intimacy over distance, as outlined in Chapter 5.
- *Aunty knowledge* as a *feminist ontology* of diasporas from the Global South (See Chapters 4 and 5). *Aunty knowledge* is:
    - *tacit,* in that it lives in the act of fermenting, cooking and eating;
    - *performative*, in that it emerges through practice, and;
    - *embodied*, in that it can be registered and shared through the senses.
- *A Set of Practice Outcomes* created through the practice of *multispecies co-creation* that are intended to invite public encounters with *aunty knowledge* through their own *tacit, performative* and *embodied* modes, including:
    - *Kitchen Cultures:* A Book of (Mostly) Fermented Recipes, Poetry, Stories and Activities
    - *Eating (as) Ecology:* Four Tasting Workshops, two hybrid/online, and two in-person in London and Sheffield respectively
    - A *Care Package* made up of recipes developed by myself and my collaborators that was sent to online workshop participants
    - *Sonic Cultures: A 'speculative' soundscape* remixed from recordings of meetings, poetry, voice notes and sounds of

cooking/fermenting designed to be listened to while cooking and fermenting at home in your own kitchen.

I argue that each of the multimedia outcomes create opportunities for new meanings on *multispecies entanglement* to emerge through practice. Documentation for each of the outcomes can be found in or by following links on Page 19, and the works should be read, made, tasted and listened to (as appropriate) in order to fully understand how the research questions were addressed. The practices of making/remaking, mixing/remixing and fermenting in new contexts become their own reflexive reiterations through which new knowledges and cultures emerge.

1.4 Thesis Structure

In *Chapter 2: Cooking with the trouble*, I give an overview of the literature and practice that inform my thinking on co-creation, food fermentation, and the cultural and ecological knowledge practices of the Global Majority diaspora. I start with a review of concepts from within design research, and then layer through the ideas I am bringing in from Co-Design, Science Communication, Cultural Studies, and the Feminist Environmental Humanities. I explore the material and conceptual affordances of food fermentation as a practice of *multispecies co-creation* in the kitchen to argue that these make us part of our environments and connect us materially to worldly metabolic ecologies. I go on to explore the concomitant conceptual and material affordances that microbial fermentation offers through conversations with practitioners, researchers, artists and activists as an initial act of co-creation that is the first step towards building my practice methodology. I posit fermentation as a practice of *multispecies co-creation* that can work as both a medium and a methodology through which to explore ecological ontologies in our cuisines, and the interrelated knowledge on climate and culture that these contain.

In *Chapter 3: Food Culture Explorations*, I reflect on Year One (2019) in the form of two research residencies, which are outlined in Chapter 3 as an initial set of methodological 'experiments':

The *Kitchenette of Future Dust*– a prototyping workshop at *Interactivos?* at the *Medialab Prado* in Madrid in March, with designer Shandi YC Hsin and five other women largely from South America and Spain, and;

Fermenting Food Futures– a two-week long residency at *We the Curious (WtC)*, Bristol (formerly *At Bristol*) in August, which comprises:

- *Kefir Café* – an installation where I interact with the daily visitors to centre and the demonstration kitchen (largely children and parents/grandparent carers), and;
- *Fermenting Futures* – two evening workshops where I ferment with participants and lead discussions on fermented foods (with a mix of participants of all ages/genders).

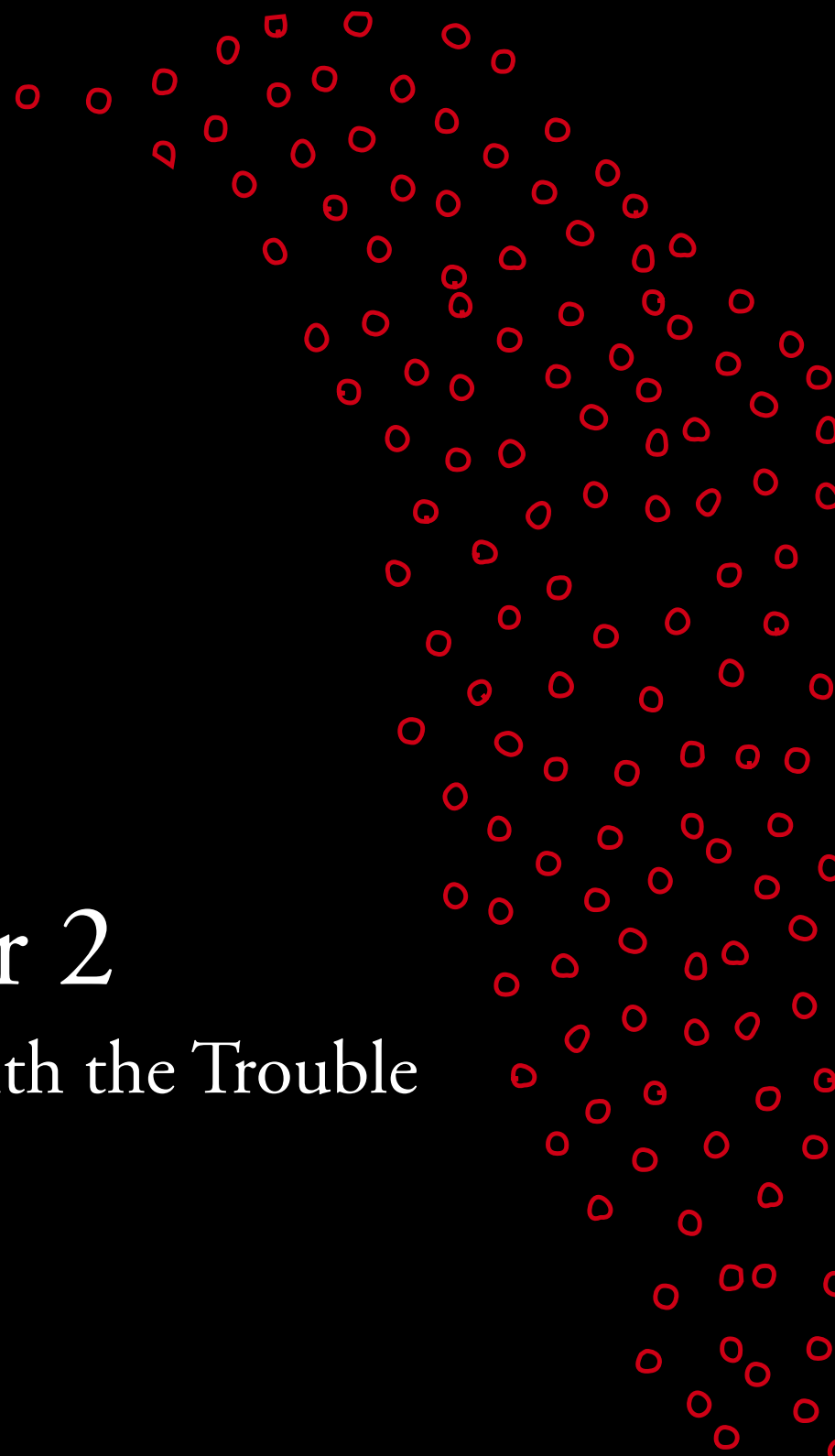
The outcomes of Year One led to a more refined understanding of what it means to intentionally design as a practice of *multispecies co-creation* with food in the kitchen. Quotes from reading, talks, interviews and workshops are interspersed through the first half of the thesis, deliberately interrupting the reading of the work to situate the research as being underpinned by particular ideas, perspectives and practices that are not my own.

In *Chapter 4: Kitchen Cultures– Fermentation as multispecies co-creation,* I outline the development of *Kitchen Cultures*, describing the application of my *multispecies co-creation* theoretical framework in practice as part of the residency with the *Eden Project*. I demonstrate the ways that the work provides both a framing and a creative methodology through which I engage women from the Global Majority into debates about how we might live and eat more sustainably in the future. This approach sits as the heart of the research residency with the *Eden Project*'s *Invisible Worlds* exhibition in Year Two (2020). Originally conceived as an in-person research collaboration with Global Majority communities in London and Bristol respectively, followed by an on-site interaction that invited visitors to the *Eden Project* to 'taste' the outcomes and engage in the debates that these raise, the project was adapted to work online as a result of COVID-19 over Spring and Summer.

This phase of the project led to the thesis title *Kitchen Cultures* and was developed in collaboration with no-waste chef Fatima Tarkleman and delivered over a six-week period online in August 2020. Six women from Global Majority diaspora communities living in the UK were invited to act as ambassadors for their respective cuisines and cultures remotely. These kitchen collaborators, or 'aunties', as we began to call them, included: Rinkal, originally from North India, living in a South Asian community in Poplar since 2010, London; Soha, originally from an Iranian community in Toronto, Canada, then living in West London since 2018; Eklass, originally from Sudan, then living in Canterbury (via Saudi Arabia) since 2015; Pepa, originally born in Peru and living as part of a Latinx community in South London since 2017; Sibutseng, who has lived near Coventry since 2003, but maintains close ties to her family in Zimbabwe; and Victoria, a second generation woman of mixed Ghanaian- Dutch-Jamaican descent living in North London her whole life, where she is also part of a local Jewish faith community. Additional collaborators included the poet Asmaa Jama, who is from a Somali community in Easton, East Bristol. Ethical consent to name my collaborators, including the presentation of non-anonymised outcomes, was obtained at the outset of the project, and continuously negotiated as new avenues emerged through which to share the work. It continues to be gained on an ongoing basis throughout the project whenever work is presented or discussed in a public arena (e.g. workshops, books and exhibitions), and any responses are shared with collaborators.

In Year Three (2021) the outcomes from *Kitchen Cultures* were further developed into a series of artistic outcomes, including the speculative soundscape and the recipe and poetry book. While these outcomes were of value and extremely generative, for the purposes of this thesis I have chosen to reflect critically on the research practice that I undertook in the first two years to develop the *multispecies co-creation* methodology. The reason I have chosen to include them here as they represent a critical media practice (as acts of listening, remixing, tasting, making, and remaking) in which I engaged in order to better understand and represent the outcomes from *Kitchen Cultures*. As such, they sit as outcomes in their own right, without which this work is incomplete. The recipes and poetry developed through the second half of my research in collaboration with my 'aunties' can be found interspersed through this latter half of the thesis as 'artefacts' in their own right. These deliberately interrupt the reading of the work to remind us of the collaborative nature of the practice, and to foreground alternative perspectives on the subject matter. Through this process of reflection, I developed the ontological framework of *aunty knowledge*. In *Chapter 5: More-than-human Cultural Practices* I use these reflections to argue that material practices such as cooking and fermenting hold important insights on how culture and climate interrelate. As part of this I highlight my *Kitchen Cultures* collaborators' perspectives on *cultural practice*, e*cological entanglement* and *multispecies relationality* that emerge through the practice (For notes and transcripts of discussions and interviews please see Appendix D).

Aunty knowledge comprises the forms of tacit and subtle knowledge that are present in everyday kitchen practices, but which are not always obvious unless we seek to look for them. Much like the recipes themselves, they might be subtle or disguised ferments, or be tacitly woven through the ritualistic practices of cooking. I regard *multispecies co-creation* as a shared material knowledge development enacted through the shared ritualistic collaborative practice in which we engaged as able to attend to these more tacit and invisibilised forms of knowledge. In so narrowing the scope of the work, I attend to the iterative design practices that I engaged that also brought forth my own tacit knowledge as designer, researcher and artist, in ways that I intend to be of use to future practitioners. This is an articulation of collaborative practice that reveals important knowledge about how we design with (more-than-human) others, particularly when those others comprise invisible practices, that can equally stand for invisible communities and cultures. Therefore in *Chapter 6* I reflect on my practice in order to build a *multispecies co-creation practice framework*, which are outlined diagrammatically and as a set of recommendations to designers and other researchers through an intentionally reflexive 'anecdotalization' (Michael, 2012a) of my experiences.



Chapter 2

Cooking with the Trouble

This is a design research practice that seeks to pluralise ecological knowledge by developing co-creation practices that can facilitate creative research explorations with and by my collaborators. By collaborators, I include those who participate in my food preservation-based experiments, as well as other artists, cooks, researchers and fermenters whom I invite to materially develop this work with me, and the invisible microbial others who live in and on our bodies and in our environments. I therefore use the term co-creation in reference not only to the practice of making together with others (human and non-human), but to the forms of tacit knowledge that are co-produced through the process of working things out together, in the moment, through the act of making. This is an iterative design practice that works through multiple layered encounters between subjects, objects and practices, including fermenting, cooking, tasting and listening, as ways to build *natural-cultural* ontologies through encounter in the kitchen. In doing so, it invites embodied, experiential and multisensory knowledges of the cultures (human and otherwise) with whom we are co-creating. This intentional pluralistic approach is grounded in the everyday practice of the kitchen, and related literature and thinking from interdisciplinary fields of Design Research, Science Communication, and the Feminist Environmental Humanities.

In this chapter I give an overview of these literatures and practices that have informed my thinking on co-creation, food fermentation, identity and ecological knowledge practices of the Global South. I start with a review of concepts from within design research that speak to co-design and co-creation, and then layer through the concepts I am bringing in from these other disciplines. I go on to explore the conceptual and material potentialities of food fermentation as they relate to a practice of more-than-human co-creation in the kitchen, and I also investigate the concomitant epistemic-ontological affordances that microbial fermentation offers through conversations with practitioners, researchers, artists and activists. I argue that fermentation as a practice of *multispecies co-creation* can work as an epistemology through which to explore ecological practices at play in migrant cuisines, that can inform a design practice that works *sympoietically* with the knowledge and cultural practices of collaborators. From this, I then outline the research aims that I have developed through these explorations, and that I seek to address through the collaborative practices in which I engaged through 2019-20.

2.1 Theoretical Framework

2.1.1 Co-creation as Public Engagement

Over the last few decades, the discipline of design has been expanded beyond the act of making artefacts to include work concerned with researching the context of design (Cross, 2006). Practices in this emerging field of Design Research are placed into three categories: Research-in-Design (RiD), Research-for-Design (RfD) and Research-through-Design (RtD) (although most projects

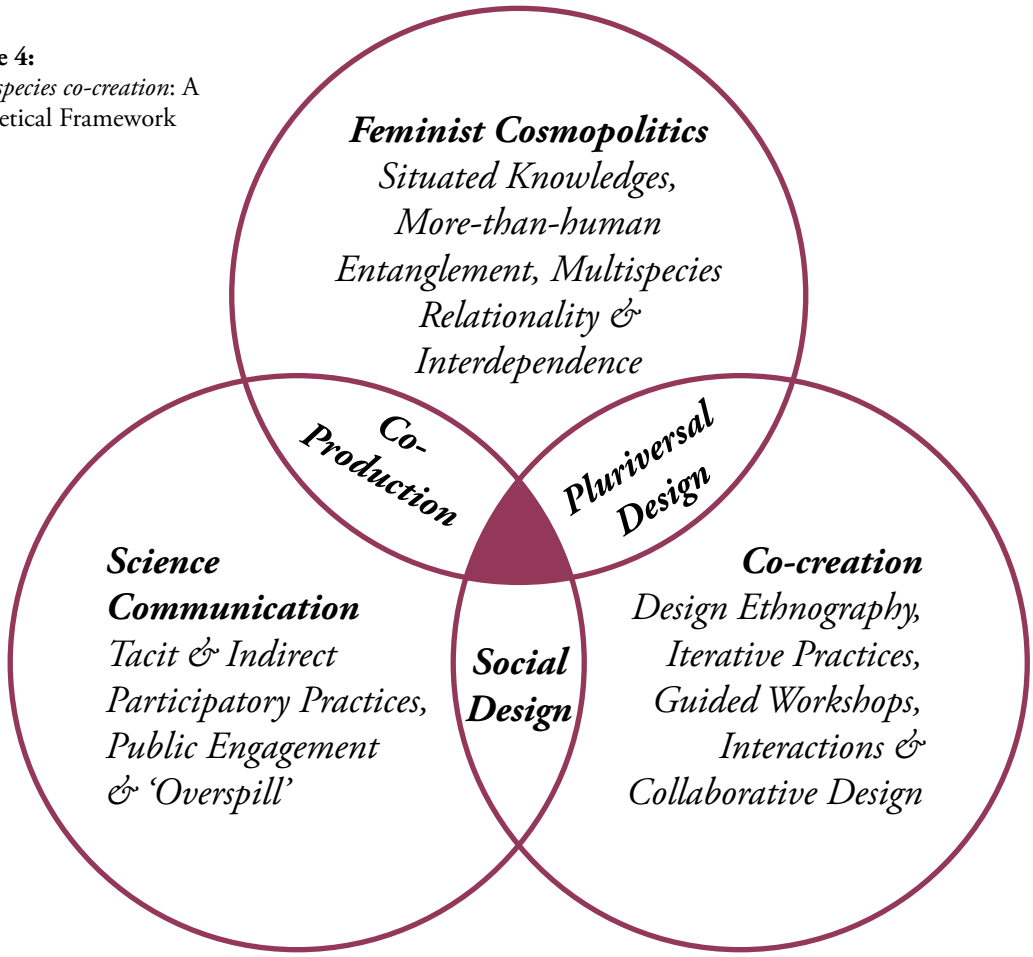


Figure 4:
Multispecies co-creation: A Theoretical Framework

employ more than one of these) (Sanders and Stappers, 2008; Frayling, 1994). An important methodology for RtD is co-creation, the act of making with others in order to understand the ways that contexts are negotiated with those who live in them (Sanders and Stappers, 2013; Gaver et al, 1999). Within the field of Design Research, co-creation (collaborative creation) refers to a set of tools and practices within collaborative design (co-design) that are used to engage an audience or 'end user' into the design process as 'experts of their own experience'. Sanders & Stappers note that these 'designerly' ways of doing ethnographic research are distinct from other forms of public research in that they involve creative acts of *making* (Sanders and Stappers, 2014).

> '…is not just a performative act of reproduction, but a creative act which involves construction and transformation of meaning, by any or all the people just mentioned, and in all those activities.' (Sanders and Stappers, 2014, p.6)

They describe the role of the co-designer as facilitator, someone who bridges the cultural gap between stakeholders involved in the design process by taking on the responsibility to design a research methodology for particular contexts. These practices are often intended as an approach to scientific inquiry that

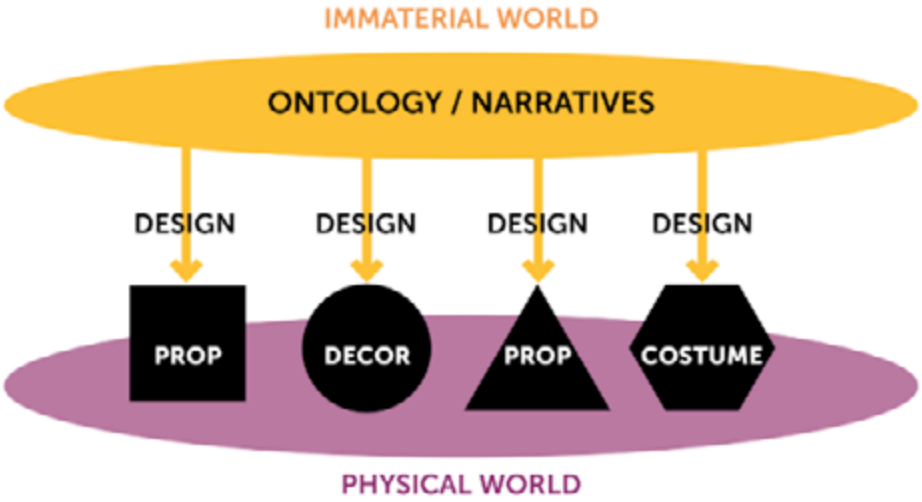
‘…co-creation is not just a performative act of reproduction, but a creative act which involves construction and transformation of meaning…’
Sanders & Stapper, *Probes, Toolkits & Prototypes*, 2014

could develop insights and public policy into complex and future-oriented 'wicked problems' (Godin and Zahedi, 2014). Wicked problems are problems where each attempt to create a solution changes the understanding of the problem (Rittel, 1967). In design, these tend to be problems that have no defined set of parameters or easy solutions, and as such require more complex and nuanced sets of tools to address (Lönngren and Van Poeck, 2021; Peters, 2017; Coyne, 2005). Co-design as a practice in-part evolved and continues to evolve in response to the more complex wicked problems of our time, such as those relating to climate change and social inequality (Busse *et al.*, 2023; Trischler *et al.*, 2018).

Science Communication invites public engagement into scientific and ecological knowledge production through varied, often creative modes, to advance citizens scientific knowledge (Wilkinson and Weitkamp, 2016). In this thesis I am proposing co-creation as a mode of public engagement practice that can facilitate co-production of ecological knowledge. Co-production is a framework for engagement into wicked problems, through which new knowledge is created via encounters between and across participants, the engagement activity and the context/objects/relations at play in that activity (Chilvers and Kearnes, 2020; Whatmore, 2009; Jasanoff, 2004). Another notable example of co-production theory would be Elinor Ostrom suggestion that citizens can play an active role in producing public goods and services of consequence to them (e.g. infrastructures such as policing, healthcare and education) (Parks et al, 1981; Ostrom, 1995) . However, rather than traditions that are more explicitly oriented to normative conceptions of social justice, my critique of co-production (and use of co-creation instead) is in response to how the term is commonly used in STS and design. Alan Irwin and Mike Michael suggest that it is the contextual and contextually-shared perspectives that are emphasised by these forms of ethnographic work, which reveal how complex and social and cultural interactions between communities, knowledge and contexts emerge (2003). Yet ethnographic forms of public engagement into science and technology often fail to notice the political implications of the conceptual and normative tendencies that research framings bring with them (Wynne, 2007, p.100).

This lack of awareness of the political and normative positions that research can occupy has equally come under fire from many designers and educators within the field of Design Research (Forlano and Mathew, 2014; Tonkinwise, 2011). There is a danger that if design education fails to teach its students to recognise and contend with the power structures that implicitly underpin all social relations, including in terms of their own positionality, we will continue to fail to address injustice and inequity in any material way (Costanza-Chock, 2020; Noel, 2020). Design anthropologist Arturo Escobar describes how present-day design practices often reproduce the totalising logics and normativities of

Figure 5: Pluriversal Worlding through Design, Leitão, 2023



colonialism, erasing other (usually Indigenous) ways of knowing, being and living in the world (2018). He and his colleagues in anthropology suggest that we might respond to this tendency to erase Indigenous and decolonial knowledges by building practices that can accommodate ontological heterogeneity, where pluralities of ecological knowledge practices can co-exist (de la Cadena and Blaser, 2018; Mignolo and Walsh, 2018). Taking up this call are a cohort of pluriversal designers, who look to engage in transformational world-building that can accommodate a multitude of ontologies (Leitão, 2023; Calderon Salazar and Huybrechts, 2020; Noel, 2020)

2.1.2 Pluriversal Cultural Ontologies

Brian Wynne (2007) has noted the lack of practices that can allow for different forms of knowledge as a profound inability and refusal of modern scientific culture to 'to internalise, respect, and reflect difference' (2007, p.101). He suggests that researchers must move beyond demanding 'reasoned, calculative, explicit, interests-based and deliberate' forms of engagement, and instead work with 'the more subtle and difficult tacit, indirect, implicit and relational aspects' of participatory or engagement processes (2007, p.102). Wynne argues that through its material, symbolic, economic and psychological interventions, science and technology has moved beyond scientific policy, and is increasingly encroaching into 'global social lifeworlds' (2007, p.104). These lifeworlds raise public concerns relating to science, which have the capacity to enrich scientific knowledge, and in which publics hold expertise. Domesticating or ignoring these concerns is part of what he calls techno-scientific culture's 'systematic denial of the other' (2007, p.105)

In taking seriously the knowledge of 'lay expert' when we look to understand different contexts in which we are operating, we can better contend with

emerging scientific issues (Wynne *et al.*, 1996; Michael, 2012a). However, Irwin and Michael warn that a general emphasis 'on 'context and community' is not enough, as it can risk 'a romanticization of lay people and their relationship to expertise.' (2003, p.39). As such, by focusing on the *situated knowledges*, or partial perspectives, of those who are most marginalised by society we might enrich our perspectives by seeing from multiple viewpoints (Haraway, 1988). Anthropologists de la Cadena and Blaser further argue that the classification of Indigenous knowledge as simply 'cultural' beliefs is a practice of neo-colonialism, which overlooks the important scientific knowledge that might be encoded into these practices and cosmologies (2018, p.17). Instead, researchers should use our creative power to work in negotiation with the worlding (or world-making) practices of 'the other', instead of simply overwriting it when it comes into conflict with the hegemonic assumptions of the researcher or institution (de la Cadena and Blaser, 2018). It is no surprise that scientific cultures are subject to the systemic inequalities, omissions and unjust power relations, as these are constructed through ontologies, or ways of being, as much as any other social formation (Stengers, 1997).

To address this, Arturo Escobar argues for design as a discipline to move beyond practices that are 'functionalist, rationalistic and industrially-motivated' towards world-making practices that are attuned to the *politically-activated* and *relational* dimensions of life (Escobar, 2018). By understanding human interdependencies and relationships with other beings, including relationship with animals, trees, rocks and rivers, we might create modes of making that are ethical and inclusive, rather than exploitative and extractive. The ontologies we engage with and embody through these practices might hold important knowledge on how to co-exist with the others with whom we share our worlds. They comprise forms of social, cultural and scientific knowledge production that we can learn from to respond to present day ecological concerns. In my own research, I employ a Research through Design (RtD) approach to conduct scholarly research by employing the methods, practices, and processes of co-design in the kitchen (Stappers and Giaccardi, 2017; Frayling, 1994). I do so with the intention of generating new knowledge on the topics of relational ecologies and multispecies entanglement in collaboration with Global Majority women, through cooking and fermentation, as a way to reveal the hidden 'cultures' that inform diverse ecological ontologies.

2.1.3 Eating as Multispecies Entanglement

'Entanglement' is a physical sciences concept that has been adopted and adapted by biology and the Feminist Environmental Humanities as a way to understand that human beings are constructed through our relations with (human and nonhuman) others (Hollin *et al.*, 2017). These relations span the globe and cross species boundaries, and in so doing make us accountable

‘Food is always a feminist issue, or at least a gendered one.’
Susannah Worth
Digesting Recipes: The Art of Culinary Notation, 2015

to all of the organisms in our world (Haraway, 2008). This is a *multispecies entanglement* in which humans and other organisms symbiotically *become-with* each other, through an act that Donna Haraway calls *sympoiesis* (2016). Eating is one of the most immediate sympoieses, in that it entangles us with the complex and sometimes harmful relationships that make us human through necessity (Haraway, 2008). Artist Lindsay Kelley notes that as long as we eat, 'we can never be free of the webs of interdependence with other people, animals, technologies, industries and economies' (2016, p.2). There is no way to eat and not cause harm, whether it is animals or plants we eat, or the microbes or even the human people whose labour and livelihoods we rely on when we eat. Anthropologist Kelly Donati takes Haraway's work as a starting point to posit the dining table as a site of possibility for convivial interactions with our food web, where *conviviality* is a question of how we live and eat well together (2014). She suggests a practice of *multispecies gastronomy,* which makes visible the invisible or less visible non-human elements in our food web, such as fungi, plants and microbes, might account for an ethics of eating that can contend with these 'messy entanglement of living beings' (2014, p.3). By foregrounding these *natural-cultural* entanglements (Heise, 2016; Haraway, 2006), feminist thinkers look to challenge the human exceptionalism present in current framings of our food system, an idea that positions us (humans) both outside of ecology, and at the top of the food chain (Giraud, 2019).

The suggestion that seeing humans as part of nature might lead to more ethical forms of ecological co-existence is not a new one; there is a long history of Indigenous and decolonial thought and activism that points to a need to see our bodies as part of the biodiverse ecosystems that we inhabit (Yusoff, 2018; Horton, 2017; Todd, 2016; Todd and Gómez-Peña, 2015; Horton and Berlo, 2013). I therefore suggest that a practice of *multispecies co-creation*, as making with, and therefore explicitly becoming-with Global Majority women and the ambient microbial and human cultures in our kitchens might allow new situated and relational ontologies to emerge. I propose that one way we might develop types of 'subtle, implicit and relational participations' (Wynne, 2007, p.102) is by working through food preservation practices to accommodate pluriversal worldviews and ontologies that can emerge through practice. Practices of fermentation and food preservation embody these *nature-cultures* in important ways that move beyond theorisation and into everyday practice, and by working through these food cultures I theorise that these knowledges can be revealed, and further represented and understood through creative practice.

Through my research, I argue for *multispecies co-creation* as a practice of designing with both human and non-human others as a way to understand social, cultural and ecological contexts. Feminist theorists Tronto and Fisher describe care as consisting of 'everything we do to continue, repair, and maintain ourselves so that we can live in the world as well as possible' (1990,

Figure 6: Dhaqan Collective: Camel Meat and Tapes Launch, Paul Samuel White, 2020

p. 41). There are four core phases outlined by Tronto as part of her ethical framework, which comprise 'caring about', 'caring for', 'care giving', and 'care responsiveness' (Tronto, 1993). These forms of care are distinct, and but one does not necessarily preclude the other. The (often-gendered) labour of *caring for* somebody or something, such as by feeding or creating comfortable conditions in which they can thrive can stem from the affective relation of care, or *caring about* something (such as the environment, sustainability, racism or animal welfare). A fifth dimension, 'caring with' was added in 2013, partly in response to an understanding of ethical care as a collaborative exercise that values the agency of those engaged in the care process. It is also a way to address the forms of 'home-based reproduction' that intersect with issues of race, disability, class, and other axes of marginalisation that 'are embedded in everyday reproductive work' home (Graham, 1991). *Multispecies co-creation* is a way of maintaining the world, and in noticing how the world is maintained by others. In understanding fermentation as a practice of *multispecies co-creation*, we are engaging in a practice of 'caring with' (human and nonhuman) others. Fermentation offers a material practice and a heuristic to understand biological

collaboration as intrinsically a cultural process, through which cultures and communities (human and microbial) are maintained. These are tacit microbial practices enacted as explicit acts of care performatively in the kitchen by my collaborators, as a way of maintaining ourselves, each other, and our microbial kin.

2.1.4 Cultural Practices and Multimedia Re-presentations

In anthropological terms, the word culture is most commonly used to denote shared systems of meaning that are symbolically passed down through generations (Geertz, 1973). However, as prokaryotes, bacteria share parts of their DNA with each other on encounter, rather than passing it down intergenerationally, as eukaryotes such as plants, birds, mammals (including humans) do (Yong, 2016). Lacking the ability to do this, humans share culture horizontally through metaphors and storytelling, and therefore an attentiveness to the ways that 'stories tell stories, thoughts think thoughts, and knots knot knots' (Haraway, 2016, p.132) is crucial for any researchers working in the cultural sphere. Some stories are fictional and others, such as anecdotes, are narratives of the past and can be a useful resource for analysing 'socially interesting phenomena' (Michael, 2012b, p.33). For the researcher, anecdotes comprise a critical way of bringing together distant and disconnected data in ways that can trigger contemporary reorientations. These semiotic and material dialogues can generate new understandings of the relationship between humans, non-humans and their contexts (Michael, 2012b).

Working through a multimedia practice with my collaborators over lockdown is therefore a form of cultural production that creates its own meanings through re-presentation and consumption in different contexts. As Stuart Hall argues, forms of media representation are similarly not simply acts of representing a pre-existing object or idea, the act of representation in and of itself constitutes a reality that creates meaning (1989). As a crucial form of mass storytelling, he suggests that who controls the media controls culture, and this comprises a cultural hegemony that maintains existing systems of power (Hall, 1989). Hall is concerned that Black[1] migrant communities have little control over our own media representations, and suggests that homegrown media practices comprise a cultural strategy that can shift these dispositions of power (Hall, 1993). As Sarah Pink notes, sensory practices can be one way of understanding and richly representing the world (Pink, 2008; Pink, 2009).

1 Hall's 'Black' references all communities of colour in the UK, as was a common practice in the nineties, known as 'political blackness', which later became BME (Black and Minority Ethnic), and is now BAME (Black, Asian and Minority Ethnic) (Appiah, 2020; Andrews, 2016). I have chosen to use the term Global Majority communities as a more contemporary parlance that speaks to the heterogeneity of the communities and cultures in question, and as a response to the idea that the concerns of these communities are 'minority' issues (Campbell-Stephens and Campbell-Stephens, 2021).

In working through storytelling, multisensory and multimedia practices, this practice does not simply re-presenting existing knowledge, but creates novel modes of *political practice* through which new meanings emerge and power is redistributed in the world.

2.2 Eating Cultural Practices

Dhaqan Collective's *Camel Meat* and Raju Rage's *Recipes for Resistance* incorporate multimedia practices and storytelling into the ways that Global Majority practices are performed, and through which the cultures and diaspora communities that enact them sustain themselves. This is a framework for sustainability that starts with the needs of the community, which only tacitly includes the other organisms with whom we interact and embody multispecies relations when we eat. *Camel Meat and Tapes* works with food and Global Majority diaspora communities in ways that I find illustrative of how gender, media and food often interrelate (Ismail, 2021). Dhaqan Collective is a feminist art collective of Somali women, led by researcher Fozia Ismail, filmmaker Ayan Climi and supported by poet and multidisciplinary artist Asmaa Jama. The collective evolved through a project with Bristol's Somali community over six months in 2019 where the participants came together to discuss the rich history of cassette tapes in the Somali diaspora. Fozia relates her memory of receiving a tape from an aunt wrapped up with dried camel meat, and sitting and listening to gossip while she ate the meat (2021). There is a practice of caring over distance that is evoked through the work, as a migrant multispecies cosmopolitics of maintaining cultures through feeding and storytelling using the technologies that are available to us. This is a rich oral tradition (both verbal and degustatory) that she is tapping into through the work, that I found to be compelling and richly realised through multimedia practices.

The work comprised a series of workshops that invited 6-8 Somali women to explore food, the role of camels in Somali culture, weaving/crafts, myths, folklore and gender roles through the use of projected images, printouts, textiles and crafts 'as well as food to facilitate discussions'. The women would lead the workshops, and conversation would evolve organically around the topics they chose to pursue about the prompts that were provided. The outcomes from the workshops were a 360-sound piece made up of 15 minutes of workshop recordings, which included spontaneous poetry and song in Somali. This was played along with a community meal at the Arnolfini in March 2020. *Camel Meat and Tapes* mobilised community knowledge and co-creation to explore gender roles and community in diaspora using 'food as facilitator', as well as subject matter. The act of eating was woven through the project as an act of care, as a material prompt and as a way to ground the work in the everyday experiences of living as a Somali woman in Bristol (Ismail, 2021). The practice inspired my own uses of food as facilitator, and as a way to explore cultural practices with the women in my own 'community' as part of Kitchen Cultures.

Raju Rage's *Recipes for Resistance* by is another interactive multimedia art

Figure 7: Tiffany Jaeyeon Shin: Microbial Speculation of Our Gut Feelings, Recess, Brooklyn. Courtesy the artist and Recess.

project that explores the politics of food and its relationship to 'migration, belonging, memory, culture, coloniality, gender, resilience, adaptability and resistance' (Rage, 2020). The artists suggest that the work functions as both a metaphor for and as a testimony to the survival of the cultures and lifeworlds that diaspora communities, particularly those from the Global Majority, inhabit. Initially situated within the context of the South Asian diaspora in Birmingham, the work has since been toured around the UK, and evolved through the different contexts where it has been shown, and discussed, collecting resources and conversations (including, now, the *Kitchen Cultures* recipe and poetry book). Rage's work is about performing identity as activism; yet it is also about care and nourishment 'as a defiant response to a capitalist system that has no time for these as basic human needs' (Rage, 2020). The project started as a zine, and has evolved into a group exhibition that includes video, photography, audio, illustration and sculpture, as a well as a library of resources to do with food, migration and politics. By inviting other artists from the South Asian diaspora to collaborate on the project, they create a community of resistance and resilience that is able to sustain itself despite 'facing continuous loss' (2020).

Working with the cultural knowledge and wisdoms that are embedded within their respective communities, these projects typify how food can be mobilised as a material practice of care, survival and culture in the face of the forms of erasure, assimilation and genocide that communities faced under colonialism. As decolonial theorists have argued, communities in the Global South have survived the end of world (Danowski and De Castro, 2016). These projects are shared with others through multimedia artistic practices, in ways that invite the audience into sensory and embodied experiences. These 'more-than-cultural' practices work through affective modes and evoke an experience of sharing space and eating with others. As my collaborator Vee states, the experience of diaspora is one of loss, and these projects are a material legacy of how survival practices from the Global Majority diaspora might offer us practices to survive the impending loss of ecosystems and biodiversity. Yet we cannot and should not do this without the people and the cultures in question. Through my own practice of *multispecies co-creation*, I draw out the material ecological knowledges that live in our cuisines as part of collaborative practice that centres the needs and agency of my collaborators from the Global South. I seek do so in ways that more explicitly speak to these practices of cultural sustainability, and so I will next look to projects that work with diaspora communities that centre microbial and human cultures in generative ways.

2.3 Microbial Cultures & Diaspora

Jiwon Woo's *Mother's Hand Taste (Son-mat)* (Woo, 2017) and Tiffany Jaeyeon Shin's *Microbial Speculation of Our Gut Feelings* (Shin, 2020) are both creative projects that explore how colonisation and migration has shaped migrant

‘...It’s important to me to let people know that you don’t need to be a microbiologist, you don’t need a microscope and you don’t need to distinguish between different organisms. The people who figured this out in different cultural traditions knew nothing about that... ’

– Sandor Katz

relationships to food, culture, gender, care, and how these often require complex negotiations across generations and distance. In their engagement with microbial organisms as part of cultural practices and heritages, they more explicitly speak to the multispecies than the ones I have already discussed. *Mother's Hand Taste (son-mat)* explores how migration, geography and history shape and are in turn shaped by the body and its microbial co-species organisms. The project is titled after the Korean food son-mat (which translates literally as 'hand taste'). Woo tells us that this is an important concept in South Korean cuisine, as it represents both cultural identity and the 'personal touch'. Woo took swab samples from the hands of four 3-generation Korean households (grandmother, mother, daughter) from four countries (Korea, Japan, the United States, and the Netherlands) with different eating habits, to examine the effects of each of their hand microbes on the taste of fermented food and drink. The outcome from the project was the creation of a ritualistic hand-infecting machine aimed at preserving *son-mat* that could capture, store and grow one's own hand microbes in order that they could be used to brew Korean fermented rice wine, makgeolli[2]. By investigating 'hand taste' through artistic and scientific means, the project reflected critically on cultural identity, heritage and the invisible ways in which ancestral knowledge can be passed down through generations (2017).

In fermenting the hand yeasts of family members Woo created an act of intergenerational and interspecies care, that crossed both species and cultural boundaries to explore the complex relationships between 'intangible cultural heritage, microbiology, immigration, and notions of a 'transient self" (2017). Woo's work illuminates a relationship with cultural heritage, and how these issues are intimately tied with historical and bacterial ecologies of place. Ostensibly the focus of the work was what Woo describes as 'genealogical research on hand microbiome and its influence on food taste'. Yet by working across multiple generations and geographies the project highlighted the adaptability and resilience of our microbial kin in ways that I feel work to critically destabilise notions of the 'authenticity'. The microbial communities on each of the 'hands' in each of the geographies is unique, yet the practices that these hands enact unite them across vast geographical divides. The project highlights the ways notions that cultural identities are both responsive and adaptive to specific individuals and contexts yet speaks to complex cultural legacies in terms of how they are maintained across distance and re-negotiated in new contexts.

Shin's *Microbial Speculation of Our Gut Feelings* uses microbial fermentation to explore immigrant health, and 'resist processes of colonization' (2020). This installation at Recess in New York transformed the gallery space into an

2 The artist notes that makgeolli, a traditional Korean wine, was banned in Korea under Japanese colonisation, and as such there was a thriving bootleg tradition that grew up around it as a form of resistance.

Figure 8: Rice Brewing Sisters Club, Boxing the Kkureomi, 2020

immersive DIY indoor garden and micro-brewery as a way to 'illuminate the vibrant materiality of immigrant bodies' (2020). Shin home-brewed lactic acid and used it to facilitate plant growth and seed germination. She drew inspiration from a tradition that is known as Korean natural farming or JADAM, a school of techniques and a collective that looks to empower farmers and work in harmony with nature (Cho, 2020). Her work is also partly inspired by scientific research into how migrant bodies are changed through the act of migration, adapting to reflect the microbiome of the geographies they move to inhabit (Vangay *et al.*, 2018). At the end of the exhibit, Shin harvested the plants, herbs, and fungi, to create a final microbial feast for guests. Shin's work explores and invites discussions on common survival, inter-species symbiosis, and care. This complicates notions of assimilation and erasure when it comes to diasporic cultures in the US. These are microbial ecosystems that both resist and facilitate colonisation, making migrants more susceptible to metabolic diseases on the one hand, but allowing them to digest locally produced food on the other. Much like Jiwon Woo, Jaeyeon Shin's work destabilises notions of fixed cultural identity, instead asking us to see culture and race as products of context as much as origin.

Sharing Korean cultures of resistance through fermenting are *Rice Brewing*

Sisters Club (RBSC). RBSC experiment with 'social fermentation' as an artistic form, and create open-ended platforms for visual art, performance, cooking, creative writing, and 'auntie wisdoms' (from which my own formulation of *auntie knowledge* draws inspiration) (Kwan, 2022). In so doing, they 'experiment with ways to connect the sensorial with the relational' through a practice of collaborative tasting and discussion. The Sisters are Aletheia Hyun-Jin Shin, Soyoon Ryu and Hyemin Son, who describe themselves as bringing in the element of 'social' to fermenting by inviting 'rice eaters from many regions, dwellers of the past, present, and future, and other various human and non-human beings to meet and create synergistic networks'. The group ran an online tasting workshop in December 2020 called *Kkureomi* as part of the Gwangju Biennale (Ryu, Son and Shin, 2020). The workshop invited ten guests to take part in an 'unboxing activity' at home, with a box of local crops grown in South Korea by women farmers at the *Sister's Garden*, an independent cooperative of women farmers that practice community-supported agriculture. All participants were sent a *kkurreomi* before the workshop, which was described as 'a box of goods and goodies made from the sisters' joint harvest and research this year,'. During the workshop, participants were taken on a journey, via taste, through 'indigeneity, soil and land, community farming, ecological thinking, and micro/macro forms of solidarity' (2020).

These projects use fermenting to highlight practices of care between humans and microbes through embodied modes such as touch, smell and taste. Both Woo and Shin are interested in how migrant bodies both transform and are transformed through migration. Where Woo's work mobilises the embodied knowledge (the literal 'hand-taste') of her generations of family members as a way to speculatively explore how bacterial ecologies of place and migration interrelate, Shin is interested in how the knowledges these communities carry with them carry regenerative possibilities. These projects mobilise networks of intergenerational care, embodied knowledge and more-than-human communities through eating, in ways that complicate notions of purity and authenticity around the origins of bodies, cultures and foods. In *kkureomi* participants are invited to taste their way through food histories at home, engaging the embodied experiences of their participants' through a practice of storytelling through the act of eating. In unwrapping the gift that is *kkureomi,* participants are invited to think about all of the ways in which our food connects us metabolically to the ecological landscape, and does so in ways that invite embodied and experiential knowledge (2020). These practices begin to describe a methodology through to examine how concerns to do with food, cultures, care and intergenerationality can be explored with migrant women, and how concerns to do with food and sustainability can be shared through sensory modes and storytelling. I took these as a starting point to begin to develop my own practice of co-creation with women and microbes from diaspora communities from the Global Majority in the UK.

2.4 Microbial fermentation as more-than-human cultural practice

Fermentation is a site-bounded bounded practice that works with people and place through a negotiation with the microbes in and on our bodies, and those in our environments. Fermented foods are estimated to make up almost one-third of total global food intake, the majority in the form of condiments, pickles and sauces (Mintz, 2011; Steinkraus, 1997). Archaeological and ethnographic evidence shows that humans have always experimented with food fermentation, and that it is an important part of the process that allowed human beings to create settlements and become agrarian (Mintz, 2011). The most well-known fermented foods in the Global North are lactic ferments that produce pickles such as sauerkraut, achar and kimchee, dairy ferments such as yogurts and cheeses, as well as forming the basis for leavened bread and pancakes. Others include legume/cereal mixtures that produce meat protein replacements, alcohol ferments, and alkaline ferments (Steinkraus, 1997). Each of these processes has a close relationship to the climate in which it evolved. Sauerkraut is common, and commonly enjoyed, in the parts of Europe where cabbage is abundant in summer, and temperatures are low enough to store jars over winter. Kimchi is common in the parts of East Asia where availability of Chinese leaf cabbage, the chillies, glutinous rice, fermented soybeans, salt and the conditions to make gochujang, as well as cold winters for slow fermenting make them possible (Katz 2012). In colder climates, these types of lactic ferments (so named because of where the bacteria were first noticed, rather than any dairy ingredients) rely on brining, however in parts of India they are made using oils, and usually contain mustard oils and extra spices, which is thought to slow down the fermenting process. A key part of the pickling process in India, Iran and Sudan is sun-drying, as even a small amount of water in the ferment can cause them to 'spoil'. In Sudan, there are over eighty fermented foods, which includes meat ferments that include muscle, offal, bones, fat, gallbladder, hooves, hides and skins, things we often discard in Europe, fermented sorghum crepes, and soured milk (kisra) (Dirar, 1993). The fact that each of these create different and desirable flavours points to a co-evolution of recipes and ecosystems and a complex entangled relationship between humans, microbes, climate, weather, culture and historical trade pathways.

It is thought that humans have been engaging in fermentation for millennia, yet we have been aware of microbes for much less time than that (Yong, 2016). Unfortunately, our understanding of bacteria and other microorganisms has from the outset been intimately tied into the discovery that they cause diseases in the body. It is only recently that the mainstream scientific establishment has become interested in exploring the ways our bodies and societies are reliant on microbial interactions to not only survive, but to flourish (Katz, 2020; Yong, 2016; Donati, 2014). Biologist Lynn Margulis was the first to imagine that symbiosis, far from being unusual or remarkable, was in fact the basis of life within our universe

‘If we want to build
a different world, we
must first be open to
new interpretations and
metaphors. Recognizing and
making visible alternative
metaphors and narratives that
enable healthier relationships
with nature and each
other is at the core of what
pluriversality is about.’

– Renata Leitão, *Pluriversal Worlding*, 2023

(Margulis and Sagan, 1997; Margulis, 1981). We now know that ninety percent of the DNA in our bodies belong to microbial entities, and our bodies contain (marginally) more microbial cells than human ones (McFall-Ngai, 2017; Yong, 2016). Humans share microbes with each other, and with other species in our environment (Song *et al.*, 2013). Microbes feed us, feed off us, protect us from disease, and may even affect our moods and our habits (Valles-Colomer *et al.*, 2019; Vuong *et al.*, 2017). These discoveries make it increasingly difficult to separate ourselves as human beings from our microbial entanglements (McFall-Ngai, 2017, 2017). Humans are a colony of bacteria, and we are also individuals who make up cultures and societies. We are a result of millennia of bacterial development and co-constitution that allow us to digest food, and to maintain an ecosystem that allows and our co-species organisms to thrive.

2.5 Fermentation as material & metaphor

Within this thesis fermentation is understood as an evocative metaphor for multispecies collaboration, which materially incorporates difference and context-specificity in ways that can speak to complex concerns to do with culture, migration, colonialism and ecology. In order to explore these ideas further, I began to ferment in my own kitchen, and to immerse myself in the experience of fermenting. Experience is central to the act of cultural production (Pickering, 2008). By immersing myself in fermenting in collaboration with others, I was able to learn from the expertise of those who had been engaging in the practice for many years. Additionally, I was able to learn from the experience of fermenting itself, as a way to 'derive meaning and significance' (2008, p.17) from the experience of making with microbial others. The forms of fermentation that rely on live cultures such as sourdough, kefir, kombucha and other symbiotic cultures, are sustained by a rhizomatic global network of practitioners who share starter cultures, tips and techniques both in-person and online. Over the course of this research, I found myself quickly folded into this community. This allowed me to connect with practitioners working through food and drink fermentation as part of their practice. I interviewed some of these who were grappling with fermenting as a way to navigate the political, cultural and social moment through which we are presently living in ways that I found generative or inspiring. These comprised one unstructured in-person interview, five Zoom conversations structed around a series of questions I had sent in advance, one set of voice notes and five completed questionnaires (See Appendix A). These forms of qualitative research sat alongside and co-produced the arts-led approach (Edwards et al, 2016; Kester, 2004) in which I engaged through the practices of fermentation and co-creation. As I worked with both my human and non-human collaborators this became an embodied mode of practice research that has underpinned the development of the multispecies co-creation methodology. In this section I draw out some of the key themes that influenced the development of this framework, which is further articulated on p.164-5.

Figure 9: Karen Guthrie's *House of Ferment*, The Victoria & Albert Museum, 2019

The first of the people I spoke to was Sandor Katz, a self-described 'fermentation revivalist', who is best known as the person who has brought food fermentation into the mainstream in the Global North. Katz was the only person I managed to speak to in-person, before the COVID-19 pandemic. He is interested in reviving fermentation practices that both benefit human health, the planet, and the cultures who live on it (human and otherwise). We spoke about the archaeological evidence to show that humans have been fermenting for millennia (Sibbesson, 2022), yet Sandor believes that the practice pre-dates the evidence. While records show clay fermenting containers that go back ten thousand years, he thinks that perhaps we were using gourds and containers made from leaves and other organic materials prior to that. In Le Guin's short essay *The Carrier Bag Theory of Fiction,* she makes an argument for carrier bags as both the oldest technology and as a metaphoric container for collective storytelling (Le Guin and Haraway, 2019). Sandor's assertion was evocative of this idea of the container as the first vessel for human culture, and for microbial cultures. I continuously returned to this idea through the aesthetics of the project, and the poem I wrote for the *Kitchen Cultures* workshop (see page 192). We realised that fermentation is metaphorically evocative precisely because of its material affordances. For my practice this is important as it suggests

‘To understand fermentation as not only a metaphor (for it can exist simultaneously to us as both metaphoric and actual) is to understand it as a naturally-occurring process with which humans are simply collaborators.’

– Jessica Bebenek

fermentation as a material situated practice that can also be a heuristic for co-creation across difference, for survival through adverse conditions and adaptation to context. The act of feeding the microorganisms on which every fermentation process is reliant also spoke to a material care practice through feeding non-human organisms, which in turn feed us.

I then spoke to curator and artist Lauren Fournier, who uses fermentation in her curatorial experiments as a way to explore and juxtapose intersectional feminisms. Fournier is fascinated by the fact that fermentation embodies both preservation and transformation, and therefore sees it as a vital practice to think through the pressing political concerns of our time (Fournier, 2020; Fournier *et al.*, 2017). In framing fermentation as an interspecies interaction that connects microbial and human cultures (both literally and conceptually), event participants are invited into modes of storytelling that capture diverse modes of knowing and being. Fournier explores how fermentation has therefore been instrumental to many forms of art and activism, as it is a versatile metaphor and inspirational practice. She relates fermentation stories, from harm reduction for people recovering from alcohol in North America without access to health care, in the form of a brewing co-op for Indigenous people, to projects such as Tiffany Jaeyeon Shin's *Microbial Speculation of Our Gut Feelings* (Fournier, 2020). These practices capture the ways that fermentation is able to represent and work with diverse and often contradictory, or counterintuitive ideas. It is the ways in which it is able to be mobilised by communities to their own ends that makes it such a compelling practice, and rich metaphor. Projects such as the ones Fournier discusses represent the complex relationships that many in the diaspora have to our foods, the lands we have moved from, the lands we have moved to, and the cultures and foods that these then embody.

Karen Guthrie, whose *House of Ferment* is both an educational project that has toured the UK, and a sculptural installation made up of the ferments she started while touring, works through fermentation as a practice of material sustainability. Our conversations focused on how House of Ferment grew and evolved over time, and how, at the end, the kitchen in which the work was stored was more microbially alive (e.g. milk would spoil faster). Karen spent some time in Japan learning about fermentation from older women who still engage in these practices at home, and she said that it was initially very difficult to get people to understand what she meant when she talked about fermenting; 'to them, it was just part of cooking'. When we spoke, Karen related a story about a woman whose family has been tending the same nukadoko barrel for over 100 years. Nukadoko, more colloquially known as 'nuka soil' is a rice bran in which lactic bacteria are cultivated through hand mixing over a period of time. When Karen visited, the woman had a broken wrist, and she told me how the woman apologetically explained that she had sent the barrel of nuka soil to a relative to be 'cared for'. This practice of interspecies care that is maintained through acts

of kinship is important, as even when people aren't aware of microbes, they are still acting to maintain them. Karen knew that the microbial inoculation in the nuka soil could survive a few weeks of not being mixed by hand, yet the woman was convinced it would affect the flavour. This represents how different forms of multispecies entanglement are enacted through everyday practices of food-making/cooking/fermenting.

Karen tells me she is less interested in fermentation for its metaphoric affordances, yet she gets very poetic when speaking about the material practice. For example, we discussed the term 'microbial time' when asked how long her recipes might take to ferment, as something that humans can and should not seek to control. This tendency to veer into the poetic when discussing the practical aspects of fermentation was something that I found throughout my discussions and engagement with fermentation, yet this is not simply a poetic practice but one of pragmatism. Fermentation is a rich and alive metaphor, yet, according to Canadian artist Jessica Bebenek, it is not simply a metaphor but a rich and alive practice. In our discussions and her writing, Bebenek asks us what it would mean for humans to see ourselves as simply collaborators in the fermentation process. In effect, rather than according other organisms more agency, what would it mean to see ourselves as possessing less. Textile artist and designer WhiteFeather Hunter is concerned about suggestions that we are collaborating with microorganisms, as she believes that collaboration requires free will and intent, and we can't know that this is the case for microbes.

> I see it as a co-creative practice. I avoid using the word, "collaboration" because a collaboration is an agreement between two entities, implying consent. (WhiteFeather Hunter, Appendix A)

She suggests that, instead of collaborators, we might describe microorganisms on whose labour we rely as 'co-creators'. It is dangerous to presume conscious intent on the part of microbes, as doing so affords more agency to non-human others than is often afforded to marginalised humans. Hunter works with microorganisms to make biological textiles, which might be considered to be a much more instrumental 'use' than say, preserving and modifying existing conditions in which microorganisms already proliferate, to change the flavour or texture of food, or to extend its life (which also benefits the microorganisms). Where Hunter feels that according autonomy or agency to single-celled organisms runs the danger of reinforcing anti-choice (pro-life) sentiments, as well as human exceptionalism, Bebenek argues against anthropocentrism as the starting principle for collaboration as symbiotic and mutually beneficial.

Zayaan Khan, a fermenter and artist based in the South Cape of South Africa, uses fermentation as both an educational tool and as a way to reduce food waste. Khan speaks of fermentation as 'a storyteller', to uncover spaces in food systems research that aren't very well populated, or 'activated by warm bodies'. She feels she was called to work with fermenting, as she lives in an arid

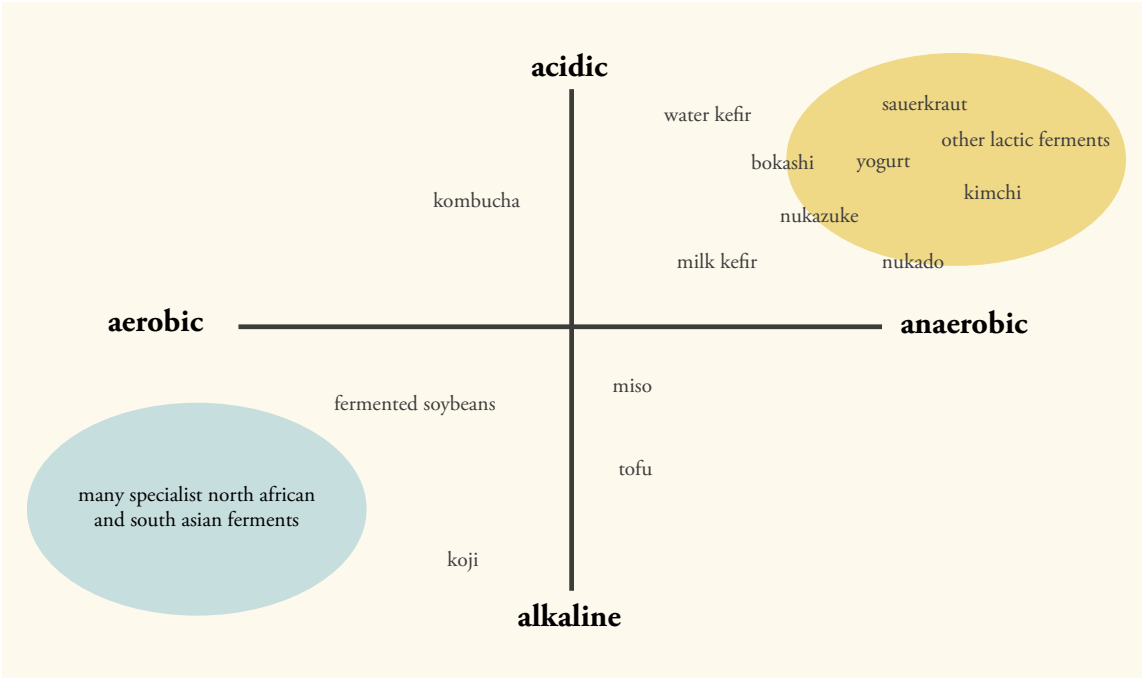


Figure 10: Fermented foods that I have learned about through my practice.

environment where there is nonetheless farming surplus. As only one of two conversations I had with a fermentation practitioner based in the Global South (the other being Mercedes Villalba), I was struck by how much the different conditions in which Khan was operating lent a material urgency and relevance to her work. This was missing, or at least less obvious in the work of practitioners I was speaking to in the North. The practice in which she engages, of whole utilisation of ingredients, has spread through her work in terms of the inks she uses for her printed illustrations and textile dying, to composting, dehydrating and other forms of preserving surplus production she gathers from local urban farmers, foraging and gleaning. By being situated in the food production practices of her local community, her work pushes back directly against both food gentrification and the colonial legacy of scarcity.

For Khan, her practice is about the survival and healing of communities who are living with the injustices of terror, colonialism, gender oppression and racism. It is a part of her identity and positionality.

> 'I cannot be separated (from this), it is so embedded in my being and thinking,'
> (Zayaan Khan)

This imperative compels her to works from and through the margins, and to use microbial cultures to relate materially with the landscape and the ecosystems with which we are entangled. As well as the cultural and ecological, for Khan fermentation is a spiritual practice beyond her Muslim heritage, that connects her to bacteria as part of ancestral heritage that she can access through very personal experiences of taste and smell. For her this cosmology is 'fluid and

‘Naming and noticing
might be a way to
care humanly, but
not instrumentally, to
recognize and value the
facts that [organisms]…
have their own life that
we are just tuning into.’
– Alexis Shotwell,
Against Purity, 2016

nonlinear', in ways that speak to an *expansiveness*, beyond what we are used to. Khan sees fermentation as being about walking a knife edge of care, that makes visible the invisible. She is certain that fermentation has always inspired human cosmologies, for example' with Indigenous communities encountering naturally fermenting sugars in the form of honeybees in trees and sap within protea flowers', in the form of Animistic beliefs.

In an online conversation with Eva Bakkeslet, an artist who has been working with fermentation for decades, she told me about how viili cultures (a milk-based lactic ferment) were taken 'as a dot on a handkerchief' by immigrant families from Sweden to the Americas when they migrated. This is a material practice of care and cultural practice that works across species, time and space. She has been working with the same viili culture for decades and thinks 'it might be the oldest in Sweden'. Inspired by similar stories of families carrying literal cultures with them when they migrate, the artist Inês Dos Santos has made a collaborative quilt with patches inoculated by fermenters of her acquaintance over lockdown, all of whom sent her patches in the post. Inês is interested in how fermentation can be the basis of a practice of both material care and social fermentation, as a practice of community collaboration. At a recent exhibition where the quilt was on display, we discussed how her work was similarly inspired by stories of people migrating with 'cultures', and how this evoked to her a practice of mutual and interspecies care.

In *Fermentation as Metaphor,* published shortly after our conversation, Sandor Katz explores the multiple potentialities of fermentation as a tool for imagining and creating the future, using it as a lens through which to explore ourselves and our cultures (Katz, 2020). He worries that the uncritical and apolitical positioning of fermentation as the cure for all ills that many fermentation enthusiasts take can often be a form of ableism an exclusion. It is a framing of ostensible care for people's health through a paradigm that judges them for what they eat, which often amounts to ableism, racism and classism. This is 'care' that operates from a position of privilege, overlooking the social and political conditions in which people may be living, and what they can access in terms free time, foods, and education. Many of the practices being promoted are taken from the cultures of marginalised people in the first place, and re-packaged and sold at prices that are unaffordable for the communities who originated them. These concerns with food gentrification and positionality are something has informed my own thinking with *Kitchen Cultures.* Many of the practitioners I spoke to work with fermentation as a practice to negotiate their own racial and colonial positionality, and this became crucial to how I negotiated my own collaborations. Bebenek is very aware of her own position as a White settler on Canadian land and is operating from the position of someone whose agency often overwrites others'. Hunter, on the other hand, is an Indigenous woman from the same region, and therefore her scepticism of ideas such as 'microbial

agency' is predicated on a historical legacy of settler colonialism that is justifiably wary of yet another colonial ontological framework that might impinge upon her own (cultural and bodily) autonomy.

I find Khan's position, of negotiating this tension through practice and embodiment, in a way that prioritises healing, justice and survival, as the most viable. It echoes Escobar's proposition for pluriversal design as a practice that can facilitate a world of many worlds, in a way that can push back against colonial ontological occupations. It is a positionality that takes responsibility for its own complicities in ways that manage to carefully negotiate the tension between posthuman feminist concerns for the non-human with the scepticism of people like Hunter and other decolonial feminists concerned that a focus on 'non-human others' might further embed injustice and inequality instead of creating responsibility for the nonhuman in question. Thinking about fermentation as a multispecies cross-cultural collaboration equips us with a material metaphor to think about our bodies and our socio-political selves as part of ecological systems, one that allows us to consider the organisms with which we share bacteria and the processes in which we are all co-creators. Heather Paxson's formulation of *microbiopolitics* tells us that to flourish in this post-Pasteurian world, we must learn to live with and invest in the potentialities of collaborative human and microbial cultural practices *on their own terms* (Paxson, 2008, 2014). Yet in so doing, these multispecies potentialities raise important questions about the agency of collaborators, both inter- and intra-species, and the ethics of how we negotiate these through our own practices.

Poet Mercedes Villalba suggests that fermentation affords us an 'attunement to the microscopic networks of bacteria, fungi, lichens and roots that make matter opaque' (Villalba, 2019). This follows philosopher Shotwell's argument that *attunement* is a recognition or ethical regard of organisms in their own right, beyond ethical 'purity'. Escobar also notes the need for design to works towards an attunement to both the earth and how relational worlds come into being and are maintained (Escobar, 2018). The material practice of fermentation is a practice of attunement to the microbes in our foods, our bodies and in our environments. Exploring fermentation as a material and conceptual paradigm through which to conceive how our ecological worlds move from the dinner plate through our digestive systems, I seek to develop situated and material analyses grounded in everyday practices, that might in some ways reveal the complex and irreducible relations that create inequalities in terms of how we 'collaborate' with others (both as designers and humans). Everything from the language we use to talk about fermentation (culture, collaboration, symbiosis), to the fact that as a domestic practice it contributes to care and nourishment in the most immediate sense, suggests mutually-constitutive modes of being that echo new insights in science and ecology about life being symbiotic instead of always competitive (Gilbert, 2017; McFall-Ngai, 2017; Yong, 2016; Margulis,

‘If you look at fermentation the reason why that was a necessity for many thousands of years was to preserve through the leaner months, in Autumn-Winter, in all those cultures. Now we have this abundance of food so it’s much easier to throw things away.’

– Johnny Drain,
Edible Futures, 2019

1981). Through *multispecies co-creation*, I seek to facilitate of more-than-human attunement through making, that can account for the different ways in which we collaborate across cultures, both human and otherwise.

2.6 Fermenting with the Trouble

I develop fermentation as a practice of *multispecies co-creation* through which we might 'tune in' to microbes through our daily interactions, even when these practices are not explicitly understood as enacting multispecies entanglements. Practices such as fermentation and other forms of food preservation can be a way to understand our bodies as a site of continuous ecological interaction that is shaped by, and in turn has the capacity to shape, our natural/cultural environments. It is an alternative way of cultivating relations between humans and microbes, something that Salla Sariola calls a practice of *microbiohacking* in relation to Bakkeslet working with bakers to revive processes of sourdough-making in Finland (Sariola, 2021).These 'reparative practices' allow us to tune into our ecological and cultural heritages in ways that allow non-scientists to notice and negotiate microbes and their effects (2021). As Maya Hey notes, these microbial investigations work through performative interactions as their own complex sets of 'iterative, reflexive and participatory approaches' that can embody important tacit knowledge to do with science and ecology (Hey, 2017, p.85). These interactions offer forms of 'staying with the trouble' (Haraway, 2016) as a way of ethically negotiating the complex and messy entanglements of living beings with whom we share worlds.

Design offers its own creative modes through which to explore tacit knowledge to do with culture and geography (Gaver, Dunne and Pacenti, 1999), and co-designers are often working through sets of iterative, reflexive, participatory approaches as way to draw this knowledge (Sanders and Stappers, 2014). However Global South designers have been critical of co-design, suggesting that Northern designers are imposing a set of Eurocentric worldviews and ontological commitments onto participants as part of co-creation projects (Abdulla *et al.*, 2019) These practices erase the autonomy and existing knowledge of the most marginalised communities, for whom autonomy, agency and the right to particular ways of life are often already denied (Costanza-Chock, 2020; Abdulla *et al.*, 2019; Escobar, 2018). Escobar sees design practices that work with the knowledge of collaborators playing an important role in responding to this 'ontological occupation' by creating forms that can defend 'people's territories and lifeworlds' from colonialism (Escobar, 2018, p.xvii). *Multispecies co-creation* is one way we might towards world-making practices that can account for pluriversal ontologies that emerge through practice (Escobar, 2018).

To develop a practice of *multispecies co-creation* as engagement I build on co-creation methodologies as developed for user research in collaborative (co-

design) and participatory design. I iterate this framework by incorporating influences from eco art/design and fermentation practices on the one hand, and Science Communication on the other. While co-design is increasingly being used by design researchers as a way to explore 'wicked problems' to do with culture and ecology (Godin and Zahedi, 2014), these do not often take place in the kitchen, where the co-creation practice comprise acts of making together that include cooking, preserving and fermenting. Irwin and Michael assert that those of us who are working in scientific engagement require new modes, categories and ways of thinking which 'mix things up' to draw out scientific knowledge in ways that go beyond the purely quantitative (Irwin and Michael, 2003). As acts of worldmaking, cooking, fermenting and eating offer ontological modes through which to co-exist with others, beyond the ones that we have become accustomed to in the Global North. Working through these practices I seek to agitate or trouble my subject matter to allow new situated and relational knowledges to emerge through 'heretical' foods as multispecies encounter. This is the knowledge produced through the act of designerly (creative, collaborative) making, that in turn produces new questions to do with the *politically-activated* and *relational* aspects of living well together (Escobar, 2018).

I see *multispecies co-creation* as a heuristic for collaboration that can account for the disparate forms of agency that are at play in any given collaborative making activity with human and nonhuman others. I began with Sanders & Stappers' definition of co-creation as not simply making together, but of sense-making (Sanders and Stappers, 2014), towards a co-production of knowledge and cultures as a practice of 'radical relationality' in the kitchen (Escobar, 2018). I further mobilised artist and witch WhiteFeather Hunter's use of the term co-creation as a practice of making with non-human others as a means to refer to the microbial others with whom we are working to produce the outcomes (and to not overstate their agency as 'collaborators') (Appendix A). I developed a practice that was situated in the embodied experiences, knowledge, conditions and practices of my collaborators, as a practice of more-than-human care for the invisible microbes on whom we rely when we eat, through which to pluralise narratives of food futures and sustainability. In my kitchen, my (human) collaborators were rendered tangible as not simply 'experts of their own experience', but as holding expertise on the subject matter itself through cooking and sharing knowledge and experiences over food. Over the COVID-19 pandemic, this became a digital kitchen where we made well together, with other-humans and microbes, through experimental and creative multimedia modes that allowed us to share experience over distance. In so doing, we found ways to co-create relational ecological knowledge on issues to do with climate, culture, community and gender, as a practice of staying, and fermenting, with the trouble.

2.7 Multispecies Co-creation

In this chapter I have explored how practices of co-creation from design and arts-based research have, along with my reading in feminist environmental humanities, informed the development of a methodology I have called *multispecies co-creation.* I have argued that this methodology, enacted through fermentation (as well as other forms of cooking and food preservation/ preparation from which these practices are difficult to disentangle), can inform a practice of public engagement with women from the Global Majority in the kitchen. Drawing inspiration from artistic and design practices that work with the cultural knowledge and microbial practices in diaspora communities, I have suggested that practices that with food can be a way to connect to the tacit ecological knowledge that lives in cuisines from the Global South in ways that facilitate agency and accountability. In conversation with fermentation practitioners, I have further explored how food fermentation is a material practice of situated interspecies and intergenerational care that can also work as a metaphor for kinship and collaboration across differences in race, culture and gender. For designers, it is a practice through which we can tune into ecological and historical cultural legacies and allow us to position ourselves geographically, culturally and politically in relation to our collaborators.

In the next chapter I further build this practice methodology of *multispecies co-creation* working through food preservation as both material and subject matter in the kitchen. This is partly as a performative artistic practice of ecological knowledge production, and then again, an act of co-creation through food dehydration and fermentation. These experiments take the form of co-production processes that reveal multispecies ecological knowledge as a complex encounter between communities, cultures, ingredients, animals, plants and ecosystems. These methodological experiments are a way for me to bring the theories with which I have been engaging in this chapter into a real-world context in order to see how they fare, which parts work, and which fall away, as a way of building an iterative design framework. I must note here that the linear nature of this thesis is misleading. The activities, conversations, readings and musings I describe happened alongside each other, in a non-linear and fluid manner that often overlapped, and more accurately look something like the Figure on page 62-3.

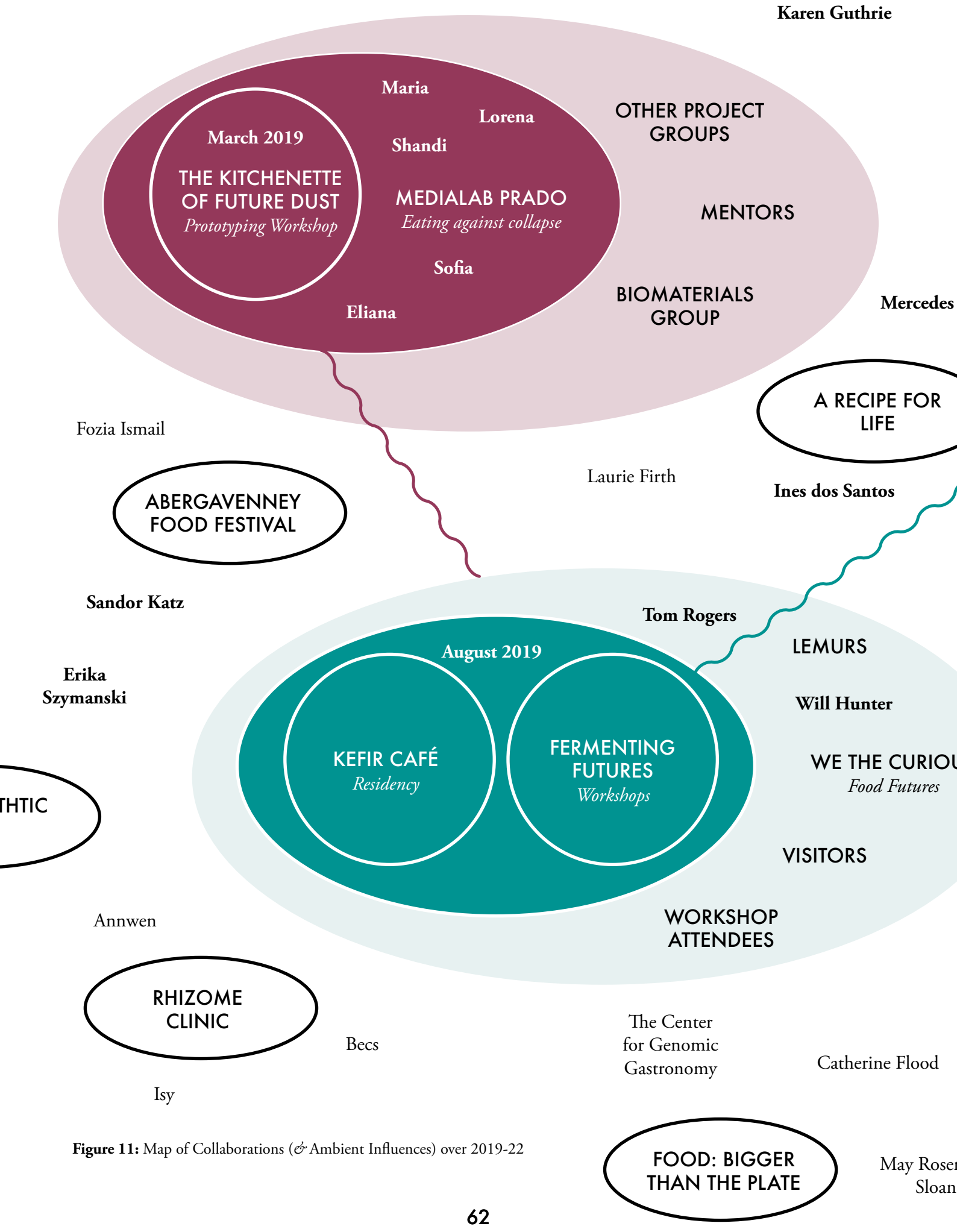


Figure 11: Map of Collaborations (& Ambient Influences) over 2019-22

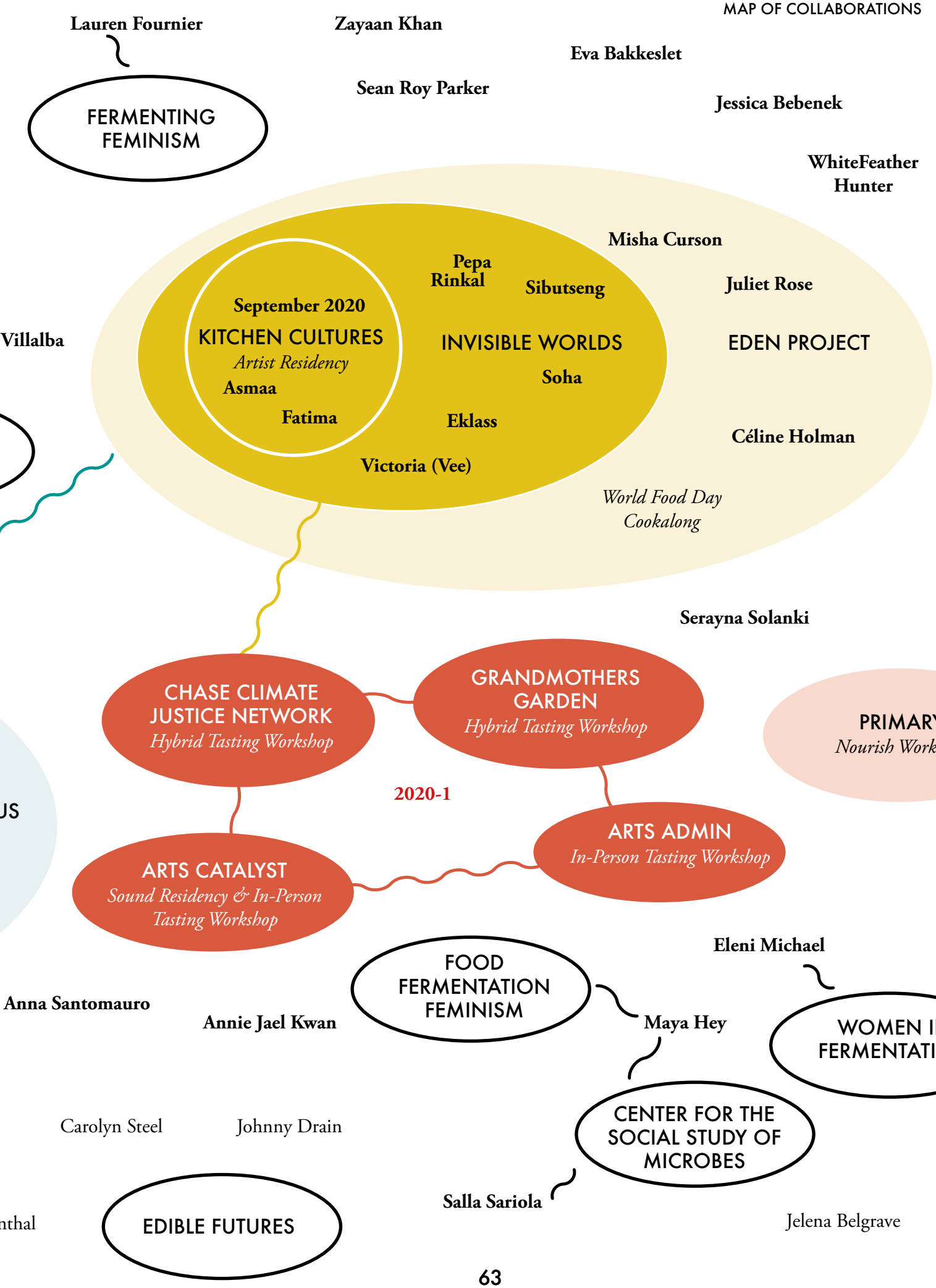
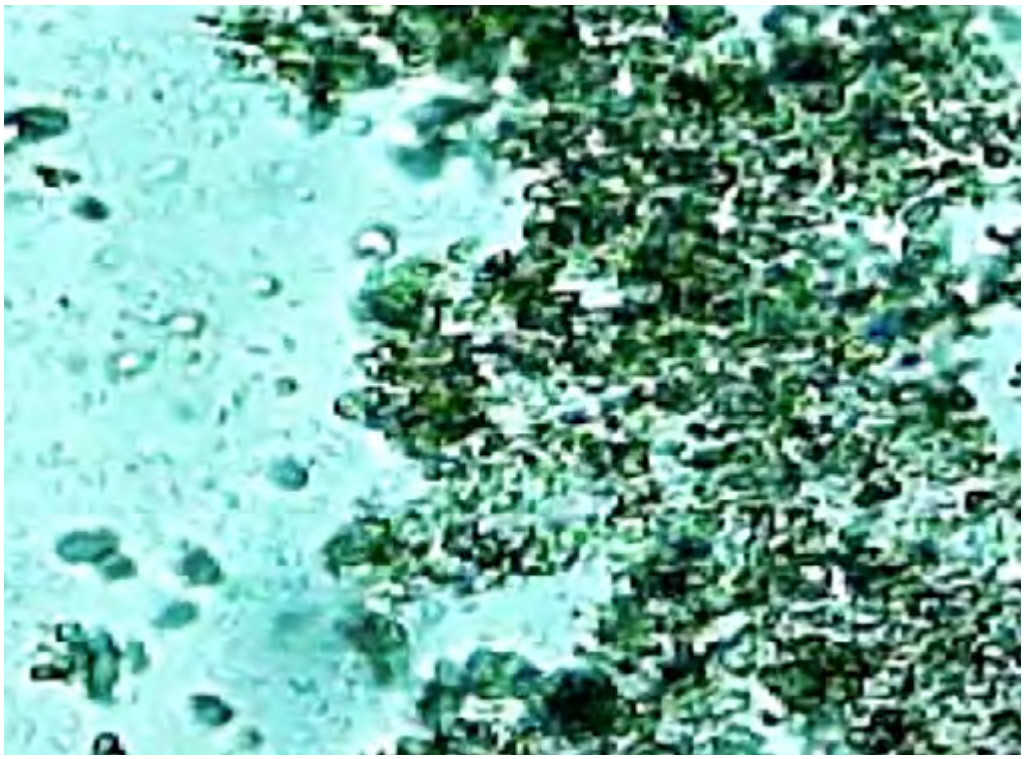

Lauren Fournier
Zayaan Khan
Eva Bakkeslet
Sean Roy Parker
Jessica Bebenek
FERMENTING FEMINISM
WhiteFeather Hunter
Misha Curson
Pepa Rinkal
Sibutseng
Juliet Rose
September 2020
KITCHEN CULTURES
Artist Residency
Asmaa
Fatima
INVISIBLE WORLDS
Soha
Eklass
EDEN PROJECT
Céline Holman
Victoria (Vee)
World Food Day Cookalong
Villalba
Serayna Solanki
CHASE CLIMATE JUSTICE NETWORK
Hybrid Tasting Workshop
GRANDMOTHERS GARDEN
Hybrid Tasting Workshop
PRIMARY
Nourish Workshop
2020-1
ARTS ADMIN
In-Person Tasting Workshop
ARTS CATALYST
Sound Residency & In-Person Tasting Workshop
Eleni Michael
FOOD FERMENTATION FEMINISM
Anna Santomauro
Annie Jael Kwan
Maya Hey
WOMEN IN FERMENTATION
CENTER FOR THE SOCIAL STUDY OF MICROBES
Carolyn Steel
Johnny Drain
Salla Sariola
EDIBLE FUTURES
Jelena Belgrave

Figure 25: Kefir under the microscope, The Kefir Café, Fermenting Food Futures, 2019



Chapter 3

Food Futures & Fermentation Cultures

Figure 12: The Kitchenette of Future Dust, 2019

In this chapter, I discuss and analyse two experiments that I worked on in the first year of my research that afforded me the space in which to develop my thinking and the methodology I outlined in *Chapter 2: Cooking with the Trouble*. This is a space in which I develop a mode of co-creation as not simply making together, but of sense-making, towards a co-production of knowledge and cultures as a practice of 'radical relationality' (Escobar, 2018) in the kitchen. It illustrates the modes through which I began to 'mix things up' (Irwin *&* Michael, 2003), using *s co-creation* as a way to engage publics into more subtle and indirect forms of participation, as a way to create new questions to do with the *politically-activated* and *relational* aspects of living well together (Escobar, 2018). These knowledges are situated in the embodied experiences, conditions and practices of my collaborators. It is where I began to address my research question of how we as design researchers develop material engagements in order to draw out knowledge on how diasporic cultures sustain themselves (both materially and conceptually), and how we might work creatively with these knowledge practices in order to understand how they can speak to issues to do with relational ecologies and multispecies entanglements. It is where I began developing a practice of *multispecies co-creation* as a *framework* for design research that could be used to explore how tacit, performative and embodied knowledges on *nature-cultures* are negotiated in the kitchen by women from the Global Majority diaspora. It is also where I begin to discover how these practices can hold important knowledge and

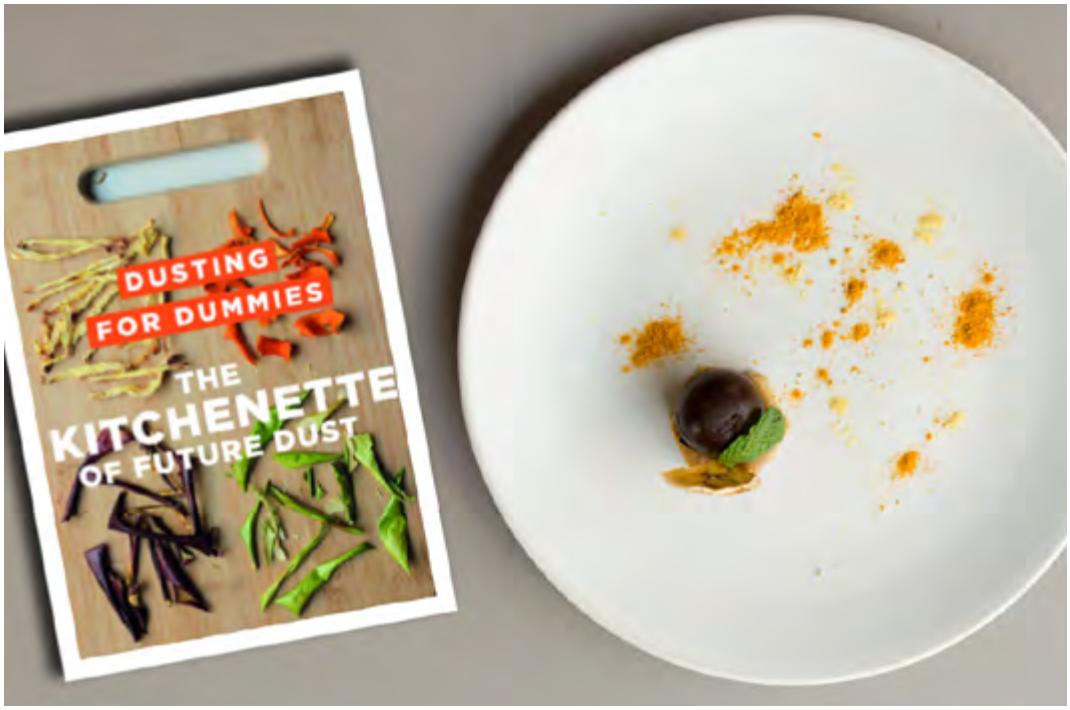


Figure 13: The Kitchenette of Future Dust, 2019

experiences of food as cultural and ecological entanglement with a range of audiences, including Global Majority women in the kitchen (as a prototype for *aunty knowledge*, which I further developed with *Kitchen Cultures).*

The first of the experiments, *The Kitchenette of Future Dust,* was a two-week seminar and collaborative prototyping residency in which I took part at the outset of my research journey, during March 2019. The project was led by Taiwanese designer Shandi YC Hsin, and was part of *Medialab Prado*'s *Interactivos?* 2019 event, for which the proposed topic of exploration was *Eating Against Collapse*. The second experiment that I discuss in this chapter was a solo two-week residency in September 2019 at *We the Curious (WtC)*, in a public-facing demonstration kitchen as part of an exhibit on *Food Futures*. This residency, called *Fermenting Food Futures*, consisted of a public-facing installation called the *Kefir Café*, where I fermented and invited visitors to taste my ferments. Alongside this I ran two evening fermentation workshops called *Fermenting Futures,* to which I invited members of the public, as well as a selection of artists and researchers to ferment with me. All of these kitchen practices became a space in which to co-create relational knowledge on issues to do with climate, culture, community and gender.

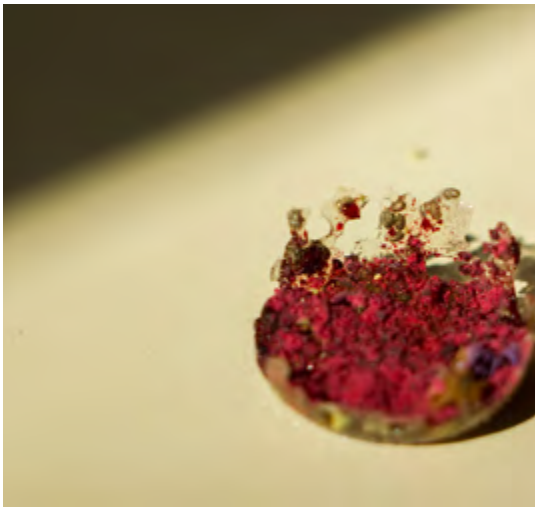
3.1 Interactivos '19? Eating against collapse

Interactivos (stylised 'Interactivos?') are a series of interactive citizen science events on themes to do with science and technology taking place annually at

the *Medialab Prado* in Madrid since 2006. The *Medialab Prado* is a publicly funded makerspace in the Paseo del Prado, the museum district in central Madrid. This is an affluent part of the city that draws tourists from all over the world, yet it borders on Lavapies and La Latina, which were (at the time I visited) two of the most deprived neighbourhoods. They also happen to be the most ethnically diverse, with migrants from all over former Spanish and Spanish-speaking colonies. In March of 2019, the proposed subject for investigation was *Comer contra el colapso, el inevitable fin del modelo alimentario agroindustrial*, or *Eating against collapse, the inevitable end of the agroindustry food model*. The event organisers invited and paid for designers and researchers from around the world to come together and collaboratively and radically redesign our food systems to better respond to the incipient threat of climate collapse. Collaborators were invited to take part in a two-week long residential prototyping workshop on a project of their choice from the eight suggested by people and communities from around the world. Each of the projects responded to the central residency theme of innovative practices, products and concepts that could 'reduce the probabilities of environmental collapse' (Medialab Prado, 2019). This notion of 'collapse' was key throughout the fortnight; the organisers and speakers were insistent that what we were facing wasn't a food crisis, but a potential collapse of the entire infrastructure on which our food system was based.

The topics we were invited to explore through making were a mix of project- and concept-led. Some of the project-leaders came with clearly defined briefs for which they needed technical expertise to implement the outcomes, including 3D animation for a community gardening documentary, a website for a recipe platform, a marketing campaign to engage young people, and an app for an open-source seed bank. Other projects took more experimental, design-led and generative approaches to the subject matter, creating design briefs that were either concept-focused or material-focused (or in some cases a combination of both). One of these looked at ways of recycling *bagasse* waste product from beer production (which produced a series of recipes and crockery/utensils), another that mapped local agro-ecological and alternative food production and sales outlets in Lavapies, (with the outcome a map and a real-time walking podcast). Another was the *Biomateriales* group, which was looking at recycling kitchen waste into biological textile materials, led by sustainable fashion designer Laura Mir Sanjuán. Throughout the residency we had regular meetups and advice from project mentors. These included Luis González Reyes, founder of a local food coop in Madrid, Juan Sánchez García (Nany), a permaculture expert and agroecologist based in Tenerife, and Cathrine Kramer, co-founder of the Center for Genomic Gastronomy, an artist-led think tank. The Center was founded following an Interactivos? workshop in 2009 where Cathrine and co-founder Zack Denfield first met, and together they create projects that resituate biotechnology in relation to the

Figures 14: The Kitchenette of Future Dust, 2019



biodiversity of human food systems

3.1.1 The Kitchenette of Future Dust

The Kitchenette of Future Dust was an experimental and playful intervention proposed by Taiwanese designer Shandi YC Hsin, which was inspired by dehydrated Taiwanese convenience foods on one hand, and dehydrated food on NASA space shuttles on the other. For Shandi, dining and food systems reflect regional weather systems and geographic locations, as well as cultural and social influences. In our workshop group, we were led by Shandi into an investigation of food preservation and preparation techniques from our respective cultural heritages, as a way to think about alternative approaches to addressing the climate crisis from the kitchen. The project we developed and delivered was called the *Kitchenette of Future Dust*, a manifesto, cookbook as open-source protocol that utilised food dehydration techniques, and recipes using dehydrated ingredients, for the future of food on Earth, and beyond. Dehydration has historically been used as means to store and transport large quantities of food within limited space, using minimal energy resources, for millennia. Dehydrating food inhibits the growth of bacteria, allowing it to be kept for longer, and we still use dehydrated ingredients in our everyday cooking, with the most obvious examples being spices, fruits, flour, grains, coffee, beans, lentils and nuts. Utilising a combination of traditional heat-based cooking and molecular gastronomy techniques, as part of the project prototyping phase we created a practice of food preparation using dehydrated ingredients that looked to retain the joyfulness and sensory abundance of historic food making, and the social and cultural aspects of food sharing, while looking towards a technoscientific future. We bought food locally, and also collected food waste from the on-site café, and used this where possible in the recipes we developed. In the course of a day, we would collect food waste, buy

extra food, experiment with recipes, and in the evening, we would start a batch of foods to dehydrate overnight that we would experiment with the next day.

We found that the different cultural perspectives that we were bringing into the kitchen highlighted differences, some that worked well through combination (different flavour, method and ingredient combinations) and others that almost didn't work at all (different modes of working), but that resulted in some surprising similarities and synergies. The tensions and contradictions for the most part yielded important insights into our practice, and the group outcomes. For example, a coconut-based 'drink' we prepared from coconut flour and dehydrated lemon, and garnished with foraged purple pansies, emerged from the drinks from all of our respective cultures (e.g. lemonade, mate, bubble tea, thandai, pina colada!). A 'sweet' we prepared using a molecular gastronomy technique with isomal was flavoured using dehydrated fruits that reminded us of home (rhubarb, pomegranate, lemon). The most enduring theme that emerged was that of ritual, and of performing cooking labour as an act of care. This wasn't always frictionless! Firstly, we were working in a space that wasn't set up as a kitchen, so we had to almost recreate a kitchen from scratch in a studio environment. We all also had to re-learn working in a kitchen that wasn't quite a kitchen, as we had to 'build' our own kitchen in the studio from what we could find in the store. This forced us to re-examine our own pre-existing habits around how we cook, and the assumptions that came with that. Our nearest sink was a 50 metre walk away, so we had to be careful about creating mess, and as we were not set up for kitchen safety and hygiene, we had to institute the rule that people only tasted our food if they were comfortable with that risk. We also had to negotiate how we worked in that pseudo-kitchen, and in the end created a set of 'rules' that were written up on the windows and walls (See Figure 14).

At this point it began to become apparent how much the culture and food of Spain was shaped by the cultures and diasporas of the former colonies, of which many of the project collaborators were part. All of us were from cultures that valued the rituals of the kitchen, and the way in which food acted socially, culturally and symbolically. L, prompted by a conversation over dinner with Cathrine, was particularly taken with the idea of dehydrated food as dust as a metaphor through which to think through migration and sustainability. She and her colleague E, an illustrator, both worked to bring a strong visual and conceptual identity to the project, and Colombian flavours. S, an Argentinian filmmaker, was excited to explore molecular gastronomy techniques and took most of the photographs for the project, further developing the visual identity. M, the Spanish artist and producer who joined us in week 2, worked with S on this, and was interested in exploring how Spanish rural traditions re-appeared in Spanish colonised nations through shared food and cooking rituals. S and M had both lived in La Latina, an area where many migrants from former Spanish

colonies live, and that got us thinking about how these practices then returned to Spain and evolved and adapted to the European context.

Much like fermentation, dehydration allows us to think through metaphoric affordances that can underpin different imaginaries for sustainability. Dust is both ephemeral and material, in that has the capacity to transgress boundaries, to cross-contaminate people and ideas, and to leave a residue. By responding to the project themes in metaphoric as well as material modes, we wanted to disrupt normative associations of food in the future as purely functional, and in doing so to encourage people to re-imagine their relationship with it in the present. We wanted to 're-ground' how we often think about food in science fictions, to get people to rethink their place within food production chains, and the wider biological, cultural and ecological systems within which these are entangled. We were in no way proposing dehydration as a complete solution to food collapse, but instead aimed to playfully suggest alternatives to dominant and hegemonic narratives of technologised futures as places in which we still had to cook, and eat. In doing so, we wanted to push for an incorporation of different cultural values in how we might eat in the future, and to think about how this might look from multiple, and even non-human, perspectives. Like fermentation, this is a conceptual way of exploring notions of cultural practice and survival that work in negotiation with material pragmatics of working in the kitchen.

My work as part of this project allowed me to broadly begin to formulate my interest in food futures, and to develop a practice of *multispecies co-creation*. This was primarily through an initial exploration of food-based co-creation in the kitchen through dehydration techniques and collaborative making as a way to situate knowledge and expertise. It also led me towards non-European knowledge and cosmologies, and how these shape and are in turn shaped by food practices. It allowed me the space to begin to think about food waste as a way to accessibly and materially engage with sustainability. I also at this point began to play with the cookbook and recipe format as a way to invite situated knowledge in terms of the way that recipes are 'interpreted' based on the 'users' knowledge and the ingredients available.

3.1.2 Kitchenette Reflections

Interactivos? was an important site of thinking, making and reflection for me, in that it sowed the seeds of my own food-based preservation practice, and introduced me to many of the concepts, ideas and ways of thinking that would inform the next stages of the research. Food dehydration is used by cultures from all over the world as a survival practice, but that tends to be mainly in places with sunshine as an abundant resource. The notion of adapting to context and working with what is available is an important practice of survival in migrant communities, and it served me well when I

Figure 15: The Kitchenette of Future Dust, 2019

had to again adapt my practice to respond to COVID-19. One of the biggest problems with the project was that the *Kitchenettas* had to dehydrate our foods using a dehydration machine, which was both energy and time intensive. The collective inter-cultural kitchen practices we were sharing seemed to me, however, to be something special. I wanted to bring that collaborative practice, and the ephemeral and material affordances of working with dust, into the next stage of the project. Throughout the two weeks, the interplay between materiality and metaphor became particularly central, as did the idea of more playful yet grounded, mystical modes through which to imagine 'the future'. I was particularly drawn to the metaphoric affordances of dust as something that is both ephemeral and material, and that has the capacity to transgress boundaries, to cross-contaminate people and ideas, and to leave a residue. This in turn informed how I continued to explore practices through my subsequent research, and particularly drew me to a similarly metaphorically evocative practice in fermentation.

Fermentation is a practice of food preservation that works both materially and metaphorically as a way to continue my exploration of food, sustainability, cultures and climate change. Food fermentation can, and is in fact performed in many climates, and across many different cultures. This is a practice that can evoke the idea of inter-cultural collaboration in multiple valences and at many scales, with cultures working at the human and microbial level. To explore this

idea further I started to experiment with fermenting food waste in my own kitchen and developed this into a residency format that I could deliver as a practice of engagement in a public-facing kitchen at *WtC* that summer. The residency started me thinking about how different food systems interrelate, and made explicit to me how much communities in the Global South shape the food cultures of their colonisers, and of other colonised countries where trade routes would intersect in the past (for example with the widespread distribution of potatoes, tomatoes, chillies, bananas). It also opened up concerns about collaborating across different cultural practices, habits, tendencies and even (as a non-Spanish speaker) language. Yet the material practice of working with food and food waste kept us grounded in the issues. Most of the collaborators went back to other parts of the world after the residency, however I stayed in touch with S and M about potentially collaborating on some work in Spain to do with local cultural cuisines. I also reconnected with Shandi in 2020 when I saw a project she had worked on to do with fermentation, and in the email exchange she mentioned that original project had inspired the Kitchenette brief, with dust figuring as a metaphor for 'preservation' that could also be read as microbial.

For a full report of the event, the speakers and the practice over the two weeks, as well as the other projects that made up that Interactivos, please see Appendix B.

3.2 Fermenting Food Futures

Post-Interactivos, over summer 2019, I played with fermentation practices in my own kitchen. Alongside my reading in Feminist Environmental Humanities and Science Communication, I found that this practice kept me grounded in the issues in messy and pragmatic ways. It stopped me from becoming to abstracted with the conceptual elements of the practice, and with my language. There is a danger that the language and concepts being used by feminists within the environmental humanities, a field of study which explores how society and ecology are co-constituted, are often inaccessible to the communities who are most marginalised (Todd, 2016). There was also a danger that in working in 'scientific' spaces such as labs and start-ups, which I was initially considering, might also exclude the people I had begun to think I wanted to include, i.e. women from the Global Majority diaspora. As someone who was at that time new to Bristol, I didn't initially have a community of fermenters I could contact for starter cultures, so I began by working with lactic fermentation, which used the ambient microbiome of my ingredients, my hands and my environment as a starter.

As this changed, and I began to connect with other fermenters, I still found myself drawn back to this 'ambient' practice as a way to render tangible the microbiome of our environments. I wanted to take my experiments and everything I had learned so far into a space where I could invite others to taste my ferments. I did this partly as I wanted to see how my ferments would

Figure 16: The Kefir Café, Fermenting Food Futures, 2019

behave in an 'unruly' environment, where I was less able to control the ambient microbiome, and partly to develop a practice of public engagement that could facilitate the drawing out of the types of hidden and tacit knowledge that I believed exist in our food practices. To this end I organised a residency with *We the Curious* (*WtC)* in Bristol during their 'Food Futures' season in August 2019. The residency at *WtC* consisted of a two-week long public-facing practice in the permanent Food exhibit, called *Fermenting Food Futures*; this consisted of the *Kefir café*, a daytime 'living' installation aimed primarily at families, and two evening fermentation workshops, *Fermenting Food Futures,* aimed primarily at adults. The aim of the residency was to develop an individual practice of fermentation to begin to work through some of the ideas that had emerged from Interactivos? around co-creation, adaptation, migration and food cultures. Additionally, by working in a kitchen that was also a demonstration space, I thought that this practice could act as a 'starter' for conversations with families visiting the exhibition, the beginning of an engagement practice that used taste to engage people into discussions about our food web. This took the shape of two evening workshops that were conceived as a collaborative making space in which ideas of knowledge-generation could be explored through the practice of food-based co-creation that had emerged from the *Kitchenette of Future Dust*. Taking these ideas forward, I began to use my individual practice of iterative making and the conversations and tasting activities into which I was inviting visitors as an initial prototype for *multispecies co-creation.*

3.2.1 Locating the Kefir Café

WtC, formerly At-Bristol, is an interactive arts and science centre and educational charity with an extensive community engagement programme. The Food space in *WtC* includes a greenhouse and demonstration kitchen that is used for daily workshops on food and sustainability by the Live Science Team (known as Lemurs), and I was keen to build a narrative that could show the links between growing and eating by working between the two spaces. The demographics for *WtC* during summer are mostly families with young children, sometimes parents but often grandparent carers. The ages of children ranged from 4 (most common) to 16 when they had groups visiting from schools. During the summer holidays, the centre might get around 2000 visitors per day, particularly on weekends and/or rainy days. The residency took place at *WtC* during a *Food Futures* exhibit, which consisted of a greenhouse growing unusual spices and herbs, an installation exploring dairy farming, photographs from around the world on different types of farms, and screens showing provocations about how we might reimagine our food system. As part of this the Lemurs ran a twice-daily storytelling activity about chocolate. Participants were led in a multisensory story through smell, texture and taste with chocolate samples to teach them about the origins of chocolate, how it is made, and also how the ecosystems in which it is grown are at risk, so that they might not be able to buy chocolate someday.

In preparation for the residency, the kitchen was dressed with a large brightly-coloured illustrated banner for the *Kefir Café* that was attached to the front of the counter, which showed bubbles and steam escaping from pipes, and bacteria and other microbes swimming about in the liquid and gas (see Figure 15). Some 'character coasters' for some of the important microbes in fermented foods, including bacteria and yeasts, with key character traits and information about where they lived, and colouring sheets of illustrations and crayons for the younger children were produced (see Figure 18). A full on-site risk assessment was carried out, and ethical approval had to be obtained for people to taste anything that was made (see Appendix C). At the time I was not food safety certified, so I had to have either a Lemur or a volunteer with me at all times. Safety and allergen information had to be clearly on display, and that it was signposted prior to any interaction. Some poster provocations were also created for the workshops, and recipe cards for four fermentation recipes that used commonly wasted ingredients were available for people to help themselves. These were for a kefir, a kimchee, a kombucha and an Indian-style curd yogurt called dahi. There was also a card that people could fill out with their own recipes, that I planned to incorporate into a further iteration of the project. I only got a handful of responses to this, but one in particular was very influential in my thinking as it referred to a Somali 'atjar' (See Figure 19).

The residency began with a daily practice of water kefir fermenting, which

AM	
9.30	Pick up fruit/veg from Hugo's
10.00	Arrive at *WtC*, pick up pass from security office.
10.15	Prepare for visitors by taking bottles of water kefir out of fridge and putting out with slides and microscopes. Unpack fruit and veg. Empty dishwasher.
10.30	Check lacto-ferments from day before. Take bottles of water kefir out of the cupboard, tighten lids and put in the fridge for stage 3. Cut up fruit and put into bottles, pour overnight stage 1 into bottles for stage 2 and label, put in cupboard with loose lids. Feed the leftover grains to start stage 1 (again). Fill dishwasher, start.
PM	
12.00	Lunch, pick up any extra fruit/veg from Sainsbury's. Pop by Arnolfini PGR office to pick up extra cards/colouring sheets/coasters/jars.
1.00	Make pickles and chat with visitors, empty dishwasher.
2.30	Fermentation food story (see below).
3.00	Tidy up from food story. Make pickles. Chat with visitors. Fill out diary. Film clips of microbes.
4.30	Tidy up from making pickles. Take bottles of water kefir out of the cupboard, tighten lids and put in the fridge for stage 3. Cut up fruit and put into bottles, pour overnight stage 1 into bottles for stage 2 and label, put in cupboard with loose lids. Feed the leftover grains to start stage 1 (again). Check lacto-ferments, loosen lids. Fill dishwasher, start.
6.00	Return pass to security office.

Figure 17: Daily Schedule, Fermenting Food Futures, 2019

Figure 18: The Kefir Café, Fermenting Food Futures, 2019

is a form of non-dairy ferment that creates 'fizzy' drinks (see Figure 22). I chose to focus on making water kefir so as not to exclude people with lactose-intolerances, but also because it has a pleasant, mild sourness which is easily disguised with a second fruit-based ferment (whereas milk kefir can be more of an acquired taste). The kefir recipe I followed can be found in Appendix C. Another reason I chose it is that water kefir is not widely available as a drink, whereas milk kefir is becoming fairly ubiquitous in supermarkets, so it had an added novelty factor. Water kefir grains are a symbiotic organism consisting of bacteria and yeasts that look like clear-ish jelly nodules. They are different to milk kefir grains in that the milk kefir organism is whiter and needs to be fed lactose to live, whereas water kefir can survive on simple sugar water. Kefir requires three stages of fermenting: stage 1 to culture the grains, stage 2 to add fruit, and stage 3 to create the 'fizziness'. I had to stick to a strict schedule as kefir ferments quickly and requires regular daily care (see Figure 18 for excerpts the fermentation diary I kept during this time)

Alongside Kefir, lactic ferments were fermented by pickling vegetables (carrot, cauliflower, broccoli, cabbage) in brine and a kimchee (a Korean brine pickle with cabbage and spices) (see Figures 16– and Appendix C for all recipes used). Lacto-ferments are brine-based pickles in which vegetables are kept underwater, so that the only bacteria that can grow on them are lactobacilli, which respire anaerobically (without oxygen). Originally the plan was to join up with the on-site café at *WtC* to use their food waste in these experiments, however permission was difficult to obtain as the café was privately-owned by a contract

company. This meant that fruit and vegetables had to be picked up from the greengrocers every morning. (See Figure 17) It's important to note, however, that as *WtC* is an interactive science centre with daily visitors numbering up to 2000 that is open every day, I had to always be ready for interruptions in the form of someone coming up to the counter and asking about the work (and often ordering a coffee!). This had an impact on my schedule, and some days I couldn't take lunch, and others I was there till much later than 6pm. I took one day off, the Sunday in-between the two weeks, and both Thursday evenings were spent running evening fermentation workshops. This was my first taste of how fermenting enough to feed others is an intensely time-consuming and labour-intensive process.

Every morning, each flavour of water kefir from the fridge had to be set out, and slides made for each, and set them out under the microscopes that I had borrowed. Fruit and veg had to be collected and unpacked for fermenting for the day, and the dishwasher had to be emptied from the night before. All the pickles had to be checked to ensure they were secure (one of the days a jar had exploded, so lids had to be loosened every night). The rest of the day was was taken up with the kefir fermentation process that had to be conduct twice, once in the morning, and once in the evening. I tried to add a different fruit to the second ferment each day, so that visitors had a variety of flavours to taste. The most popular were apple, which were I made from apple juice and tasted 'like cider', and strawberry, which were from fresh strawberries and tasted like 'strawberry-flavoured pop'. The kefir became fizzier much more quickly in the demo kitchen than they had in my home kitchen, which I suspect was due to the ferments interacting with the (much more lively) ambient microbial environment of *WtC*. Sometimes when the kefir ferments weren't quite ready, they were left overnight. This was particularly apparent on a day where they were fed honey (which I later learned is because honey has antimicrobial properties), and on the Friday after the first workshop where I gave away some of my kefir grains (see more on this below). Conversely, the day where I fed them maple syrup seemed to result in fizzier more 'lively' ferments. However, this could just as likely have been because the environment in the centre was more microbially diverse or humid due to increased numbers of visitors, or because of some other environmental factor which I was unable to measure or quantify. Kefir grains were shared once they had multiplied enough, however sharing cultures threw off the whole rhythm of growing. This meant my visitors missed out on one day of a kefir batch, and this could only be recovered by adding a second colony of kefir grains. At this point, the population exploded. This could have been because two different cultures/colonies were interacting and creating a new symbiosis. Or maybe it was that the cultures had been fermenting for long enough for there to be a multiplication 'tipping point', or because this was around the time the sugar source was changed to a syrup instead of an organic unrefined sugar.

Figure 18: Fermentation Diary, The Kefir Café, Fermenting Food Futures, 2019

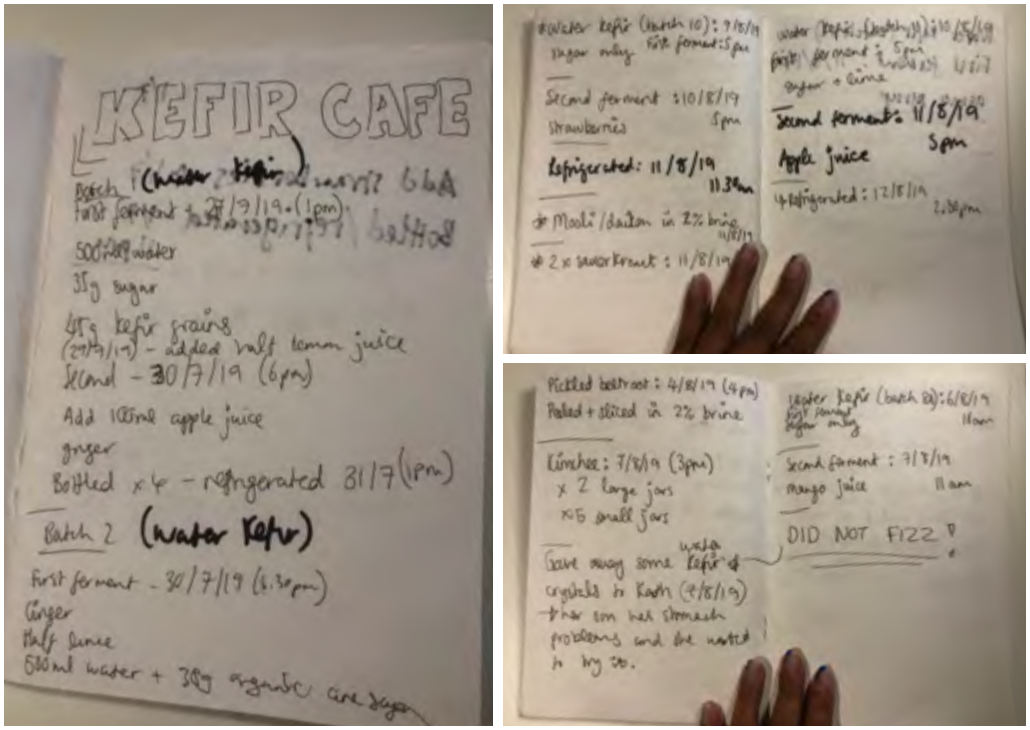


Figure 19: 'Share Your Culture' Cards, The Kefir Café, Fermenting Food Futures, 2019

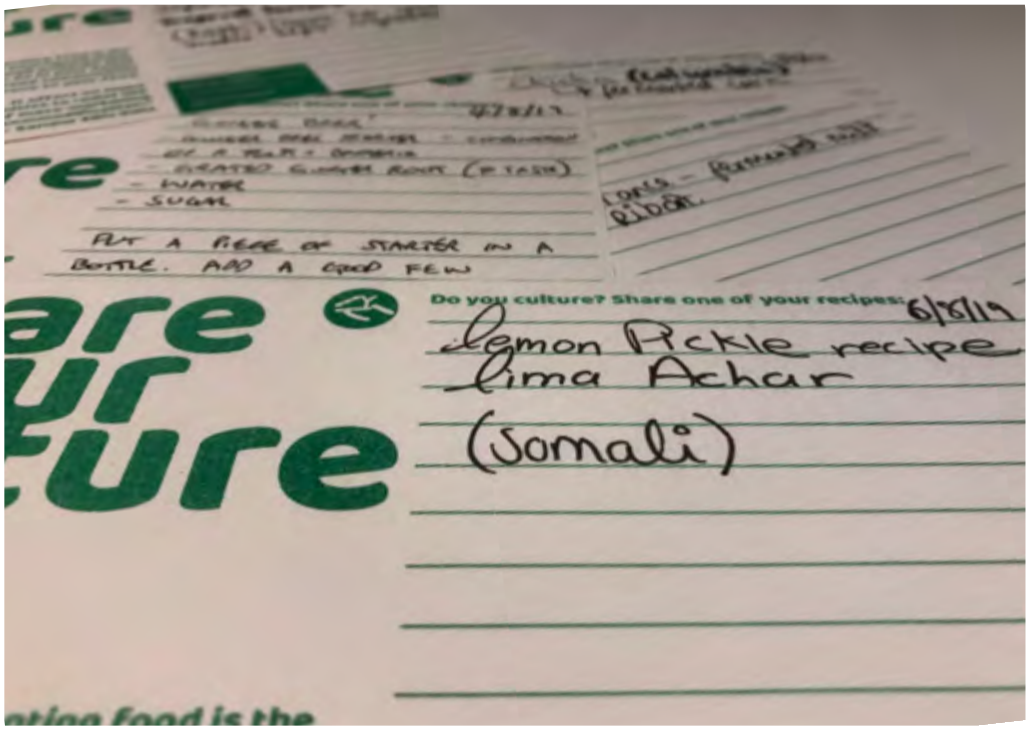


Figure 20: Coasters & colouring sheets, The Kefir Café, Fermenting Food Futures, 2019

With *Fermenting Food Futures,* I was attempting to create a context for encounter with some of the concepts I outlined in the previous chapter. Namely ideas I have been working through around food fermentation, multispecies care as collaboration, and metabolic ecologies (the interrelationship between our bodies and other beings in our food web). I wanted the kitchen at *WtC* to be a space that allowed for curiosity, exploration, and knowledge sharing, much like the space we developed at Interactivos? with the *Kitchenette of Future Dust.* I wanted to create democratic spaces in which expertise could be disrupted, and interesting discussions could be had between people from diverse backgrounds and different levels of scientific knowledge. However, this becomes difficult when most people are there for a few hours at a time, and most of them simply want to learn, or want their children to learn, about 'good' and 'bad' microbes. This speaks to the forms of binaristic thinking about human/other, nature/culture that Ursula Heise has argued underpins Eurocentric ecological thinking (Heise, 2016). This is an ecological ontology that sees human bodies as antithetical to, rather than a part of nature. It speaks to the forms of instrumentalisation that both Paxson and Katz are concerned with, as ways of engaging with the microbial in terms of how they benefit human health, rather than learning to work with them on their own terms (Drain, 2020; Paxson, 2014)

What struck me about my daily practice of fermenting was that I had a responsibility to the bacterial life I was creating; in practice this meant that I couldn't take a day off but had to come and check on my colonies everyday (I took one day off in the middle and it disrupted the fermentation rhythm/cycle completely). I was, in effect, living in that kitchen; I was making visible the domestic labour of food preparation, cleaning and washing up as a practice of care on which these practices rely, and I was doing so in a way that was

constantly under scrutiny by visitors to the exhibit. I was not only feeding my visitors, I was feeding my microbes in order to be able to feed my visitors, and they were both my responsibility. I was doing so in a space that I was sharing with others, in a building that I only had limited access to. This resulted in an artificial separation between my life and the work, that resulted in a 'performance' of care labour in a demonstration space for public consumption. The public responses particularly highlighted the gendered aspects of these forms of labour (not simply cooking and washing up but educating and informing). These forms of 'performative material interactions' in co-design practices that rely on iterative, reflexive and participatory methodologies, as a set of performative interactions that are also part of fermentation practices (Hey, 2017). These practices comprise an entanglement with time, place and context in a way that precludes, or at least renders more difficult, the act of generalisation or romanticisation that fermentation often invites. Whenever I found myself becoming too abstracted with the metaphor, the materiality of the practice once again brought me back to the context.

The 'chocolate' food story to introduced people to the idea of sustainability and climate relationships through taste. I found my own practice influenced by this activity, and after a few days I started to run a 'food story' of my own using the ferments I was making. This was not a documented activity; it evolved quite naturally from conversations about fermented food and drink into engagement practice that could work intergenerationally between family members. First families were invited to taste and look at the ferments under the microscope. They were then invited to taste and to look at the other ferments while I told the story, in which I would talk about the microbes in our food, our bodies and our environments. Sometimes the children would be encouraged to get soil samples from the greenhouse so we could look at them under the microscope and make links between all three microbial ecologies (soil, food, bodies). During this time, I kept a regular fermentation diary for the entire period I was in the kitchen. It consisted of what I was making, the times at which I was fermenting the various kefir stages, and notes about interesting comments and feedback from visitors (see Figure 19). I also filmed clips of my ferments, and of the sauerkrauts my workshop participants made in the first week.

3.2.3 Fermenting Futures Workshops

The two workshops took place on consecutive Thursday evenings during the residency. These were intended as a space in which attendees could work with people to develop and extend the fermentation practice and metaphor that was being explored through during the daily residency. To do this work, it felt appropriate to work with adults and multigenerational groups rather than children. Adults could bring their pre-existing knowledge of food, cooking, preservation, ecology and health into the space as part of a collaborative practice. To recruit people to the workshop, invitations were created to give

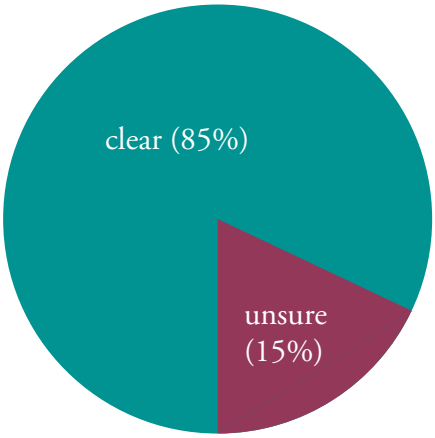
out to people during the day, and the event was advertised the event on the *WtC* website. Certain people were invited directly, such as Katy Connor, a bio-artist based at Spike Island, and Anna Roessing, a researcher and former microbiologist interested in DIY artistic biohacking techniques based at the University of Bath. The first workshop lasted 2 hours, and consisted of 8 people, plus Tom Rogers, the Food Exhibit Manager, to assist. Everyone was invited to introduce themselves through a food or fermentation story. In this workshop, most of participants were women between the ages of 20 and 40 who were interested in food fermentation for health reasons. One of the volunteers from *WtC*, the only man, was there to find out more about the science behind fermentation.

Katy and Anna were both interested in the event as a way to explore artistic-scientific engagement as extensions of their own practice. I outlined the workshop objective: to explore fermentation as a practice of sustainability that could enable us to reduce food waste in the home, and as a way to materially connect us to ecological systems. I also explained some of my initial thinking about how it could be a metaphor through which to understand sustainability as a practice of both preservation and transformation, and of collaboration across difference (a metaphor I would later extend to talk about migration through my work with *Kitchen Cultures* in Year 2; see Chapter 5). Attendees were led in a sauerkraut-making activity while we discussed fermentation as a cultural, artistic and scientific practice. Everyone got to choose different ways in which to 'adapt' their sauerkrauts to their specific taste, including by adding spices, fresh radish and ginger, and unusual herbs that were growing in the greenhouse. At the end of the session, I answered any questions the group had about fermenting, shared out some of my kefir grains, and held the ferments 'hostage' for the week. This was partly as Tom wasn't initially sure if the risk assessment covered people taking the sauerkrauts home 'before they had fermented'. However, this worked well as an incentive for people to return for week 2 so that the knowledge in the workshops could grow and adapt through sustained engagement with the same group. It also allowed me to create daily film clips of the bacterial growth in each of the sauerkrauts, which I then shared with people at the end of the residency.

The second workshop was advertised as a kimchee-making workshop but intended as a social space in which we could continue to experiment with and learn from each other, building on the work we had done in week 1. This was assisted by Will Hunter, the Creative Producer at the centre. Everyone who was returning from week 1 were asked to bring an ingredient from their own kitchen that they might have been about to throw away. Four of the participants returned; one of them brought some carrots that were slightly wilted, and another brought half a cucumber. As well as the sauerkrauts from workshop 1, participants were offered a collection of the ferments I'd made during the

How would you rate the workshop?

How clear were the research objectives?



Would you try fermenting at home?

yes (100%)

Would you come to future events?

yes (100%)

Like to be kept up-to-date with the research?

yes (100%)

Favourite parts

'Tasting different ferments, getting to make my own, seeing the bacteria under the microscope!'

'The process involved and how informative the instructor was.'

'Learning so much about fermenting and how easy it is to do at home.'

'Interactive and informative with a healthy amount of group discussions.'

'Getting stuck in to making the sauerkraut whilst chatting to others on the table.'

'How art, science and food intertwined!'

'the hands-on and friendly approach.'

Improvements?

'Wasn't sure if we were giving you what you needed for your project!'

'More info on the art aspect maybe but overall a brilliant workshop.'

'Learning so much about fermenting and how easy it is to do at home.'

'More tasters please.'

'More theory and background to our microbiome and the benefits of fermented produce to a wide variety of human wants and needs .'

'longer? so there's room to maybe develop a second trial in the time??'

Any other comments?

'I really enjoyed how after the initial intro, we were left to create our ferments in the way and with the ingredients that we wanted and also at our own pace. It was very relaxing and the I felt the activity helped the group bond and be creative!'

'Kaajal's boundless enthusiasm for the subject is infectious. She has definitely got the bug(s)!'

'It was really excellent to play around with all the different types of fermented food. Thanks for the grains as well!'

Figure 21: Workshop Feedback, Fermenting Food Futures, 201

Figures 22: 'Hostage' ferments & ferments to taste, Workshops, Fermenting Food Futures, 2019

residency, plus some locally fermented produce (including cheese, wine, cider and bread) to taste. This was a way to make the space more social, and to begin to build the conversation around fermentation through familiar and unfamiliar tastes. The intention was to explore how the flavours produced could encourage conversations about our relationship to our food web, and how this might encourage us to think about sustainability in a more intimate, everyday way.

As well as the kimchee-making, I had intended that participants would be led in an experimental activity with the ingredients they brought with them. However, one of the women had come to the residency during the day, and her young daughters were excited about learning fermentation recipes, so she had asked if she could bring them with her. This changed my plans, as they had to be supervised more closely with kitchen implements and needed more direction. This left my 'experienced' fermenters from week 1 unsupervised with some brief instructions on how to do a simple brine lacto-ferment of the carrots (a variation on the sauerkraut recipe they had made the week before), and some reference books to ferment the cucumber. Meanwhile, I worked with the new participants on the kimchee recipe. Apart from the woman and her daughters, who stayed with me on the second table, most of the group moved between the two tables, snacking and chatting. The 'experienced fermenters' activity was more social/experimental/self-directed (with participants from the previous week), whereas the new fermenter activity was much more directed/educational/instructional (with the new people and the family). At the end, we all came together and made a quick fermented tomato salsa, and the two groups were able to merge and discuss what they had learned. The first workshop was an introductory space in which to introduce the subject matter, of fermentation as an ecological practice that connected us to microbial ecologies in our environment. The second was a week later and allowed some of the ideas to 'ferment' with people at home so that they could come to the second week with their own thoughts, ideas and reflections on the practice. Videos of the ferments evolving the week were played in the background as we

Figure 23: Water kefir, The Kefir Café, Fermenting Food Futures, 2019

Figure 24: Ferments ready to be viewed under microscope, The Kefir Café, Fermenting Food Futures, 2019

snacked, chatted and fermented, and people from week 1 were excited to watch their 'babies' grow. This initial excitement indicated participants beginning to think about their relationships to microbial ecologies. I named each ferment and therefore each video with the name of the maker, and it was interesting to see how each of the attendees anthropomorphised 'their' ferments as this invited them to feel a sense of kinship.

3.3 Further considerations on Food Future & Fermentation Cultures

In this first year I explored three iterations of a co-creation methodology based on feminist foodways, co-design and artistic fermentation practices. Through these experiments, some of the key concepts that underpin my thesis, namely that of Global South perspectives, sustainable cultural practices and fermentation as co-creation, began to take shape. Through *Kitchenette*, I began to explore how working with other women from the Global South could bring a more cultural element to thinking about sustainable food practices. The residency and workshops that comprised *Fermenting Food Futures* allowed me to explore how I might begin to engage others into these debates through touch, taste, smell and storytelling modes, inspired by the Science Communication activities taking place at *WtC*. *Kitchenette* showed how working with food preservation practices as co-creation might allow considerations of culture and climate to emerge in novel and unexpected ways. They did so partly through the recipes themselves, and then again in how myself and my collaborators developed, encountered and contextualised them to ourselves, and discussed them with our audience. It allowed me to explore food-based co-creation with migrant women from the Global Majority, and the *Kefir Café* allowed me to develop my fermentation practice in a situated context, where I could also invite people to reflect on the process of fermentation through taste.

The *Fermenting Futures* workshops allowed me to explore a practice of fermentation as co-creation and showed how the practice of making together allowed other, more tacit forms of knowledge to emerge. The recipe cards (See Figure 19) I gathered and invited visitors to fill out as part of *Kefir Café* captured some insights, but due to the number of visitors who came through the space daily I wasn't able to follow up on them in detail. Feedback from my workshop participants also focused on my knowledge about fermentation, and while they all seemed to enjoy learning about it, I didn't quite have the time or resources to draw out my participants' knowledge. This made me think that the format I was working with was too directive, and I began to think I could create recipes using an experimental-style collaborative model, such as the one that emerged from the evening workshops. I started to think about how I could share this through a toolkit like the chocolate box as the basis of an activity with fermented foods.

Doing the workshops as a daily 'food story' in the café felt very directive and instructional and less engaging due to the format and the number of

participants (often 20+ people would come to the space for events). While I was working in the kitchen space, there was a 'Hello' event, which provides free and discounted tickets to families from socio-economically challenged neighbourhoods for particular weekends through the year. There were large families with all generations represented, however I found that delivering my microbial story to such large groups, all with differing levels of interest, engagement, capacity and scientific education, became a real challenge. Both weekends I was there, I had to let the Lemurs run the *WtC* chocolate food story run during regular workshop times and did smaller activities at the kitchen counter in-between. The ongoing interactions while I was working in the kitchen space felt more natural as discussion spaces, as these were usually either one-on-one, family, or a couple of families, and could take place alongside my own practice. At the same time, being required to explain my work to families as they came through the space kept my work grounded and forced me to consider my practice using accessible language and concepts instead of becoming too abstracted or conceptual. In some ways, this meant that the process of collaborative engagement was ongoing and threaded through my practice from the beginning (even when it was inconvenient for me). It yielded insights I couldn't have come to on my own, and often these contradicted my own feelings and expectations on the subject. This is a tension I have continued to pursue in my work as my practice has evolved.

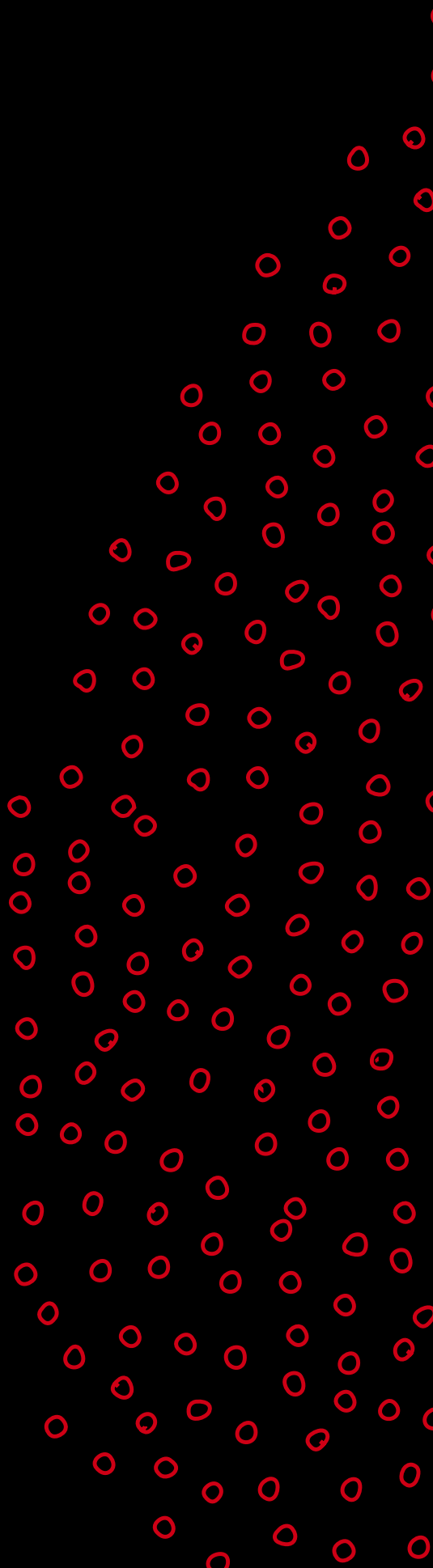
Over the course of my two weeks at the centre, I learned about how the engagement activities the Lemurs were doing had evolved from input by each of them; how they regularly had brainstorming sessions and bi-weekly meetings where they fed back on what had worked and what hadn't, and which formed the basis of iterative refining of the activities and workshops offered on a rotating basis at the centre. I learned that that WtC activities took months, sometimes up to a year to develop. I also considered how the chocolate activity was self-contained; each tasting group got a box containing everything they needed to run the activity themselves, therefore if the Lemur running the session was distracted by answering questions or by another group, they could carry on with the activity. This is one of the ways *WtC* is trying to move further towards public engagement with science, rather than a historic 'education deficit' model of one-way science communication. By creating mechanisms for participation that families could do together as an intergenerational activity, such as the 'chocolate box', this meant that the activity prompted discussions between family members in ways that invited their own knowledge. It also did so in a way that engaged through different senses, inviting embodied and experiential reflections.

On reflections these learnings allowed me to think about how to create a practice of engagement that could work through food. I wanted to create recipes using an experimental-style collaborative model, such as the one that

emerged from the evening workshops, over a longer period of time. I wanted to develop 'hybrid' fermentation recipes collaboratively with Global Majority women, as a way to draw out the tacit and subtle knowledge to do with multispecies entanglement that lives in our cuisines in a way that could invite encounters in order to create what Katz has called 'heretical' recipes (Appendix A) that cross different forms of cultural practice. I believe that these can allow new forms of ecological knowledge to explicitly emerge. I wanted to also think about how to share these recipes as a practice of engagement with others, so they might create new knowledge encounters with ecological perspectives from the Global South as embodied through food. I thought that this could be shared through a toolkit like the chocolate box (or kkureomi) as the basis of an activity with fermented foods. In effect, what I wanted to explore was a more intimate, domestic practice of food fermentation over a longer period of time, where the knowledge and experiences of overlooked or marginalised communities could emerge as valid cultural *and* ecological knowledge. I wanted to do so in a way that was 'activated by warm bodies' (Khan, Appendix A). The outcomes from this would then be turned into an engagement activity that would invite further reflections on culture, fermentation and sustainability in the UK context. To develop this more intimate practice of co-creation, I needed to move away from a public space and into a community or home kitchen. In the next chapter, I outline how this practice was developed through a research residency with the *Eden Project*, called *Kitchen Cultures*, and the outcomes that resulted.

Chapter 4

Food fermentation as *Multispecies Co-creation*



In this chapter, the research practice and methodology of *multispecies co-creation* that I began to explore in Chapters 2 and 3 is further iterated. In *Chapter 2: Cooking with the Trouble*, it was argued that the conceptual and material potentialities of food fermentation could underpin a collaborative practice of *multispecies co-creation* that worked to explore 'wicked problems' to do with culture and ecology (Godin and Zahedi, 2014) as a practice of public engagement. In *Chapter 3: Food Futures and Fermentation Cultures*, the methodology was developed to facilitate public engagement into debates on food futures, using an intentional pluralistic approach grounded in the everyday practice of the kitchen through two experiments in 2019. The first of these experiments, *The Kitchenette of Future Dust,* was a two-week seminar and collaborative prototyping residency in which I took part at the outset of my research journey, with Global Majority women in Madrid. The second experiment, *Fermenting Food Futures* was a solo two-week public-facing residency at *WtC* in Bristol, which consisted of an installation called Kefir Café, and two evening fermentation workshops, where members of the public, as well as a selection of artists and researchers, were invited to ferment with me and taste fermented foods.

This chapter presents a programme for the research residency with the *Eden Project*, called *Kitchen Cultures*, which was supported through their permanent *Invisible Worlds* exhibit, where my thinking and practice in *multispecies co-creation* was further developed. The work is described as it evolves and is adapted through the COVID-19 pandemic, how the work was by necessity moved online, and how this then shaped the subsequent research practice. I do all this whilst also locating the work within the broader project of developing a practice of fermentation as *multispecies co-creation*. The chapter demonstrates how the work, while moving away from the central premise of fermentation that shaped the majority of my research in 2019 and early 2020, continues to engage with microbial and other ecological cultures through everyday acts of cooking and fermenting in the kitchen. This responds to my research aim of developing a practice framework for *multispecies co-creation* through which fermentation techniques that extend the life of commonly wasted foods with Global Majority women in the domestic kitchen, are adopted. Through the practice and articulation of this work, how such practices contain important knowledge and experiences of food as both cultural *and* ecological *entanglement,* are furthered developed, with explicit attention given to such points in Chapter 5.

Material outcomes from the practice include photography, recipes, stories, poetry, video and audio produced by my collaborators. These have been turned into artistic outcomes and shared throughout this thesis (full poetry and recipes can also be found in Appendix D, and by following the links on p.19 of this document).

4.1 Fermentation and collaboration: An overview of the Kitchen Cultures 'experiments'

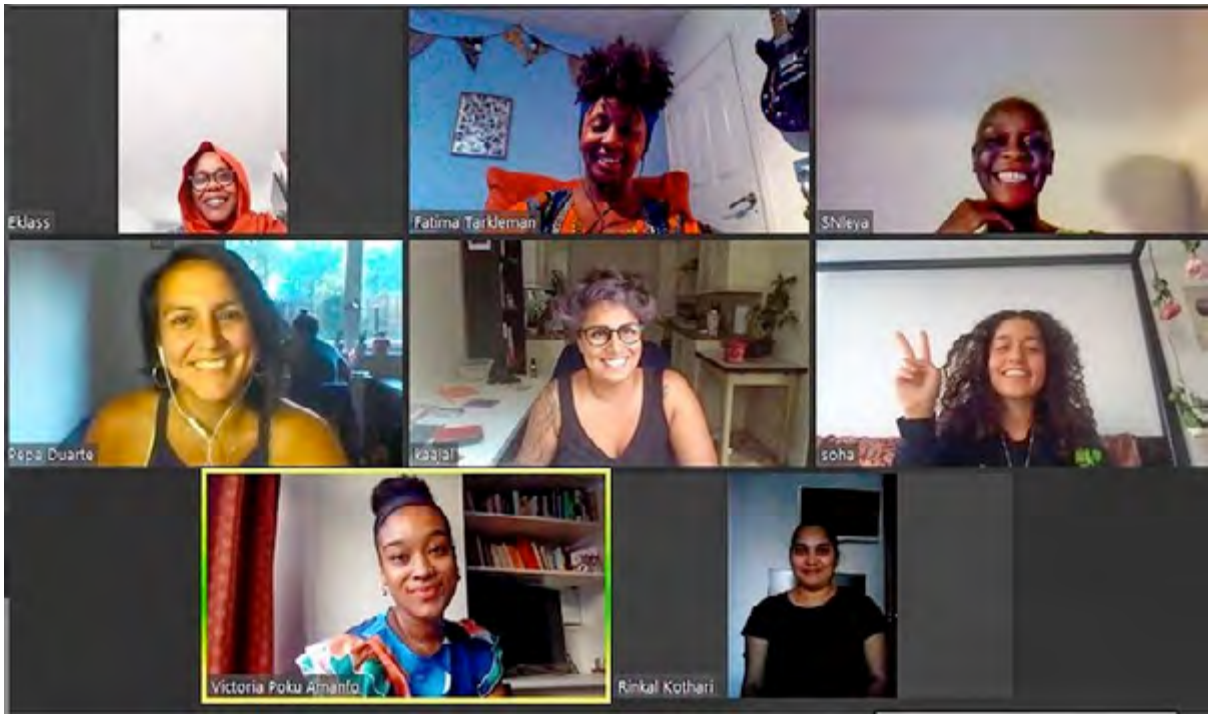
Kitchen Cultures was a collaborative practice of fermentation recipe development together with chef Fatima Tarkleman, and six migrant women from the Global

Majority whom we invited to 'develop recipes to reduce food waste' with us in pairs, in their own kitchens over lockdown. At We the Curious, I had realised that food-fermentation based engagement can take months to develop, and as a result I wanted to create a practice of sustained engagement with a group with whom I could work over time. The project was supported by a research residency with the *Eden Project*'s *Invisible Worlds* exhibition, and the curators were keen on a practice that incorporated 'invisible' communities at both the microbial level, and the human level in terms of people that we all felt were often missing in the conversations around sustainability. The residency took place over six weeks in Summer 2020, with an additional few weeks for the recipe finalisation, and the primary outcome was a series of recipes, and food poetry from a workshop with the poet Asmaa Jama. The framing of 'reducing food waste' was deliberate, as it seemed like a concern that could appeal to a wide range of people, where 'sustainability' and 'fermentation' were terms that meant different things to different people, which I found did not necessarily translate across different linguistic and cultural understandings.

The project was a way to think about migrant food cultures in the kitchen as ecological, as well as cultural, and the outcomes suggested that the distinction between these two areas was not that clear. Through the practice I sought to value the knowledge that lives in communities of colour, in domestic spaces, that are care spaces, and usually, historically, the responsibility of women, non-binary people and femmes. It emerged as a way to draw out a connection between sustainability, and the practices of reuse and maximising resources that I had grown up with, that I find to be prevalent in migrant kitchens as a matter of both necessity and cultural practice. Vandana Shiva notes that women in communities in South Asia women are made responsible for not only cooking and feeding, but the ecological resources that produce the food, namely fields, forests and waterways (Shiva, 2009). When migrating to the North (or even to cities), much of this knowledge is left behind along with its geographies and the attendant responsibilities. I argue, however, that this knowledge remains present in recipes and the tacit cooking knowledge that has been passed through families, usually orally, by the women. I further argue that in the right context, through the right framing, if we look for it, this knowledge emerges.

A secondary, but no less important objective that emerged while we were planning the project in Spring and Summer 2020 was the need for Black and brown women to come together and reclaim our own narratives and stories, in our own words, and through our own practices. Further, as migrants who have moved away from our homes, our recipes connect who we are now to ancestral knowledge, through practices, flavours and rituals. However, as Mary Weismantel argues, it is important not to reify cultural practice without an understanding of the contexts in which these practices and rituals evolved and are enacted (Weismantel, 1988). Beyond the ancestral, food practices connect us

Figure 26: Kitchen Cultures Zoom, 2020



in the present to our food web and all of the beings that inhabit it– from the microbes in the soil to the farmers who till that soil, to the pollinators, packers, distributors, cooks, chefs and sellers, to the microbes in our kitchens– every being who comes into contact with the food we eat on its journey into our homes. Kelly Donati argues that this *multispecies gastronomy* is present every time we eat, and an awareness of it might engender a more ethical relationship to the others in our food webs (Donati, 2014). I argue that the journeys our foods take enact a human-microbial entanglement with ecosystems encountered along the way, which are made explicit, or at least rendered sense-able in undeniable ways, through the act of fermentation.

4.1.1 COVID-19 and practical considerations

Kitchen Cultures was a project that developed primarily over the COVID-19 pandemic, and the ensuing lockdowns. This means that while the research started out as being an investigation into cooking, fermenting and tasting together convivially in the kitchen with migrant communities from the Global South, in the end it took the form of a remote research project where the majority of interactions took place digitally, over the phone or by post. We saw something of a digital transformation in this time, with all of the additional opportunities and limitations of digital technologies that this engenders[3]. However, it completely reshaped the project and forced me to

3 An important resource during this time was femtechnet, a blog and resource tool for researchers conducting feminist work on or through technology, and the crowd-sourced document compiled by social scientist Deborah Lupton about conducting fieldwork in a

‘Kitchen Cultures sought to bring together women of colour home cooks from across the UK migrant diaspora, to think about sustainable food practices in the home kitchen and how this fits into each of our unique and shared food stories and experiences.’

– Fatima

edible memory

at times i find it difficult to remember things that are probably significant

but some memories just aren't appetizing

they're bitter but not in a nice way like sucking on citrus peels

they're tart but not in a nice way like an entire greengage in my mouth

they can be hard to chew and hard to swallow too

so sometimes i'll eat fast and then forget

the moments i do remember keep me full though

realizing i could have feelings for her when she pocketed three apricots before leaving the house

learning that the perfect grilled cheese has its bread buttered inside and out

discovering we were both lactose intolerant and trying our best to hold off

drawing with pancake batter

instructed to eat every last grain because 'do you know how much water it takes to grow rice?' (i'm habitually vigilant now)

three days straight of smelling like my favourite stew, you said I tasted like it too

making loved ones laugh when i lick the plate clean and silly

watching in awe as you lower saffron cotton candy into your mouth with your head tilted way back

confessing that i enjoy eating onions raw

her admitting she enjoys it too

spitting small pits into big hands

struggling to crack open fully enclosed pistachios with baby teeth

bullied off the beach by seagulls with our takeout fish *&* chips

tupperware filled with fresh pomegranate seeds for recess when the season hit

judged by my dentist for an obvious excess in lemon intake

our first and only argument over leftover chilli

Figure 27: Kitchen Cultures, figs

heart shaped fig insides on our second date but you couldn't look because you have trypophobia

ghee as a gift

meeting someone i want to cook for forever

these memories are sandwiched between blank spaces that look like empty plates

but i think what matters is that i can remember these

and i'm happy to only remember these

reformulate my objectives from the ground up. From a practical perspective we had to think about technologies we would be using, and how we might need to facilitate access to them. For example, the women we worked with were all of various ages, from early twenties to in their sixties. Some of them were comfortable working with technologies, some less so. During the project we used Zoom (where we had our weekly meetings), Google docs (where we shared activities and resources), YouTube (where we shared resource videos) as well as WhatsApp, which seemed to be the only technology with which everyone was equally comfortable. All of these raise their own data privacy issues, but in the end and through co-understanding and discussion we adopted technologies that were easiest to use, and with which my collaborators had the most experience. These were Zoom, Google docs and WhatsApp. We also had to provide technology for people to film themselves working in their own kitchens. It created limitations, but it also created its own opportunities, such as people being able to cook the recipes in their own kitchens instead of somewhere unfamiliar. Documents detailing each of these, and links to the media, can be found in the Appendices.

As Fatima later noted, COVID-19 shaped much of the project, both directly as a result of collaborators being unwell themselves at times, and indirectly where they were unable to attend sessions or take part in activities because they were caring for unwell dependents. Additionally, some of the collaborators '… found that their job status was in flux during the project, which affected them being able to have the time to carry out some of the requested tasks outside of group sessions'. However, many of our collaborators reported a positive side, and saw the group as an important way of connecting with others during a time when 'spontaneous novel human connection was harder to come by'. Our collaborators also reported feeling a sense of community with the other members of the group, having connected over a topic that was meaningful for them. Another pragmatic consideration was access to culturally specific ingredients, particularly during periods of lockdown[4]. As Fatima later reflected 'participants who lived in diverse areas with local access to ingredients from all over the world, posted ingredients to other collaborators who needed them for their recipes (taking appropriate precautions of course)'. Fatima herself lives near Brixton, in South London, which has many 'ethnic' supermarkets, so was able to source ingredients quickly and easily when any of the rest of us struggled. She would post these to collaborators, and they 'would happily sit

pandemic (Lupton, 2021)

4 During Summer 2020, the UK government guidance for COVID-19 advised that people from different households should limit indoor in-person interactions, and where possible avoid them altogether. Two people 'adequately distanced' (2m apart) could meet outdoors for short amounts of time, but no more than that.

in the box in a safe place for a few days while decontaminating' before they could be used. We also sent preserved food to each other, particularly things in jars as they were easy to clean once received. All of this, by necessity meant that the practical part of the project, i.e. the development of recipes, took much longer than anticipated, and we didn't actually finalise any of the recipes for publication until early 2021.

4.2 Methodology and process: *multispecies co-creation* and co-production of *aunty knowledge*

In this section, I outline the methodology that I have developed, of *multispecies co-creation* as a *practice framework* for design research that can be used to explore how tacit, performative and embodied knowledges on *nature cultures* are negotiated in the kitchen by women from the Global Majority diaspora. As a result of COVID-19, where the interactions couldn't take place in person, I further draw inspiration from diaspora media practices as ways to facilitate forms of intimacy over distance. To develop the practice, I drew from a conventional 'co-creation' methodology, as developed for user research in social design (as outlined in Chapter 2). Much of design research has been criticised for not taking into account the ways that the designer's own agenda and cultural influences are shaping the research design, and how these forms of tacit positionalities are complicit in maintaining hegemonic power structures that continuously disempower marginalised communities (Costanza-Chock, 2020; Escobar, 2018). The approach that this project takes, of developing a *multispecies co-creation* practice framework that works towards cultural *and* ecological co-production in the kitchen as public engagement, is therefore a novel one. It joins an emerging tradition of literature and practice in pluriversal design that seeks to address questions of ontological pluriversality as a pre-condition for radical transformational worldmaking (Leitão, 2023; de la Cadena and Blaser, 2018; Escobar, 2018).

In order to develop this framework, I drew from my reading, my experiences with Interactivos and We the Curious, and my discussions with practitioners working with fermentation. The work was then negotiated in context together with my co-facilitators and collaborators, as a practice of shared material knowledge development that built on the skills and capacities of the others with whom I was working through co-making in the kitchen. As part of these others, I include the ambient microbial agents in and on our foods, in our kitchens and homes, and in and on our bodies. The research was about creating intimate interactions through food and creating a level of microbial intimacy through fermenting and eating together. The COVID-19 lockdown led to a distance between the microbial and social forms of fermentation, yet it allowed for other, more metaphoric, forms of intimacy to emerge. As an approach, this is a co-creation practice of collaborative making over distance, in our own kitchens, that can allow multiple viewpoints to come together to co-produce epistemic and

normative consensus (Jasanoff, 2004). However, it is also important to note that I have had to edit, refine and interpret these 'data' through the lens of my own experiences, cultural understandings and research agenda. Jasanoff herself notes that the act of data analysis is politically loaded, and approaches that disguise their subjectivity when discussing intermingling of science and values leave themselves open to contention from all sides (Jasanoff, 2020).

The discussions we had as part of Kitchen Cultures research touched on diverse ideas to do with identity, gender, loss, beauty, care and race, and many other important topics. While some of the discussions intersect with my research aims, others by necessity sit outside the scope of this thesis. I have chosen to focus on the question of how my collaborators negotiated the tacit, performative and embodied knowledges on *nature-cultures* that are embedded in our food and fermentation practices. This is a knowledge production practice in the kitchen, through which I can explore my collaborators' experiences of food as *cultural* and *ecological entanglement*. In Chapter 5 I argue that the outcomes from this, which I have called *aunty knowledge,* figure their own multispecies ontological frameworks for entanglement. These are revealed through the embodied performative interactions in which we engaged in the kitchen through the act of fermentation (and the other forms of cooking, food preparation, and preservation in which these were embedded). The knowledge held by these practices are important in terms of how they might pluralise our understanding of migrant food cultures in the kitchen, as important sites of ecological *and* cultural knowledge production.

Building on my reflections from previous practice, *Kitchen Cultures* was an attempt to create a space in which the more subtle aspects of working with other organisms could be drawn out over time with long-term collaborators, beyond broad brush ideas of 'animism from the Global South'. In order to do so, I developed the framework of *multispecies co-creation* as a form of knowledge production that can account for the embodied performative interactions in which myself and my collaborators engaged in the kitchen through the act of fermentation. I use the term fermentation literally in reference to the act of preservation and transformation of microbial cultures in which we were engaging, and also in reference to the more metaphoric social transformations that also occurred in the spaces we were working. The language we were primarily using, English, didn't allow for these ideas to emerge fully, as for many of my collaborators it wasn't their first language. This means that I am also arguing that much of the knowledge lives in the practices and material outcomes themselves and can only be known through the act of making and tasting the recipes, reading the poetry and stories, and listening to the speculative soundscape.

In effect, I am working with two distinct yet overlapping concepts. The first of these is *co-creation*, which refers to the activities I take part in throughout

my research as a practice of reflexive making with human others. It then also refers to *Kitchen Cultures* where I engage women from the Global Majority into collaborative fermentation practices with food waste (and the collaborative activities in the previous chapters that informed these) as a practice of material making with the ambient microbes in our environment. The second is *co-production*, in which new knowledge emerges as a result of the conceptual encounters that occur in *Kitchen Cultures*, through the encounters between my collaborators, myself and my co-facilitators through the research design and implementation as it is negotiated in context. I have called the framework thus developed *multispecies co-creation,* as to me this highlights the agential negotiation in context engaged in by all of my collaborators (human and microbial) through acts of fermenting and cooking.

I call these *more-than-cultural* practices in reference to the more-than-human entanglement through which we as humans are constructed through cooking, fermenting and eating. This term also references de la Cadena and Blaser's assertion that practices of the Global South comprise more than simply cultural knowledge. In effect, the research explores and exposes two sets of interactive relationships; between peoples/cultures and recipes on the one hand, and between people/biologies and geographies on the other. Fermentation both works as the material practice in which I engage with my collaborators through this act of *multispecies co-creation*, and then again as a heuristic through a practice of co-production of what I call *aunty knowledge*. *Aunty knowledge* is the tacit, embodied and performative knowledge that is embedded in our food and care practices that speak to geography, climate and land. It owes a debt to *Rice Brewing Sisters Club* and their formulation of 'social fermentation' as an artistic form that highlights cultures of resistance through fermenting, and that can draw out forms of 'auntie wisdoms' as an experiment to connect the sensorial (through feel, taste and smell) to the relational (through discussion and creative practice). Social fermentation as defined by *Rice Brewing Sisters Club* is a social practice that allows for cultural exchange through multisensorial and multimedia modes. I am using it here as a metaphor for a sociality that is able to change shape, material and practice depending on the context in which it is operating and the 'ingredients' it has available. It is also a sociality that is performed, sensed and re-presented through the act of remixing and sharing in ways that create new meanings.

The only defining factor of fermentation is that it is a form of 'safe' decay/transformation/preservation that is apparent in the tasting of it. Even then, it is only recognisable as safe if you have the knowledge to recognise it, which means the cultural context in which you encounter it shapes the interaction. As I have discussed in Chapter 2, this makes it a rich metaphor through which to frame collaboration across what Haraway calls the 'differential relationalities' in which we engage when we cook or eat (Haraway, 2008, p.295). The work is continuously adapted against the background the COVID-19 lockdown, and the different rules that were in operation based on current understandings of virus 'smear'

transmissibility and food safety regulations. These then add another layer of multispecies (in this case viral and human) negotiations in which we were participating throughout the project, which resulted in us having to find ways to create intimacy across distance. This resulted in my collaborators engaging in their own practices of media productions as a storytelling, which I have sought to honour through my own acts of remixing foods, recipes and media reproduction.

4.3 Stages and iterative development of research and outputs with collaborators

Kitchen Cultures was a project co-created iteratively in context with my co-facilitators Fatima, Asmaa and our six kitchen collaborators Soha, Rinkal, Eklass, Pepa, Victoria and Sibutseng. The work took place over six weeks, and consisted of a series of six online workshops as follows:

Week 1: Sharing a ferment/pickle/preserve from your culture

Week 2: Exchanging a recipe/flavour/song that to you represents your culture

Week 3: Pairing and beginning to develop the 'hybrid' cultural recipe

Week 4: Answering Q&A and continuing recipe development

Week 5: Sharing outcomes and reflections

Week 6: A poetry workshop in which we explored food metaphors as a way to tell our own stories of identity, memory, migration and climate

The material outcomes from this phase were six preservation recipes that could be adapted to work with commonly-wasted ingredients in the UK (you will find these interspersed throughout this thesis, but a more comprehensive account can be found in Appendix D). Other outcomes were the poems from the workshop with Asmaa, as well as a series of images, short film clips, shared voice notes, WhatsApp messages and other audio recordings.

4.3.1 Eden Project

The *Eden Project*, my partner in this research, is an eco-educational charity and social enterprise based in North Cornwall that 'builds relationships between people and the natural world to demonstrate the power of working together for the benefit of all living things' ('Eden' Mission', n.d.). *Invisible Worlds* is a permanent exhibition 'that reveals the world beyond our senses: too big, too small, too fast, too slow, too far away in space and time' ('Invisible Worlds exhibition', n.d.). As such it seemed like a natural fit to develop and showcase some of the recipes I had planned to develop and collect, and where

Figures 29: Eklass apple biscuits, WhatsApp Chat, Kitchen Cultures, 2020

(I thought pre-lockdown) I could invite visitors to taste their way into some of the interrelationships with other beings (human, microbial and other). The curators were very keen on the fact that the project not only highlighted the invisible microbial relationships in our food webs, but also people from demographics who they felt were missing from their usual visitors. Since, as part of the *Kitchen Cultures* project, I wanted to develop experimental recipes that could be shared with the public, some of which would be live (and potentially poisonous) foods containing living microbes, I was concerned about the Health and Safety aspects of my work. I decided that one of my collaborators needed to be a chef who had knowledge of fermentation techniques and of food preparation for the public.

4.3.2 Fatima: The Chef

Fatima Tarkleman is a no-waste chef of Nigerian-Ugandan-Pakistani-Punjabi heritage who has been working as a chef since 2018, but as she says, 'I've been cooking for a lot longer than that!' Prior to 2018, Fatima worked for over a decade as an Occupational Therapist in dementia care within the NHS, where her job included creating accessible activities for people with additional physiological needs and psychological capacities. In her new industry Fatima had become frustrated

Figure 30: Eklass spread (Week 1), Kitchen Cultures, 2020

with how professional chefs were disdainful of the knowledge of home cooks. While training she found that there was a tendency in the hospitality industry to overwrite home cooking knowledge with Eurocentric values and techniques that disregarded (in her case) decades of expertise. There was also a 'blatant disregard' for employee wellbeing and the safety of marginalised people in these spaces that made her feel that as a Black, queer, neurodivergent woman, she wasn't welcome within the hospitality industry. When, as a result of COVID-19 she was made redundant by the kitchen she was then working in, she decided she wanted to reimagine a restaurant practice that valued the knowledge and experiences of home cooks.

We came together through a shared frustration that the knowledge and the agency of women and femmes in the kitchen was being overlooked both within hospitality, and within food and eco-activism in the UK. As such, our interests in gathering recipes and stories overlapped, but Fatima was more interested in the recipes for their own sake, and in the stories as a way to contextualise them, and I was more concerned with what those recipes and stories could tell us about climate, geography and migration, and how these might offer us new insights into multispecies ecologies. However, we were both keen to do the work in a way that was not appropriative or extractive and was respectful of and

Figure 31: Eden Project, *Invisible Worlds*

careful with the knowledge of others. We wanted to create a project that valued *aunty knowledge* (as we started calling it). Almost everything we knew about sustainability and food came from how we had been raised and learned to cook in our own communities. In Fatima's case this was primarily in Lagos, Nigeria, and then a Pakistani-Ugandan community in South London after she migrated to the UK. My own heritage is Gujarati-Ugandan, from Leicester, where I was born and raised.

Fatima and I made the decision early on that for the recipe development stage we only wanted to work with women and non-binary people of colour/from the Global Majority currently living in the UK, preferably ones who had some experience of European colonisation. There were a few reasons for this: partly as we both have some experience of being first- and second- generation migrant women/femmes of colour in the UK ourselves, and we felt that the kitchen is a space that is often a site of responsibility and power for women, femmes and non-binary people within migrant communities of colour, and in many cases they have been their(/our) only real site to effect change. The kitchen in our homes growing up was the site of women's agency, and it was where women gathered and shared stories and gossip and tips and expertise. And then partly, we both strongly felt that women from the Global Majority are a demographic

Figure 32: Fatima Tarkleman, Kitchen Cultures, 2020

Figure 33: Kitchen Cultures Instagram

who are often excluded in discussions and decision-making about how food is grown, produced and sold. As a result, we set out to recruit eight women and nonbinary people from different Global South migrant heritages living in the UK to act as 'ambassadors' from their respective communities and food cultures with whom we could develop our recipes and other outcomes.

When I began the project, I saw Fatima's role as a chef advisor, who could guide us on the safety aspects of fermenting and help me to develop the recipes into something I could share. However, it quickly became apparent that due to her prior work she was bringing with her a lot of expertise in group facilitation and access that turned out to be useful during lockdown. As a result, she and I ended up working together more collaboratively to create a kitchen practice that could draw out the knowledges that we were both interested in, in her case to do with the tacit expertise of women in the kitchen, and in my case to do with how their knowledge, both tacit and explicit, could be a form of climate and ecological expertise. We were working remotely, yet we wanted to evoke some of the experience of cooking together in a kitchen. This meant trying to find ways of creating a bond between our collaborators despite the geographical distance, and diverse social and cultural experiences. Our intention was to create a combination of real-world and digital interactions where these relationships could be built, and stories, gossip, tips and recipes could emerge.

Fatima's experience as an OT with elderly and disabled people meant she often had to approach sensitive subjects in ways that were creative and dynamic, often in a group context where there was a need to build strong group dynamics to facilitate knowledge exchange. Although she had never done this kind of group work online, she had many times had to work with individuals over the phone, and this experience became very useful to how we planned the sessions and created spaces for 'active listening'. This became particularly relevant to how we facilitated our own group sessions and, along with my own training in co-design, as well as group facilitation[5], meant that we were able to develop a unique framework for knowledge sharing that was able to respond to the specific conditions of working remotely over lockdown.

4.3.3 Recruiting the Kitchen Collaborators

I designed some graphics, and we used them to advertise the project through our networks on Twitter, Instagram and Facebook (See Figures 34). Mine was through community organising and grassroots political groups, and Fatima through her healthcare and food industry contacts. The *Eden Project* also shared our call out through their own social channels, and as such we were able to get it shared among a wide variety of different communities. We got a lot of applicants, however initially they skewed strongly towards the South Asian, and Fatima in particular was keen that we have broader representation from the Global Majority. I also had feedback from a nonbinary friend who wanted to share the call that the language we were using was not inclusive of non-cis women. We changed the wording to be more inclusive of non-binary people and femmes, and to be about 'preserving and using food waste' and sent out a more general call for 'cooks' rather than 'pickle aunties'. We got a further set of responses that were much broader geographically and culturally. It was from this total pool of sixty applicants that we made our selection.

We then sat down and worked through the selection process. All men and people not from the Global Majority were discounted. People with professional cooking experience were immediately put to one side (Fatima is now working with many of them on a project called 'Kin-spiration'). Of the people who were left (around 30), we started a spreadsheet in which we discussed their various skills, experiences, attitudes and what we thought they might bring to the project. We based this selection on the broadest geographic, gender and cultural representation, as well as their answers to our recruitment questions (Appendix D). We weren't averse to having less experienced cooks, however an interest in finding out about their various food cultures through their networks was a must. We ended up with a shortlist of twelve people. We contacted them with more information about the project and asked when they had time to

5 With grassroots activist groups including *Sisters Uncut* and *Food Not Bombs,* as well as in active listening over the phone with *End Deportations*

Figure 34: Sibutseng, Kitchen Cultures, 2020

‘I love food because it brings people together… The way I grew up, the first thing you do when someone walks into your house is offer them food.” – *Sibutseng*

Kitchen Cultures are recruiting!

- Are you a woman/non-binary person from the migrant diaspora living in the UK?*

- Do you love to cook?

- Do you hate waste/love to save food/love to learn new skills?

- Would you like to be part of a food sustainability project where your time, knowledge and experience are valued?

- Would you like to learn about, experiment with and taste food from different cultures from all over the world?

- Would you like to learn about the science and culture of pickling/preserving/(non-alcoholic) fermenting?

If this sounds like you (or your aunty or cousin or gran or mum), we'd love to hear from you!

Kitchen Cultures are Fatima, a Nigerian-Ugandan-Pakistani chef, and Kaajal, an Indian artist-researcher. We are on a mission to combat food waste in the home kitchen using preserving and pickling techniques from all over the world, in collaboration with the Eden Project.

We are looking for curious and creative collaborators from the UK to join us in our quest! As well as recovering recipes, a key part of the project is collecting the individual stories and the family histories that are an intrinsic

Figures 35 & 36 : Recruitment Web Page & Social Media Graphics, Kitchen Cultures, 2020

meet. In the end we had individual phone/Zoom calls with eight participants about their background, interests and motivation for joining the project, as well as their technological capacity, their kitchen facilities and any extra assistance they might require with these. We asked all eight to join us for the initial onboarding meeting, however in the end only six managed to join us and stay for the duration of the project.

4.3.4 The Kitchen Collaborators

Our final collaborators for *Kitchen Cultures* were Victoria, or Vee, a second-generation Jewish Jamaican-Ghanaian woman who runs a cooking Instagram and works in sustainability; Sibutseng, a first generation Zimbabwean woman who has lived in the UK her whole life, and who was keen to rediscover some of the food she had grown up eating; Eklass, a first-generation Sudanese woman who had lived in Saudi Arabia, and who had been registered to participate by one of her grown daughters; Pepa, a first-generation Peruvian performance artist who had been working on a show about her relationship with food, and recovering her identity through vegan adaptations of traditional recipes; Rinkal, a first-generation Indian woman from the community in Poplar who works with a social enterprise called Preservation Culture, and whose pickling workshop Fatima and I had attended in March 2020 and Soha, a second-generation Iranian woman working in the arts who was born and raised in Canada.[6]

4.3.5 Kitchen Cultures: fermentation as multispecies co-creation

For the research phase Fatima and I worked together closely to develop a collaborative and iterative practice-as-research methodology, in which our kitchen collaborators were gradually led through an increasingly experimental practice using skills that already existed within the group to create new recipes to reduce food waste, and to become more comfortable talking about their experiences using food metaphors. Using group facilitation techniques and creative activities this practice was intended as a way for us to draw out our collaborators' knowledge. We iteratively and experimentally developed this process, which took the form of a series of online workshops and activities, to learn about and develop our collaborators' knowledge of food sustainability and fermentation (as well as other preservation practices and recipes) in their own kitchens. We invited collaborators to share this knowledge with each other, and to develop new recipes that combined this knowledge in novel and delicious ways to extend the life of commonly wasted foods. In the meantime, Fatima and I brainstormed and discussed techniques for facilitating spaces of warmth and intimacy remotely. Where my practice was drawing from artistic and

6 We also recruited a Brazilian woman and a Malaysian Chinese woman, both of whom were slightly more experienced cooks, but they were unable to take part in the end for their own reasons.

designerly methodologies, as well as an activist community-based facilitation practice centred on food, Fatima was drawing from her own literature and practice on disability, marginalisation and access, as well as her experience of working in professional kitchens. To this end, we decided that we wanted to create a clear syllabus and structure that still allowed for us to respond to our participants needs (see Appendix D).

We started with a broad structure, however we also felt that with the quickly changing landscape of the pandemic it was important to go into the practice with an awareness of the fact that we might need to change things at short notice. We decided to meet once a week on a Thursday afternoon/evening for an hour and a half. Each week we would set a task to do with food. Initially this would be individual, but eventually we wanted to pair our collaborators to begin 'hybridising' ideas and outcomes. We based the pairings off cooking experience, cultural backgrounds and interests, and personalities. We also set up a WhatsApp[7] group for people to share insights, gossip, recipes, pictures and anything else between the ten of us, and to ask Fatima and myself any questions they may have. Fatima was to field any questions to do with cooking and ingredients, and my job was to manage expectations to do with the project outcomes, timelines and tasks. She would also manage the Instagram and organise takeovers by our collaborators. One of the primary ways in which we facilitated this collaboration was by reallocating funding from the *Eden Project* residency to pay collaborators for their knowledge and time, and to act as 'food ambassadors' for their respective communities and cuisines. Fozia Ismail notes that attaching a monetary value to women's knowledge is a way of developing a less hierarchical co-creative practice (Ismail, 2021). Every week Fatima and I ran through the meeting structure with each other, and checked for timing, understanding and general 'flow'. We ran through the first session with our partners and housemates, and they had some thoughts on how to make the subject more accessible and fun, such as taking breaks or speaking more slowly. We also added an icebreaker at the beginning of each session, which was initially simply to warm up, but then became a way of introducing the idea of 'food as metaphor' as a precursor to the poetry workshop.

4.3.6 The Weekly Structure

Over the weeks we spoke about sustainability, migration and waste, and used these as a way to speak to broader themes on climate change, and how between them the group likely held a lot of knowledge on how to adapt to

7 WhatsApp was the first messaging app that my family in Africa and South Asia (including the older women) had adopted, as it was the first cross-platform phone messaging app that made it free to talk to family abroad using VoIP. As such, I suspected that my collaborators would be comfortable with the technology, and this turned out to be the case.

Figures 37: Sibutseng stew, WhatsApp Chat, Kitchen Cultures, 2020

changing climates and food availability. I also spoke about fermentation and the ways that food practices from different cultures and climates are connected to landscape ecologies. I explained that by working the way that we were, I wanted to draw out those connections. We started the first meeting with the icebreaker question: if you were a flavour of ice cream what flavour would you be? It was a warm day, so it seemed appropriate. Fatima and I answered first to lead by example. I picked some flavours and moods that were bright, minty, fresh and 'silvery' to reflect how I was feeling at that point. Fatima chose spicy and rich flavours to reflect her personality. Some of our collaborators immediately got on board with the activity, where others just told us their favourite ice cream flavours and a bit about themselves. Either way, it was a useful way to start the session in terms of getting people to start talking to each other and to begin to think about food and flavours as metaphoric.

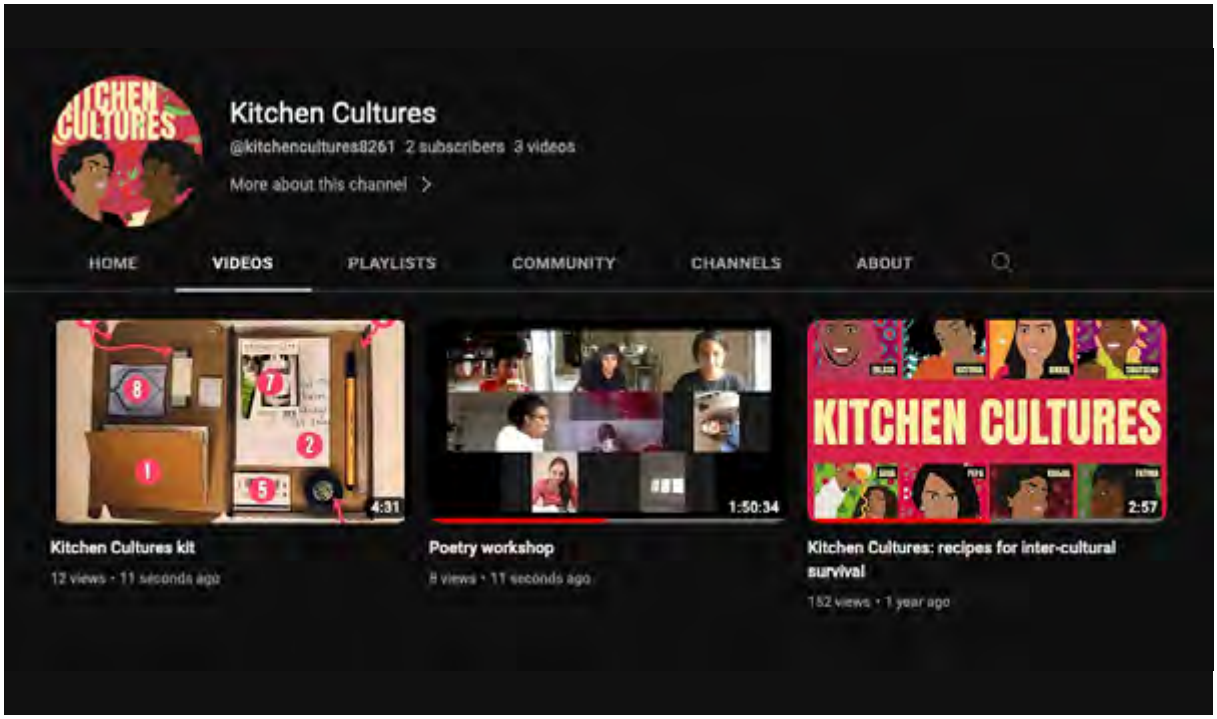
In each session also we set an activity to do with food and flavour in relation to the primary project objectives. Fatima and I did these activities alongside our collaborators to check the feasibility within the times we had set and adjusted our timelines and objectives accordingly. It also allowed us to join in the weekly discussions instead of simply acting as external observers, which we thought would change the dynamic. In the first week we introduced the overall

aims of the project: we wanted to find out about preservation recipes and techniques from their respective culture(s) and use these to reduce food waste in the home. We shared a list of commonly wasted foods in the UK and asked our collaborators to share their thoughts about foods that they reuse and how they approached the issue of waste in their own kitchens. We discussed what collaborators wanted to get from the project, and we found that most were there because of their interest in sustainability and reducing food waste. We also created a collaborative Community Agreement, which was a set of broad principles on how we would interact with each other, respectfully and with care, in deference to the diverse cultures, experiences and identities we were bringing with us (See Appendix D).

For Week 2 we set the task for collaborators to find out about a pickle or preserve from their own culture(s), and to make a note of what foods they might be throwing away. We also set them a tasting activity in which we asked them about the texture, smell and taste of that food, and a memory associated with it. In the second meeting, we asked them to share their impressions and memories of this food. This activity created unexpected connections between the different experiences and geographies where this food had emerged, including a story about collecting raw mangoes that had blown off trees and pickling them together with other women and children from the community that emerged in both North India and Zimbabwe. A curious fact was that they both used the word 'achar' for this mango pickle, a Sanskrit root word that means 'sour'. Another unexpected connection was in the discussion about cevice/escabitch; this is a raw fish dish prepared with a vinegar pickle that appeared in both Peru and the Caribbean. For more details of each individual session, with breakdowns of ice breaker activities, and the activities we developed, please see Appendix D.

In Week 3, we paired up our collaborators interculturally and intergenerationally, and tried to do so in ways that were complementary in terms of their personalities, abilities and interests. For example, Rinkal is vegetarian and only cooks vegetarian foods, and Soha was interested in eating more vegetarian food, so we paired them. Sibutseng wanted to learn about pickles from around the world, so we paired her with Victoria, who had the broadest knowledge base, and who responded really well to Sib in the initial meeting. Pepa was interested in food histories, and respecting cultural knowledge, so we paired her with Eklass, who has daughters her age and was excited about working with someone that young. We paired the collaborators for three reasons; firstly, we wanted to create new hybrid recipes that might not emerge from a single geography or culture; secondly, we wanted to encourage people to share knowledge and to ask questions that they might not think to ask about their own cuisines; and thirdly, practically, we wanted to pair people in ways that would complement their existing skills and knowledge, and that

Figure 38: YouTube channel, Kitchen Cultures, 2020



would allow them to learn from each other. We also found that this created accountability for when we weren't able to work with our collaborators directly, as each of them had someone they were accountable to, personally, each week.

We set them the task of sharing a 'flavour' of their culture with each other, however we made this a broad task that could refer to any form of cultural media, as we had already realised that two of our collaborators lived in areas where finding ingredients from other parts of the world would be difficult. I created a Spotify playlist that we collaboratively contributed to that was designed to be listened to while cooking, which we continued to contribute to through the project. Soha, Fatima, Vee, Pepa and I all added songs to the Spotify playlist, some that we liked and felt expressed a relationship to our culture, and some that were suggested by Rinkal, Sibutseng and Eklass. To facilitate the exploration, and to encourage documentation of their processes, each of our kitchen collaborators were sent a kitchen kit (See Figure 39), consisting of:

- A notebook and pen
- An addressed envelope to return the notebook and slides/pH strips
- A thermometer
- A hygrometer (to measure temperature and humidity)
- pH Strips
- Slides and slide covers
- A phone microscope

Figure 39: Kitchen Cultures Welcome Kit

- A packet of 'Peace' tea

I made a video for them about the welcome kit, which I shared on our YouTube channel, and via the WhatsApp group chat. We also provided a tripod and ring light for people to film themselves working in their own kitchens with their phones. The take-up of these tools and technologies was varied; almost no-one used the phone microscope, but at least two of the collaborators had fun with the pH strips. Only one of my collaborators sent their notebooks back to me in the self-addressed envelope at the end of the project. All except one took pictures and filmed themselves with the tripod and ring light (although I had to have calls with two of them to help them set these up). The main way people shared their progress was via pictures and voice notes in the WhatsApp group, and during the weekly zoom sessions. Eklass and I had regular phone calls, and Rinkal and I also spoke on the phone a few times over the course of the project. In Week 4, I set a task that people could respond to in their preferred format, in their own time. This consisted of a series of exploratory questions

(see Appendix D) as part of an exercise that invited collaborators to meditate on subjects such as food, home, adaptation, preservation, cultural exchange, waste, seasonality, nature and the future. In Week 5 we came together and shared our thoughts on these ideas, as well as progress on our recipes and our experiences of collaboration. At the end we all took part in a poetry workshop where we learned how to tell our own stories of migration, colonisation, and identity using food metaphors, facilitated by Bristol-based Somali poet and artist Asmaa Jama (who had formerly worked on Fozia Ismail's *Camel Meat and Tapes* project).

4.3.7 Asmaa: The Poet

The poetry element of the project emerged because I wanted to find out more about our collaborators, and find ways into exploring their relationship with food, as well as their experiences and knowledge to do with land, migration and ecology. During the summer Fatima had attended an event called 'A recipe for life' organised by a friend and artist Laurie Firth, in collaboration with the Ukrainian chef and writer Olia Hercules. At the event, Fatima wrote the poem 'Akara, and my grandma's hands', which I have shared in this project with permission. We thought that this could be an interesting way to explore our own collaborators' experiences and to draw out more tacit and conceptual knowledge. We suggested it in a weekly meeting and met with a positive response. I asked Asmaa if they knew of some similar uses of food as metaphor in poetry. Asmaa came back to me with three or four poems that we then sat down and discussed in terms of their creative use of food metaphors to speak about culture and identity. In the end we chose three different poems, plus *Ogbono Soup*, and Asmaa constructed a workshop format around these. This was delivered in the final week of workshops, on a Sunday. (For a breakdown of the workshop, see Appendix D). At the end of the workshop those of us who felt ready to shared our poems with the group. Pepa shared the poem *my dad's heart*, in which she uses artichokes to explore her relationship to her dad, and Fatima shared *Akara and my grandmother's hands*. The rest of us went away and worked on our poems individually for a few weeks and then shared them when we were ready. To facilitate this, I posted a recording of the workshop on our private YouTube channel, and into the WhatsApp chat.

4.4 Re-Presenting *Aunty Knowledge*

The above outlines the practice of the research phase for *Kitchen Cultures,* which I present as a novel practice framework through which I engaged collaborators remotely in the kitchen. The initial project preparation developed the themes I wanted to explore around recipe development to reduce food waste through fermentation. It invited and valued the forms of knowledge that were further co-produced and negotiated in the space, through the act of making together with humans, foods and ambient microbiomes, as *multispecies co-creation.* My co-facilitators and I continuously adapted the project to work in ways that were responsive to collaborators needs, understandings, capacities and comfort levels. The outcomes are an ontological framework called *aunty knowledge*, a way of being

Akara & my grandmother's hands

My grandmother's soft, papery hands
Tiny brats wailing around her calm, tiny feet

My mother's hands
Standing and sweating over the cooker

My mother's hands rubbing the skin off the beans
The hard beans rubbing the skin from my mother's hands

Frying oil was always so exciting and dangerous: being shouted at to 'get out of the kitchen!' and sneaking back in to get the first akara from the hot oil

Crispy, savoury, little miraculous clouds from the wet, weird, musty mixture

My mother's hands have usually snuck a bit more chilli in than she said, as usual

Being hurried along to 'eat them while they're hot! They won't keep!'

Eat them at my grandmother's funeral and think of her small papery hands that helped you hide the food you didn't like while shouting 'you beta chop am o!' to distract your mum and keep you out of trouble.

Figure 40: Fatima holding akara, Kitchen Cultures, 2020

Figure 41: Akara batter, Kitchen Cultures, 2020

Figure 42: Kitchen Cultures Spotify Playlist

and making in the world that relates culture *and* ecology. The multispecies entanglements at play in this framework are made tangible through cooking and fermenting as *practices* of more-than-cultural making as collaborative encounter between humans *and* microbes. The knowledge produced is *tacit, performative*, and *embodied*, and it is *re-presented* through recipes and multimedia practices as a performative evocation of multi-sensoriality. This afforded me the space to reframe existing knowledge in ways that could allow new insights into how we might negotiate multispecies ecologies. The varying ways in which the workshop was adapted to context and how the ferments in each of these instances behaved speaks to the way that these are living cultures that are continuously negotiated in context. Engaging in this act of remixing allowed me to further explore how material practices of collaboration that are non-hierarchical, and even non-extractive might look/taste/smell/feel. They require much more complex and contextual negotiations that are situated in the experiences of the people and organisms we are working with.

Following this stage, my collaborators, Fatima and I spent 3 months finalising the recipes and poems, and I reflected on the learnings through a practice of remixing the and making the work into forms to be (re)presented for different audiences. The outcomes created through the practice of *multispecies co-creation*

are intended to invite public encounters with *aunty knowledge* through their own *tacit, performative* and *embodied* modes, and include:

1. *Sonic Cultures– a 'speculative' soundscape:* a 45-minute long (the average length of recipe preparation) sound piece that includes the poems, stories, interviews and discussions that collaborators and I engaged in during the development of the recipes and activities, as well as sounds of cooking and fermenting. The intention was to re-create the feeling of cooking at home together with 'invisible' others during lockdown.
2. *The 'multispecies care package' and online 'tasting' workshops:* two online tasting workshops that took place over Spring/Summer 2021, where I created and sent a 'multispecies care package' to attendees to taste along with me while I told the story of how each recipe was made. I saw this practice of tasting as a way of revealing the 'invisible' labour that composes our food, that we consume when we eat.
3. *Kitchen Cultures– the recipe book:* a recipe/poetry/activity book for people to engage with at home that emerged as a response to my thinking about the need for people to be able to make the recipes in their own time, and to adapt them in their own ways according to their own taste and available ingredients. It includes stories about my collaborators in their own words, as well as recipes and poetry.
4. *Eating (as) ecology– in-person tasting workshops:* two in-person tasting workshops in 2021-2, where I took the final recipes from the practice, the sound piece, the stories and the ideas, and invited others to reflect on them as they tasted along with me.

The development of these outcomes and the insights that working through the practice of creating, delivering and reiterating these over the subsequent year and a half became my practice-based analysis of the work. Throughout this project I have attempted to be reflexive about my own influences and agendas, and that of my co-facilitators, and to foreground our contributions to the research. By definition, these types of knowledge are difficult to disentangle from their contexts and require responsive and creative modes that can allow them to be (re)presented carefully and in ways that can foster (more-than-human) cultural production and exchange. The development of the Speculative Soundscape meant I had to sit and listen to the audio from workshops, sound of cooking and fermenting, voice notes and poetry for hours as I edited and remixed the recordings. The development of the Tasting Workshops meant I had to make and remake the recipes in my own kitchen, and then tell the stories of where they came from and how they were developed with people in the workshops in ways that invited new insights and reflections. Creating the Care Packages made me think about how to store each recipe, how long each of them could keep, and how they could be sent. Collating and designing the

Figure 43: Kitchen Cultures Recipes Soha x Rinkal

Rinkal's Chilli Carrot Achar

1. Wash, peel & cut carrots into desired sizes. (Approx. 4 carrots for 1 jar)
2. Mix carrots into salt & turmeric dry mix bowl, cover let carrots rest in mixture for 5 hours
3. After 5 hours, drain the water content released from the carrots and wrap them up in a clean cloth and let it rest overnight (minimum 8 hours)
4. Heat up 1 tbsp of oil with crushed methi seeds (fenugreek) and mustard seeds, let this roast for a couple of minutes and. then cool
5. Create a dry spice mix for the pickling including: chilli powder, sumac, salt, fennel seeds, and black cumin (kalonji) if you have it.
6. Mix the carrots into the dry mixture, add the oil mix to it as well. Once mixed in, place into a sterilized jar. Add 1 spoon of vinegar.

7. Now, heat up an oil of your choosing, the amount is dependent on how you'd like it to be stored. If you want to keep it out of the fridge for up to a year, the carrots should be covered in oil, or you can do it about halfway or so if you want to leave it out of the fridge for only about a month, or if you'll be putting it in the fridge eventually.
8. Get the oil very hot, and then turn off the heat and let it cool completely for a few hours.
9. Add the cooled oil to your jar!
10. All done

Recipe notes: Heat the oil the night before, and allow to cool fully before adding to the pickle. The longer you leave it out of the fridge, the more the taste will develop.

Soha's Carrot Torshi Style

1. Wash and chop all vegetables (carrots *&* also cauliflower if desired) – add salt and leave to dry over night
2. Wash and chop herbs (coriander, tarragon, dill) and allow them to dry as well (overnight not necessary)
3. Mix vegetables *&* herbs in a bowl
4. Mix spices in a separate bowl or the same one as vegetables:

a. turmeric for colour

b. 3 table spoons of salt (for 2 large jars of torshi – apparently eyeballing the salt just to ensure it coats and salts the size of your bowl of vegetables)

c. 1 tsp per jar of any other spices such as cumin seeds, fenugreek seeds, and fennel seeds, depending on what you have!

5. Vegetables and herbs go into the jar *&* you fill it to the top with vinegar of your choice. 1 chilli and a couple of cloves of garlic / shallots *&* a bay leaf are nice inside as well, usually placed at the bottom.
6. Let it sit in a dark cool place for 10 days before opening. Good to keep out of the fridge for at least a month as long as liquid is still covering the vegetables/herbs. I prefer it in the fridge for an extra crunchy and contrasted temperature to hot foods.

For both Rinkal and Soha's recipes, herbs and spices can be used based on what's available! Open for experimentation.

Figure 44: Kitchen Cultures Speculative Soundscape with Arts Catalyst

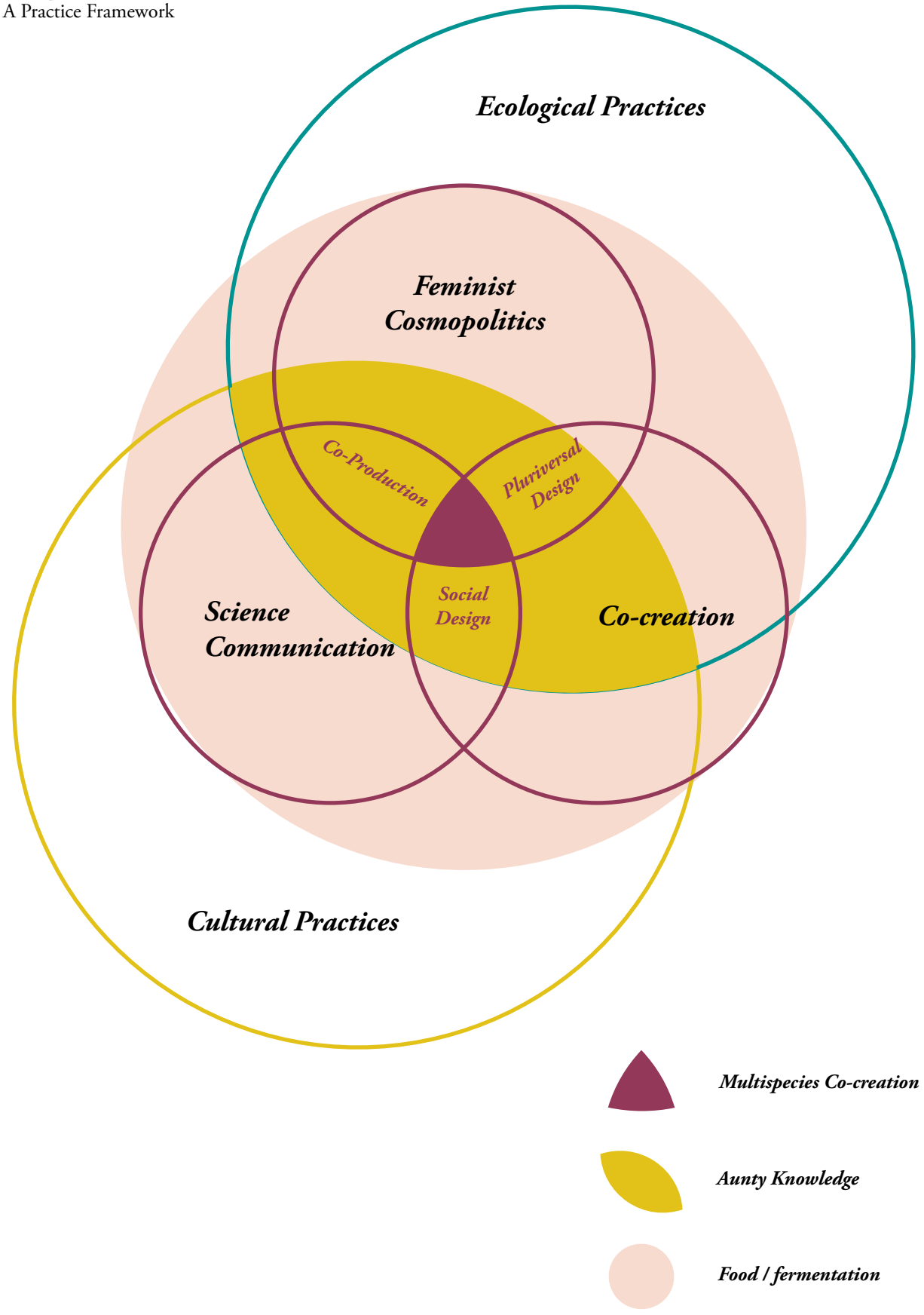
book meant I had to carefully illustrate my collaborators and their recipes, and think about the ingredients in terms of their seasonality and availability, substitute in my own food waste, and reflect on the embodied activities that had been effective in creating a shared space during the workshops.

The development of the care packages and the tasting workshops was reflective of the practices of care in which myself and my collaborators were engaging through lockdown by sending each other ingredients, jars and biscuits in the post, and cultural artefacts such as songs and ideas for foods to try during our digital interactions. By activating 'memory and imagination' (Stengers, 2018) through an evocation of time and place, utilising sensory engagements that were themselves encounters between people, places, memories, flavours, ideologies and ideas that took place in a space that was at once intensely material (the kitchen/home), and abstracted (Zoom, voice notes, WhatsApp), I created a practice that was at once intensely situated and also reflective of my collaborators understandings and experiences of food, culture, geography, ecology and migration. Remixing all the sonic outcomes into the speculative soundscape brought together my collaborators knowledge and my own interpretations and juxtapositions of these to develop a 'polyphonic assemblage' (Tsing, 2015, p.22) that creates its own ecological co-production. Tsing suggests that the polyphonic

assemblages that comprise human-ecological relations are 'performances of livability' (p.158) that we can use to understand difference at multiple scales and in varied contexts. Assemblages are a way for ecologists to 'get around the sometimes fixed and bounded connotations of ecological "community"', and the communities in a species assemblage can work together, thwart each other, or not influence each other at all, simply just occupying the same place. he qualifier 'polyphonic' points to the intertwining of autonomous melodies as a way to 'listen with multiple perspectives' (p.23). As a technique that is no longer employed in Western music, but that is still common in the music of cultures from the Global South, I found the idea of polyphonies an evocative metaphor that allowed me to explore the diverse and sometimes contradictory perspectives and understandings of my collaborators.

In the next Chapter I highlight some of the aspects of knowledge and experiences of food with Global Majority women in the domestic kitchen and bring together the outcomes in order to argue that these practices contain important tacit and subtle knowledge on cultural and ecological entanglement. I argue that these creative practices facilitate the recovery and creation of important knowledge practices that form their own feminist multispecies ontologies that I have called *aunty knowledge*. *Aunty knowledge* is the tacit and relational knowledge to do with culture and ecology that emerges through embodied and sensory modes.

Figure 45:
Multispecies co-creation:
A Practice Framework



Chapter 5

More-than-human Cultural Practices

In the previous Chapter, I outlined the material practice of *multispecies co-creation* which I developed in the kitchen with my collaborators through *Kitchen Cultures*. This was a form of 'shared material knowledge development' (Hunter, 2022) that was enacted through the collaborative practice of fermenting, cooking and the ecological negotiations that my collaborators were engaging with. Through this research, I asked how we as design researchers develop a practice of making through food with Global Majority women as a way to draw out tacit, subtle, relational knowledge on the ways in which culture and ecology are entangled in diaspora cuisines. This was a way to attend to how women in diaspora cultures tacitly negotiate multispecies entanglements, as a way to attune us as researchers to the ways in which domestic practices can often be practices of more-than-human care. I was concerned that ways of knowing and practicing multispecies entanglements can often go unspoken when working across differing cultures, often due to uncertainty and slippage with language and of the differing ontologies that underpin them. As a result, the third question I asked was about how we might develop a multimedia re-presentation of the tacit, subtle and performative forms of knowledge that emerge, which could facilitate further encounter outside of the research context, and invite their own cultural and ecological co-productions.

In this chapter, I outline the topics that emerged more tacitly through the practice by reflecting on the workshop recordings, the poetry, responses to interview questions, and other audio-visual recordings made by my collaborators during the research. Marisol de la Cadena and Mario Blaser argue that daily practices of the Global South often hold *natural-cultural* knowledges that are important in their own right, beyond 'cultural practice' (de la Cadena and Blaser, 2018). I have therefore sought to disentangle some of my collaborators ideas on food as cultural practice and identity through the following text as a reflection on how these contain 'more than culture'. I further relate the knowledge that emerged to ideas to do with fermentation as symbiosis, collaboration and adaptation. These are heuristics that live at the heart of the fermentation process that have informed my research framework, as they speak to ecological and cultural knowledge production as co-constitutive. By relating and remixing the recipes, stories and poetry, I make the practice outcomes as a reflection on my own artistic practice of reflexive co-making with others, as a way to draw out 'the more subtle and difficult tacit, indirect, implicit and relational aspects' of public engagement (Wynne, 2007, p.102). As a result, this Chapter does not stand alone but should be read (and practiced) alongside the recipes and poetry found through this thesis, and by listening to the soundscape linked on Page 19.

5.1 Subtle, Tacit and Embodied knowledge as 'Overspill'

The framework of *multispecies co-creation* became a way to interrogate aspects of ecological relationality. As I noted in Chapter 2, co-design practices rely on iterative, reflexive and participatory methodologies, as a set of performative

Figure 46: Kitchen Cultures Pepa biscuits

Figure 47: Kitchen Cultures Rinkal spices

interactions through which knowledge is accrued and outcomes are developed with others. As such, design research accommodates an account of knowledge production that is 'always emergent, in the two registers of emergence: self-organized and other-organized, the latter qualifier meaning that the scholar/designer also lays down elements and makes decisions that enable the self-organizing dynamic to take off and do its thing' (Escobar, 2020, p.xv). There is the aspect that is created by the designer, that has an explicit outcome, and how the collaboration goes on to shape itself. This latter is outside of the initial organisation and is shaped by those who participate in the activity, negotiating, enacting and reframing the project through their own forms of understanding, practice, knowledge, culture and agency. These outcomes tell me that, despite the many ways that the language we are working with seems unable to contain or represent this knowledge, the *practices* themselves allowed tacit and subtle relational knowledges to 'overspill' (Michael, 2012b). This 'overspill' then afforded me the opportunity to further develop *multispecies co-creation* as a way to explore how tacit, performative and embodied knowledges on *nature-cultures* are negotiated in the kitchen by women from the Global Majority diaspora.

The way my collaborators chose to engage with the practice is its own form of agential reframing, or overspill, that tells us something about the 'problem-space'[8]. What I

8 Stengers and Michael refer to this form of refusal to engage with the problem as it is explicitly framed using the word *idiocy* (Michael, 2012b; Stengers, 2004), and while they don't necessarily mean this in a pejorative manner, I still can't bring myself to use the word in reference to my collaborators (and I don't believe that they would appreciate it either).

Figure 48: Kitchen Cultures Carrots

Crunchy Carrots (helped by Arya)

Crunchy carrots, carrots, carrots.
As bright as a parrot, parrot, parrot.
You can use it as a snowman's nose but
don't put it in your hose!
I like carrots in my soup,
I like carrots in my cake,
I like carrots, nice and crunchy but they're
hard to bake!
Crunchy carrots, carrots, carrots.
As bright as a parrot, parrot, parrot.
You can use it as a snowman's nose but
don't put it in your hose!
When I cook a carrot, the smell is nice.
When I cook a carrot, I put it in my rice!

Figure 49: Kitchen Cultures Sumac

Rice Rap (helped by Shriya)

I like rice,
I like rice,
I like rice,
With a bit of spice.
I like spice,
I like spice,
I like spice,
When it's on some rice.

learned was that my collaborators were interested in food waste as something they see as a problem, *in and of itself.* On the whole, there was a tendency within the group to reify cultural practices, except, sometimes, when we were engaging in the *practicalities of making.* My collaborators were able to negotiate differences in taste, culture and personal preference quite proactively, even in instances where there was a tension between what each of them wanted to do, such as in the instance of Rinkal preferring more spicy (chilli) food and Soha coming from a region that didn't use so much spice, or Pepa wanting a recipe to be vegan and 'healthy', and Eklass stating she was 'not as comfortable' experimenting with ingredients. As a practice that was situated in the food practices and cultures of my collaborators, I felt that the framing of the work as a fermentation also offered an accessible way into ideas to do with agential co-creation across difference. By which I mean a difference in biology (as microbiodiversity), epistemic difference (in terms of the knowledge that is validated) and cultural difference as ontological difference (i.e. the pluriverse) (Escobar, 2018).

Of the recipes that my collaborators and I developed, 3 are ferments (both achars and the torshi), one uses a fermented (a vinegar) ingredient to preserve (the escovitch pickle), the biscuit uses yogurt to help it rise before baking, and the jam is preserved by boiling in hot water to 'sterilise'/seal the jar. Each of them uses an ingredient from our 'commonly wasted foods' list (See Appendix D), or can swap out ingredients with fruits and vegetable you might have too many of in your kitchen, or with the spices that you like the flavours of (which equally affect the proliferation of microbes in a ferment (Lee, Jung and Jeon, 2015)). We sterilised our worktops and our jars as we worked, and discussed whether/how things might 'keep' or 'spoil' if stored in different ways. Therefore while fermentation became less central as the framing through which we were working, we were in constant negotiation with the microbial ecologies of our ingredients and our environments. Domestic practices such as cooking, fermenting and cleaning that are tacitly negotiating the multispecies attune us as researchers to how diaspora cultures maintain themselves as practices of more-than-human care. In seeking to attend to how such I set a series of questions for each of my collaborators on topics to do with land, climate and home. (For the list of questions, and full transcripts of responses please see Appendix D). In this chapter, I reflect on how *multispecies co-creation* was developed as a framework to explore *aunty knowledge* as a *feminist ontology* of diasporas from the Global South. *Aunty knowledge* comprises my collaborators' experiences of food and fermentation as connected to their entanglement with communities, cultural heritage, identity and history, as well as culture and geography. *Aunty knowledge* is *tacit,* in that it lives in the act of fermenting, cooking and eating, it is *performative*, in that it emerges through practice, and it is *embodied*, in that it can be registered and shared through the senses.

5.2 Disentangling languages, cultures and geographies

Each of my collaborators wanted to have more time to make our cultural foods at home, but for many of us this was balanced against time, knowledge and inclination to produce our own foods when they are so easily to buy from supermarkets, or where alternatives are available. When Pepa and Eklass were discussing how reliant on the sun their respective cuisines were, and how they were both from historically nomadic cultures who moved across landscapes with varying climates, and how this had shaped the food they ate, we were able to draw connections between a nomadic lifestyle and a lack of fermented pickles. A conversation about the achar that turned up in both North India and Zimbabwe led to a discussion about 'authenticity' in food practices, and how many of the recipes we think of as authentic representations of a cuisine are simply the ones that have been validated by being written down at a particular moment in time, as a snapshot of cuisines that are constantly in flux and responsive to their environmental conditions.

While the human cultures were emerging, the microbial cultures stayed unspoken. Yet they were materially present in the recipes and in our kitchens. There was also something about the explicit framing of 'relationality and multispecies entanglement' that was inaccessible to my collaborators, but intrinsic to many of the outcomes and practices in which we were engaging. Most of my collaborators didn't speak English as their first language, so the knowledge contained in the material outcomes (i.e. the recipes) seemed to me as important as the ones that were expressed using words. In 'Staying with the Trouble', Haraway tells us that 'it matters what matters we use to think other matters with' (Haraway, 2016). What she means is that the practices, tools, metaphors we use to explore a concept shapes how we understand that concept. When I ask Rinkal whether something is 'soured', she understands this as a flavour, a taste, an experience that can be added processually, e.g. using a sour ingredient such as lemon. Her food is alive, teeming with microorganisms, and I am wary of telling her this is the case lest it means she no longer trusts her own experiences and the knowledge she has gained from a lifetime working with these practices. However, if I work with her, through the practice (of the verb) of souring, we both understand that the process is how certain flavours are achieved. Escobar argues that the conditions for 'spontaneous relational living' only partially exist at present, so all communities are variously 'thrown into the process of having to practice both embodied and detached reflexivity' on our own histories and contexts '*sometimes even as a matter of sheer survival*' (emphasis mine) (2018, p.214). This renders a danger of instrumentalising these relations, and it is this form of design that he is concerned pushes relations 'into an objectifying and individualizing mode of hierarchy and control' (Escobar, 2020, p. 214).

The linguistic concerns led to me adopting the less accurate but more acceptable term 'preservation' instead of fermentation when talking about food. Over the

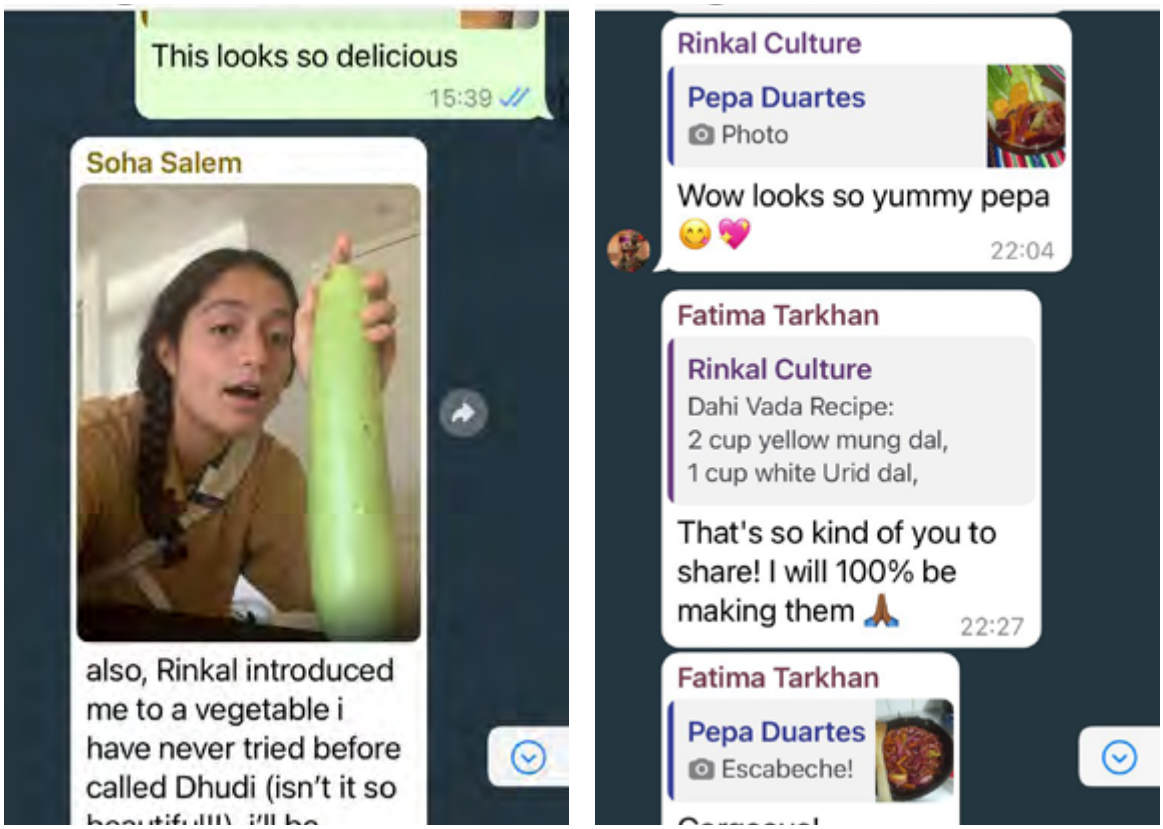
Figure 50: Kitchen Cultures Graphic Soha

‘Care through food sticks with me… in friendships using it as a way to get to know each other and explore, using food as a facilitator to get to know someone.’ – *Soha*

course of the research my vocabulary developed imprecisely, speaking to 'souring', 'salting', 'keeping', 'curing', and the Gujarati word 'atho', which roughly translates as aerating (or breathing). As part of the collaboration Fatima and I also referred often to 'extending the life of food' or leaving something to 'sit' for a while. For example, the word *atho* was useful when I was asking Rinkal about savoury cakes such as *dhokla* and *idli*. However, when we moved to talking about achar, the word proved to be the incorrect one in Gujarati. I instead asked her if there were any foods that she 'left out' (of the fridge) after making for a period to allow the taste to develop. However, since Rinkal has developed the habit of reducing the amounts of salt and oil in her cooking to make her food 'more healthy', she tends to put her pickles straight in the fridge without allowing the flavours to develop further. Since I already knew about the pickles she made being a form of lactic fermentation, which created a sour taste, I asked if they tasted different as a result. She was sure that they didn't, and in fact that they were probably better as they were 'less sour'. If I wanted mine to be more sour, I could simply 'add some lemon juice'. In this way, the subject of the inquiry was continuously obscured, and had to continuously be unearthed, particularly for some of the collaborators who spoke less English. Yet these negotiations also speak to the types participatory or engagement processes as relational design practices that might allow us to account for different ways of knowing the world (de la Cadena & Blaser, 2012; Wynne, 2007). Rinkal cannot explicitly point to microbes, or articulate in her own language what she thinks is happening when she ferments, and I in pushing her to do so, I pushed her away from the practices through which she accesses and negotiates that knowledge.

I became very cognisant of the fact that the knowledge about microbes I was bringing into our discussions had the potential to overwrite my collaborators' own more subtle scientific and indirect ecological knowledge. The linguistic and scientific framings equally held the danger of enacting their own forms of epistemic erasures. As a result, I chose not to continuously bring the conversation back to fermentation and microbes when it veered elsewhere, except when it was specifically relevant, or when someone else brought it up. The explicit scientific tools in the welcome kit I provided were used by some of my collaborators, however, there was not an appetite to discuss these in the group meetings, and I chose not to push this explicitly 'scientific' agenda. Both Wynne and Haraway agree that we must take seriously the knowledge of lay experts when we are looking to understand contexts in which we personally are not engaged (Haraway, 2009; Wynne et al., 1996). While my context might have been similar, each of our cultural and individual contexts were unique. Additionally, I was shaping the research therefore there was a power differential I was seeking to mitigate. This meant that I tried to let my collaborators lead the discussions and collaborations, and to take seriously the stories and practices through which they chose to explore and enact this knowledge.

Figures 51 & 52: Soha doodhi, Rinka; Dahi vada, WhatsApp Chat, Kitchen Cultures, 2020



In seeking to engage with practices of fermentation as living and evolving cultural practices, that are lived in unruly ways through practice, I am invoking these as an embodied and detached reflexivity. I suggest that the concepts of entanglement and multispecies relationality are embodied and negotiated through the food fermentation practices my collaborators are engaging in, yet the language we are sharing, of everyday English, does not seem to be able to accommodate the concepts. It would be impossible, for example, for my collaborators and their ancestors to incorporate both the germ theory of diseases and inherited fermenting practices into a reflexive framework. Yet they can and do coexist, in order that my ancestors could preserve food, and my collaborators can ferment pickles. This is its own form of (partially) reflexive 'cosmic interconnectedness' that evolved as a matter of survival, and continues to evolve (Escobar, 2018, p.214). This is a way of living that evokes conservation and multispecies relationality but does so in a way that is simply about the daily lives of the human communities that my collaborators inhabit. Much like the fermentation (and other preservation practices) in which my collaborators were engaging in the kitchen as a matter of daily practice, this isn't a consciously ecological practice; *'they just lived them.'* (Maturana & Verden-Zoller, cited in 2018, p.213).

Figure 53: Kitchen Cultures Fruit Salad

Mixed Fruit

Vibrant
Like a bowl of mixed fruit cocktails
Sweet ones, mostly
And just a few tangy ones
Some tangerines can have a tanginess to them
But not always
When mixed with all the sweetness
and yummy juices you don't notice the taste
The tanginess gets mixed up
and it becomes a sweeter taste
The fruit mixture
The skin is hard
But don't let that fool you
Open it up with joy
and you will discover the soft,
colourful mellow delicious fruit
One bite, and you are loving it
As you chew with delight
The more sweeter juices are released
Every mouthful you take
You want more
Happiness
Music to your palate
Joy to your belly
Is what I provide!

Interwoven through the discussions you can hear in the soundscape and in the phone conversations and WhatsApp discussions are my collaborators' concerns about how in moving to the North, our internal microbiomes have suffered through over-sanitation, lack of contact with animals, use of antibiotics, exposure to chemicals, lack of contact with dirt, etc. Often we seem to think that these 'cultural' practices only exist in the past, as communities are displaced from the originating geographies and eras of the human-microbial cultures in question. As a practice that is used in almost every culture as part of food preparation, I had thought that fermentation could be a familiar lens through which to understand that collaboration and care between humans and other organisms can live in the most mundane of places (i.e. the kitchen, the home, our bodies). However, in a way that echoed Karen Guthrie's experience from her work in Japan as part of the *House of Ferment* (Chapter 2, Appendix A), it quickly became apparent that it was difficult to separate fermentation from general food preparation practices. In many instances, much like my experience with the Indian achars I had grown up eating, these were ferments disguised as preserves, or processes that served other purposes, such as to change textures or develop flavours. Most of these are practices that pre-date our awareness of the all-pervasiveness of microbes, and as a result the discussions on fermentation never really took off. Once, when I tried to approach the idea of bacteria in the kitchen, I was quickly assured by Rinkal that 'my kitchen is very clean'. This was both fascinating and frustrating, as it spoke to how pervasive and enduring the germ theory of disease has become.

Food fermentation practices are ecological practices that are developed through trial and error in collaboration with our microbial environments. This process of adaptation to context, including practices of 'cheating' are multispecies relationalities that comprise the humans, the practices, and the microbial ecosystems of our homes, kitchens and communities that have to be continuously renegotiated. These negotiations mirrored the ways our own continuous adaptations, of cleaning and hygiene practices due to COVID-19, shaped our ferments and our relationship to microbes. These acts not only figure complex multispecies relations in ways that are negotiated by each of us daily through our practices, they do so in ways that reflect the quickly changing and emerging public views about microbes (Sariola, 2021). In many industrialised nations, it is estimated that the majority of us spend 90% of our time indoors (even prior to the COVID pandemic and its ensuing lockdown), and our homes are occupied by thousands of microorganisms (Wakefield-Rann, 2021). We know that the organisms/other beings with whom we share our homes share their microbial ecologies with us (Vuong *et al.*, 2017). Therefore, it is likely that the act of fermenting itself changes our bodies and our homes in important material ways, beyond attunement, ontology and metaphor.

5.3 *Aunty knowledge* as more-than-cultural practice

5.3.1 Storytelling as Survival

Figure 54: Pepa Duarte 'Eating Myself', Kings Head Theatre, 2021

Maya Hey notes that due to their size, human relations with microbes are always mediated (Hey, 2021). We cannot see, hear, smell, taste or feel microbes themselves, however there are ways that we might sense their presence through the enzymatic processes in which they are engaged, which produce outcomes that have distinct colours, smells, flavours and textures. Therefore, the act of sensing microbes is an act of mediated representation in which we engage in embodied ways. As Sarah Pink notes, sensory ethnographies comprise 'thick' practices that evoke their own ways of understanding and representing the world, by offering more than simply textual readings (Pink, 2008; Pink, 2009). If *multispecies co-creation* is a practice of making with both human and non-human others as a way to understand social, cultural and ecological contexts, then working through sensory modes is one way of understanding and evoking new forms of knowledge. Practices of fermentation and food cultures therefore embody *nature-cultures* that are mediated through the senses by smell, touch and taste. These multi-sensory engagements break down binaries such as microbial/human, nature/culture in important material ways by bringing forth more embodied ways of knowing. They speak to how ideas about multispecies entanglement are not simply abstractions but lived realities through which humans engage in and with

the world. Our senses are technologies through which we experience our worlds, which is then mediated through an act of processing by our individual brains, each of which is unique and therefore subjective. Yet we make collective meaning through the act of telling ourselves, and each other, stories (Haraway, 2016).

The stories we tell ourselves impact how we relate to the world around us, and how we think about issues such as food, sustainability, care, microbes. Through the duration of the *Kitchen Cultures* project, the practices of *multispecies co-creation* in which we engaged in our kitchens highlighted the central relationship between food and culture, and how migrant cultures maintain themselves through storytelling. Each of my collaborators use food to reconnect them to their cultures and their heritages, and also as a way to connect to communities in the present. For Vee, it is a practice of nostalgia and a way for her to reconnect to her diverse cultural heritage(s).

> 'The thing I most love about food is the way it connects you to other people… I love to eat and love ingredients… the most important thing is who gets to eat my food and hear my stories.' – Vee

The act of gathering in these kitchens to cook, and around a table to eat, is a practice of cultural heritage that is maintained through the act of storytelling. This act is one of the ways in which diaspora communities maintain themselves, over time and distance. Fatima reflected on how wasting food was a normalised practice in professional kitchens, and in the group discussion hypothesised that this concern with waste is a defining feature of 'home cooking'. My collaborators told the story of waste and wastefulness as a European idea, that they had to somehow learn to assimilate into eating 'fancy' or 'gourmet' foods. Cooking in this way required them to throw away the perfectly usable parts of ingredients (such as tops, skins, bones and offal). Where sustainability is matter of survival, the story is that it is unethical at a cultural level to waste foods that might be saved or transformed for use later.

> 'In Zimbabwe, you **do not** throw food away!'– Sibutseng

Another story was about how disconnection from a community leads to more waste/less sustainability. Eklass says that when she first moved to Saudi Arabia with her husband she had no one to share food with, which made it more likely that extra food she had cooked would be wasted:

> 'I did not have my community to give food… so it is easier to waste.' – Eklass

Sharing food not only creates and maintains communities, but also minimises waste. In the cultures my collaborators are from, people make large pots of food, and share it with each other, and remake it into new recipes the next day if anything is leftover. This is a cultural practice that is also ecological, in that it speaks to a history of using the resources available in seasons and geographies when food is scarce.

> 'When I think about sustainability and food, they are things that immigrant

Figure 55: Kitchen Cultures Care Package V1

> communities have had a consciousness about for a very long time, perhaps longer than other people.' – Vee

A story that Vee told was about migrants being sustainable because 'we had no choice':

> 'We had no other choice but to turn our ice cream tubs into containers for food, or turn our biscuit tins into knitting kits or first aid kits... When you leave home and with little access to material resources, your class status may change too, and you learn to make the most of what you have. Sustainability is as much about saving money so you can care for your family…'

This is speaks to the idea of sustainability as care and maintenance of community. Members of migrant communities support each other on arrival to new shores, and therefore there is an implicit understanding that the whole community is impacted by your actions and choices. When you take that understanding into into the kitchen, you are likely to make choices that engage with concepts such as responsibility and interdependence more explicitly and directly. Sharing food is its own practice of sustainability, yet over COVID-19, sharing food became difficult as people visited with each other less, and some of us were locked down away from our communities. For many of my collaborators this changed how they were able and allowed to care for others, and how we were able to gather over food.

Vee suggests that 'we can tap into that inner creative person and find new ways to

Figure 56: Kitchen Cultures Graphic Vee

‘We had no choice but to turn our ice cream tubs into containers for food, or turn our biscuit tins into knitting kits… When you leave home and with little access to material resources… you learn to make the most of what you have.’ – *Vee*

connect with food' to rebuild the relationship we may have lost to 'home food', for example through learning about 'fermenting things, and how to preserve them'. As evidenced by my own experiments in the kitchen and discussions with fermenters we also know that in different climates and environments these processes happen quicker, slower, or not at all. Rinkal, when asked how big she chops her vegetables for the achar she was making, told me that 'it depends'. This 'it depends' covers a wealth of knowledge, and speaks to a certain element of intuitiveness required, or some trial and error, with each of the fermentation recipes that were working. Soha describes Rinkal as 'accidentally sustainable', in that she uses and reuses everything in her kitchen almost instinctively. Vee's comments would indicate that these habits are less an accident, and more habit that has evolved through necessity. These are arguments on urbanisation that are just as relevant in the North as they are for North to South migrations. These not only speak to migrant experiences, but also the experience of disconnection from sites of food production which require a reorientation with the idea of 'home' as a the place we and our practices originate vs home as the place we live. As Hall has argued, communities and cultures are shaped through encounter, and presuming a fixity in multicultural 'traditions' does a disservice to the fact that these are living practices that are continuously evolving.

There is a question here about who gets to imagine, and therefore to be part of, the futures that we are creating, and how it enriches our imaginaries of the future to include Global Majority perspectives. As part of the interview questions, I asked my collaborators to speculate on the future, as a way to address this as part of the act of disentangling multispecies and ecological knowledge. Pepa answered that she wanted people to live more in tune with ecology, and therefore wanted to spend more time in her garden and learning about sustainable foods. Sibutseng wanted more time 'to try making the pickles', and Rinkal wanted more opportunities to share her recipes with others. Vee wanted more self-determination for people from diaspora communities. Soha wanted people 'to have access to good nourishing cultural foods, and to not feel judged for it and just generally feel nurtured by the food that they're eating and able to get access to', and to create more initiatives for free food and mutual aid. Eklass wished 'for everyone in the world to live with food and water, why not, if we are wishing?'. These are imaginaries of the future that work through sharing and caring ('if that isn't too cheesy'– Soha), that understand resources as both finite and abundant if we wished it. As Soha points out:

> 'It all comes back to mutual aid and networks of mutual care that are developed locally, and if we prioritise care over sustaining ourselves as individuals, if we can sustain ourselves as communities that's 1. the most sustainable thing, and 2. the most equitable and sensible thing.'

5.3.2 Food as feminism(s)

The places where you learn feminism as a migrant woman, for example the

kitchen, are not always what you expect, and many times these ideas are not even recognisable as feminism by others (Vergès and Bohrer, 2021; Ahmed, 2017). Yet it is precisely this resistance to European ontologies that makes them important feminist ontologies. Learning to adapt processes to context, sharing knowledge between generations, enacting care in the kitchen, negotiating ecosystems and geographies, making the most of resources; these are all important instantiations of multispecies entanglements enacted through practice. If care consists of 'everything we do to continue, repair, and maintain ourselves so that we can live in the world as well as possible' (Tronto and Fisher, 1990, p. 41) then the (often-gendered) labour of *caring for* somebody or something, such as by feeding or creating comfortable conditions in which they can thrive can stem from the affective relation of care, or *caring about* others. Yet it can equally be a gendered expectation imposed by society, community or family. 'Caring with' understands ethical care as a collaborative exercise that values the agency of those engaged in the care process, as a way to address how forms of 'home-based reproduction' that intersect with issues of race, disability, class, and other axes of marginalisation that 'are embedded in everyday reproductive work' home (Graham, 1991). *Multispecies co-creation* is a way of maintaining the world, and in noticing how the world is maintained by others. In working through *multispecies co-creation*, my collaborators and I are engaging in a practice of 'caring for' 'about' and 'with' human and microbial others (Fisher, 2013). These are tacit practices enacted as explicit acts of care performatively in the kitchen by my collaborators, as a way of maintaining ourselves, each other, and our microbial kin.

The acts of storytelling that frame these practices are forms of cultural production that take place over distance and time, that connect us to geographies and climates, as well as complex herstories of culture, colonisation and care. The conversations we were having (and the practices in which we were engaging) reflected complex relationships between gender, culture, care and feminism in terms of how they are enacted materially through food.

> 'When I was younger, food was a signifier of care, as one of the core ways I was cared for as a kid (e.g. my grandmother making my favourite stew as an expression of love when she visited). As I got older it became a way in which I expressed care, for family (biological and otherwise) and friends. It gained an importance over time as a way to express how I felt for someone, in a really tangible way (beyond emotional, although that is also important).' – Soha

Food stands for Soha's (sometimes complex) relationship to her heritage, her sexuality and her gender that she negotiates through cooking the foods she grew up with for her community. Her community is both her Iranian-Canadian family and her queer family in London. Cooking and feeding are practices of material care that she was taught by her grandmother Shaheen, and it is how she has learned to express her care and love for others. Yet these acts of care are not always reciprocal, particularly for women. Soha relates how while both she and her grandmother love food:

Figure 57: Soha vada pav, Kitchen Cultures, 2020

Figure 58: Eklass 'jelly' mold, Kitchen Cultures, 2020

> '…my grandma's case it was an entirely obligatory, gendered role that was placed on her, and that she grew to enjoy, especially the agency she got in the kitchen, as the 'best chef in the family'. However, I am not certain that she would have chosen it, but it's really hard to say as she wasn't offered the same opportunities to pursue alternate pastimes and passions.' – Soha

Soha's grandmother Shaheen had no choice in whether she would be a cook for the family, but she used her positioning to create a space in which Soha could be brought in 'more gently', and where her engagement with food could be about enacting agency and consciously caring for others. Shaheen didn't choose the role, but she used it to create a space of agency within the home. For Soha cooking was very much a choice, as her interest in it came from a place of desire, and as a result:

> 'My relationship with food is more nurturing and caring, as I was never expected or forced to cook at home.' – Soha

The theme of women's agency and of differing societal expectations emerged continuously through the project. Fatima never learned to cook Nigerian food growing up with her mum because her mum didn't cook, and I only learned to cook the things that it wasn't easy to buy from the Indian supermarket, as I was expected by my family to study and get a professional job. Eklass never learned to cook as the youngest daughter on her father's farm, so for her learning to cook

was a way of reconnecting to her heritage when she got married and moved away from home. These experiences echo Avakian and Haber's view that while the kitchen has historically been and continues to be a site of oppression for women, it is still an important space for learning about women's lives in terms of creativity and agency (Avakian and Haber, 2005).

It is also important to note that while kitchens are places were care labour is enacted, women are judged for consuming the fruits of this labour. Pepa candidly talks about how like many women:

> 'I've also always struggled with my weight… so rediscovering a relationship to food has been part of developing a healthy relationship with my own body… [and to] reconnect with my cultural heritage through cooking.' – Pepa

She says that one of the reasons she never cooked growing up was because it was expected of women in her community.

> 'In my culture women are expected to cook, and so I never wanted to.' – Pepa

It is only as an adult that she has begun to create her own relationship to food, but it is a complex negotiation of health, ethics and cultural heritage that she explores through her own performance practices[9].

> 'As someone who was raised vegetarian (which was unusual in Peru in the nineties), and as someone who sees myself as a feminist, I have a complicated relationship with food.' – Pepa

Pepa saw the opportunity to get involved in *Kitchen Cultures* as an opportunity to explore 'food as connection and care'. Food practices connect us to health, sustainability and cultural heritage as practices of material care for, by and with others.

Pepa is vegan, and interested in sustainability and health, so all of her recipes are explorations of what this means:

> '…while also preserving and learning from traditional land techniques.' – Pepa

She found that the investigations of food cultures and heritage in which she engaged through the project revealed complex histories and connections to geographies.

> '…my family is from the Peruvian highlands, which is broad and green and

9 During the project, she was promoting her one-woman show 'Eating Myself', which I and Fatima managed to see the first in-person performance of post-lockdown at the King's Head Theatre in London, in April 2022. The show consisted of Pepa cooking her grandmother's stew in real-time, using the breaks in-between the embodied labour in which she was engaging to act out her experiences with food. These included her interactions with members of her family, their own experiences of cooking and eating, as well as her hopes, worries and frustrations with the ways in which her own relationship to health, culture and femininity is shaped by societal expectations. At the end, she served the stew to the audience, and we ate it together.

Figure 59: Kitchen Cultures Graphic Pepa

‘…diverse geographies means that you can get all of your ingredients fresh, which might be why there aren’t so many preservation recipes.’ – *Pepa*

> mountainous. The techniques I learned about come from that place, so it allowed me to reconnect with my family knowledge…' – Pepa

She notes however that these traditions 'involve a lot of meat preservation', yet this is her cultural heritage, that 'dates back to the Incas. This is knowledge that is connected to our roots, and the land, and all the wisdom that existed before we were conquered.' She is torn about not being able to eat it, but she is vegan as she thinks it is a healthy and more sustainable way to eat in her present time and context.

> 'It has been really interesting for me to understand the significance of preservation in Iranian culture, and of certain techniques and the way they're quite timeless… now I'm very conscious of all the time and energy that goes into certain fermenting processes'– Soha

Soha's recipe is an adaptation of a torshi her aunt used to make for her family. Her realisation that this involved an extremely labour-intensive process made her reflect on her relationships to the women in her life as one of material care through food that 'sticks with her' as a way that she has also cared for the people in her life who matter to her. This was a feeling that was echoed by participants, and even Fatima and I felt this when we engaged in the laborious act of hand peeling beans to make akhara. In the act of rubbing beans, or efficiently chopping 'huge piles of vegetables…. chop chop chop' (in Soha's case), we were connecting to a lineage or heritage of material making that connected us to all the women who had previously engaged in these acts. This is an invisible history of women that is made tangible through acts of material care in the kitchen, yet we all acknowledged that the time commitment meant that we were unlikely to engage in these acts regularly when the ingredients or a (homogenised, sterilised, simplified) version of the food is often readily available in shops or restaurants.

The younger of us further reflected on the fact that we hadn't been taught a lot of these processes by our parents. We had been taught that everything our parents had been through in moving us to the North was worthwhile if only we were able to 'study and get a good job'. Even for the women, the access to education and better opportunities was more important than being a good cook (although those of us with brothers admitted that there was still an expectation to care for the men in our family). Vee and Sibutseng's experiences, where the former was unable to find time to complete work on the project due to suddenly changing work priorities[10], and Sib had to stay locked down for a large part of the project due to one of her sons getting COVID-19, therefore becoming responsible for caring for him, was also illustrative of the negotiation of these everyday commitments. These were discussed as one of the ways that considerations of ecology and sustainability by necessity take a back seat when 'life gets in the way'[11], yet it also

10 At the time, Vee worked for an intimate partner violence charity, and there was a spike in IPV over lockdown.

11 Yet they both continued to cook and attend meetings, and take part in discussions. I

Figure 60: Diary documentation Pepa

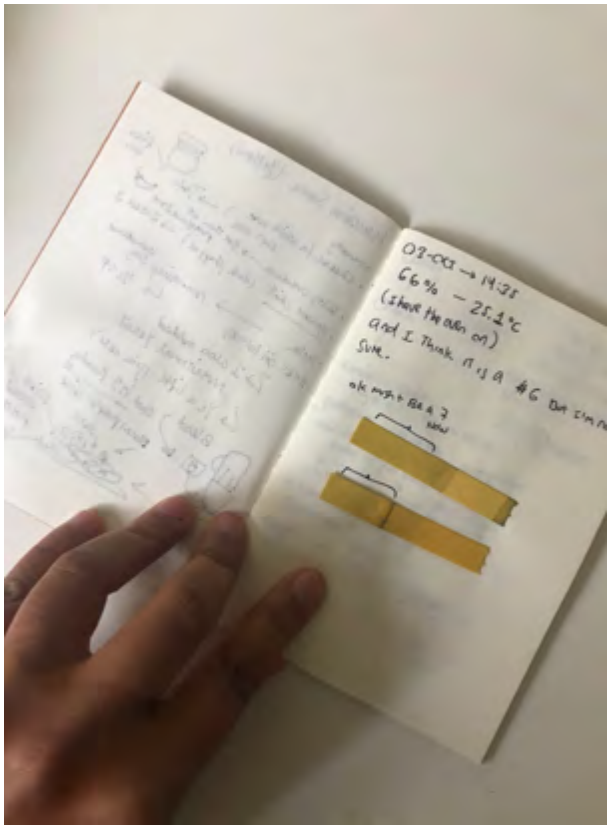


Figure 61: Documentation pH testing Rinkal

speaks to how care relationships (including those to do with other multispecies relations, e.g. caring for someone with the virus) must be negotiated with the everyday life.

5.3.3 Entangled cultures and geographies

Vee uses cooking as a way to negotiate her heritage, and to reclaim some of the:

> 'internalised prejudices and narrow-minded ways of thinking about 'home' food when growing up in the diaspora… For second-generation children, you can grow up thinking your food is smelly, eaten in a strange way or paired unusually. It is not cool, or isn't as delicious or interesting, or even as exciting as European food. I know now that is not true, but it's only as I've reconnected with these foods that I've been able to rediscover what it means to love them… It has given me a sense of pride, self-esteem and ownership over my own cuisine and history.'

There's a stigma associated with eating 'cultural foods' that many of us who have wanted to include recipes from them in the cookbook I produced for the *Eden Project* as reflective of this, and of their wider participation in the project. For Vee, this was the escovitch pickle, and for Sibutseng it was the achar, as I felt that they both spoke to the central concerns of the project, and they were pickles/ferments that had fuelled important discussions in the group about how culture and climates interrelate.

Figure 62: Kitchen Cultures Recipes Eklass x Pepa

Pepa's aguaymento jam

Aguaymanto jam (or any type of berry that otherwise will be wasted!)

250 grams golden berries

4 tablespoons maple syrup.

Use a pan and add maple syrup. 7min stirring medium heat. Blend the berries. Next 7min low fire. Conserve on a glass jar!

Serve with Eklass's 'biscuits with a twist'

Eklass' biscuits with a twist

Dry ingredients (mix together) :

2 ½ cups wholemeal flour

1 cup almond flour

½ cup oat flour

½ teaspoon baking soda

½ teaspoon baking powder

1 TBSP cinnamon powder

1 TSP black seeds

2 TBSP fennel seed grounded

Wet ingredients

1 sunflower/rapeseed/coconut oil

1 cup of vegan (soy or coconut) yoghurt

1/2 cup maple or date syrup

1 teaspoon vanilla extract

Combine.

Then combine dry and wet ingredients. Place on parchment paper over the baking tray. Like placing a pizza. 170c oven for 20min until golden colour. Then cut in pieces, turn and back to the oven 150c for 10-20min

Serve with Pepa's 'aguaymento jam'

Notes: You can use other flours, and other types of vegan milk. For the black seeds, poppyseeds or nigella work, or something similar.

This is a simplified version of the recipe; the original version can be found in Appendix D.

grown up in the west know intimately. Different smells, flavours and textures are valued in different places, and these are both reflective and constitutive of the cuisines that were popular in these places (e.g. the Nigerian concept of 'draw' and chewy meats). Soha, a second-generation Iranian migrant who grew up in Canada, relates that when she was growing up that there was a lot of stigma around bringing unconventional (Iranian) foods to school.

Fermented foods stink; this is often the first thing people note about them. During the eighteenth-century, at around the time that our countries were being invaded and occupied by Europeans, the overwhelming view of microbes was that they were 'dirty, dangerous, and disease causing' (Sariola, 2021, p.S389). These terms uncomfortably echo colonial descriptions of 'foreigners' and are equally familiar to those of us who have experienced both interpersonal and structural racism[12] (Markel and Stern, 2002). The fact that as a child Soha would hesitate before taking torshi to school, or sharing it with her friends at a table points to a rupture between the acts of material care she was used to receiving, and the way she was 'allowed' to show care for others in different cultural spaces. Her reclamation of this as an adult is echoed by Vee when she speaks about reclaiming her heritage, and Pepa when she talks about how participating in *Kitchen Cultures* allowed her to reclaim 'that sense of passion and pride of the things you are made of'. A repeated motif was how exciting and empowering, and *familiar* it was to see this reflected in these other women from vastly different cultures.

Vee suggests that the experience of diaspora:

> '…is one of loss; not necessarily through death, but for example the loss of identity that comes with moving away from home; loss of cultural traditions; or loss of language, and also loss of the homelands and geographies that produce our 'cultural' foods.'

This loss can be mitigated by finding others who have shared similar experiences of loss, or by creating shared experiences or by sharing food and stories of what has been lost.

Throughout the practice of *Kitchen Cultures*, this idea of loss underpinned everything we spoke about in our collaborations; leaving the land that originated us and the food we loved, holding onto the cultures as a practice of holding onto ourselves, adapting our foods and ourselves based on the climate and availability of ingredients in the places we had moved to (for example Rinkal finding places to ferment yogurt in warmer places around the home, or Eklass using sugar instead of date syrup). This was often framed as discussions of 'home' and 'land' (a common linguistic slippage), where each of my collaborators had a different response to the question of home based on where they had been born and raised:

12 COVID-19 led to a rise in anti-Asian hate crime in a way that speaks to a persistent association between 'invading foreigners' and 'invading germs' (Reny and Barreto, 2022)

Figure 65: Kitchen Cultures, Soha fig jam

Figure 66: Kitchen Cultures, Rinkal jars

> 'Home is a difficult idea for migrants, home isn't attached to a place… Iran isn't home, but parts of Iran have naturally seeped into my life through parents, grandparents and family friends, and my cultural heritage…home food for me is a very specific Iranian-Canadian blend that is sometimes difficult and complex to negotiate.' – Soha
>
> 'Home is where you are, and the people you are surrounded with'– Pepa
>
> 'Home is the memory of 'big pots of food cooking on the stove'– Vee
>
> 'However much I [have] lived abroad, I never felt UK is my home'– Eklass

Sibutseng has now lived in the UK longer than she lived in Zimbabwe, yet when you ask her about home she will talk about food in Zimbabwe. Soha has 'had to find ways to make myself feel at home, kind of, wherever I am', and that 'you can bring (home) with you, often through food'. The notions of homes, of geographies and belonging are complex, and it is important that we not flatten the specific conditions which underpin our relations particularly the ones that connect us to the very real geographies where we, and 'our foods' come from (Haraway, 2016). Eklass' people are nomadic, so many of her recipes are biscuits, that could be dried in sunny places and reconstituted in wetter ones (often using a 'souring' process). But she continued to enjoy the taste of these biscuits and associated them with home. Our homes are sites of multispecies negotiation in which we engage tacitly, instinctively, in ways that are both obvious and not. The

Untitled I

There's no recipe when you have
no time to be present
No recipe when you have to be
somewhere else.
But there's time to be messy
And traditions around huge pots
of boiling water
Artichokes
Artichokes
Alcachofas are for the grown-ups
They are
too difficult
too dangerous
too messy
But you drain them from boiling water
And it's hot and pointy and scary
There's lemon, olive oil, pepper, salt
There's lemon, olive, pepper, salt
And finally there's time
And nothing is too dangerous
But alcachofas are messy
So it's only us
And the best part
There's lemon and time
And the heart looks like ours
All covered in layers of messy little things
Aggressive little things
But there's time
So you clean a heart for me

Figure 63: Kitchen Cultures Artichokes (Wikimedia Creative Commons)

And alcachofas are much more
beautiful like this
But they're still grey
and broken
There's no recipe
Just a moment to see beyond
the pointy, hard, leaves
And let the water boil
Let the water boil
Papá.

act of engaging in these practices themselves entangle us within time in ways that speak to heritage and cultural tradition.

Yet while knowledge practices are historically tied to the cultures, climates and contexts in which they originate, they also change as they move. As Hall notes, culture is not static, but continuously evolving through encounter (Hall, 2015). The shared place that my collaborators occupied over the course of the project, was digital, but it was also our own kitchens. Conceptually, and in terms of how we were engaging with memory, it was also the specific geographies of place that some of my collaborators had lived in or migrated from and through. In the cases of those of us born elsewhere, it was a half-imagined 'home' that we had built through pictures, stories and flavours of a particular time and place that had been shared with us by our ancestors. This showed how the work was as much about 'memory and imagination' (Stengers, 2018) as it was about the specific contexts themselves. The ways in which my collaborators chose to remember and to imagine their homes became its own 'speculative commitment' to matters which they enacted as practices of care (de La Bellacasa, 2017). These recipes act as rituals that could evoke the feeling of cooking and of an imagined space where we could share experiences as a collaborative digital kitchen.

In this digital kitchen, we performed acts of culture that are then re-presented in the context of the collaboration through smells, tastes, songs, stories and poetry, as well as recipes. As Eva Bakkeslet notes, carrying microbial cultures was a common practice for Finnish migrants moving to the new world (Appendix A), and stories such as these speak to the idea of food cultures as a way to push back against standard narratives of assimilation and adaptation in diaspora communities. Eklass spoke about 'bringing suitcases full of flour' to the UK with her, which she couldn't do during COVID as she couldn't go 'home'. These are practices of 'carrying culture with you' that ground you in the materiality of the present in evocative and undeniable ways. The flour in question is a pre-fermented sorghum flour that is 'sun-dried' and reconstituted to make kisra, which are fermented pancakes similar to injera or dosa.

None of these practices required a knowledge of microbes, or of the specific interactions that were taking place, but instead could be engaged with through 'performative interactions', or the act of 'becoming-with'. This meant that I didn't have to work with people who were explicitly 'fermenters', but I was certain that fermentation would form part of the practices as I worked in the kitchen. These form part of a way of being in the world that maximises the resources we have available to us, as a matter of survival. Often concepts are held in practices such as sharing foods, or reusing leftovers, or saving as much as possible. The practices of my collaborators and the stories they tell to contextualise them comprise their own ontologies that matter to them, such as food waste and water scarcity.

> '[I found out that] a third of the water in the world is wasted due to food waste, and that made me sad.' – Eklass

Figures 65 & 66: Kitchen Cultures Care Package V3 (Final version)

The stories told were not always consistent with the practices. There was a binary being negotiated between abundance and scarcity created an interesting tension; there was a distinction made in terms of food as a cultural practice, and food as an ecological subject. The moments where this tension was resolved were when the collaborators raised their own food concerns, that were ecological concerns. Listening to Eklass speak about how food waste impacts water scarcity , it became very clear that water this was an important issue for her as she comes from a water-scarce region. The recipe she made, and chose to share was a biscuit; biscuits are a way that nomadic people can travel from a water scarce region to a water rich one, and she spoke extensively on the different types of flours that were 'sundried' in one area, to be revived in another. She mentioned how many of these were 'soured' through the process of sun-drying, so it is likely that this process in Sudan involved a form of lactic fermentation. In the UK she does this by 'cheating' with yogurt, the fermented food most readily available in UK supermarkets, adding it to her unfermented flours to recreate the textures and flavours of home. In so doing, she is tapping into a natural-cultural practice of using the resources available, as a matter of survival, much as her ancestors did. Even though she no longer has to worry about access to water, the knowledge about how to survive in water scarce conditions lives on in her recipes.

These moments of connection to the aims of the project occurred when we were able to bring practice and knowledge into alignment, and this was particularly apparent when we reflected on how cultures and cuisines are entangled with geographies. Eklass made some of her kisra for the meeting that were 'left to rise'. She told me that in Sudan 'it is easier' to get the bread to rise, and that here she would sometimes 'cheat' by adding yoghurt. Similarly to Eklass's kisra,

Rinkal noted that she would add yogurt to get her dhokla to rise, as the flour she uses to make this is also 'sun-dried' in India. I related a story of how the airing cupboard in my bedroom was also the yoghurt cupboard, that my mum used to speed up her yoghurt fermentation, as another example of 'cheating'. Practices of 'cheating' such as adding yoghurt, using a warm room/yoghurt maker (or placing a jar of ferment in my yoghurt maker to speed up the fermentation process for a workshop) figure as important stories that stand in for entanglements with microbial relations.

These responses spoke to the practical nature of working with available resources in creative ways that can facilitate agency and self-determination. The stories in question materially embed multispecies care into recipes and practices that work through embodiment and oral traditions. These oral traditions worked on two levels, in terms of feeding, as in both feeding the humans and the microorganisms in the recipes we produced, as a practice of multispecies gastronomy (Donati, 2014), and then again through the telling of stories that situate these practices (Michael, 2012b). They represent an embodied engagement with the world around us that is lived through fermenting, cooking, eating and feeding others that is difficult to disentangle from the care practices in which we engage for other organisms. It is a practice of entanglement with the here and now, situated through the encounters between people, places, knowledges, objects and microbes in our homes, in and on our bodies and in our food webs. These are the daily enactments of relationality that manifest as particular flavours or cooking practice, that are negotiated in place, in the moment, as a multispecies encounter between people, foods, geographies, climates, ideas and concepts. Yet as you hear over and over in the soundscape, this creativity is a learned technique that people who live closer to the sites of food production, and who are responsible for feeding others, have inherited from elders who aren't quite so used to having access refrigerators or freezers, or (regular) electricity. It is a practice of creativity as necessity, that contain a multitude of 'herstories' that can only be shared through practice.

5.4 Making the invisible visible

In this chapter, I explored the fermentation practices that are 'hidden' in migrant cuisines, and within daily practices of the kitchen, through a practice of *multispecies co-creation* that engages with microbial practices and human stories. I argue that these practices and the stories used to contextualise them represent ontologies of natural-cultural entanglement. These *aunty knowledge*s can tell us about human and microbial cultures as they are practiced by women from Global Majority diasporas living in the UK. *Aunty knowledge* can be one way of understanding 'invisible' knowledge to do with culture and ecology, as acts of caring for, about and with microbes. These are gendered care relations that are not always engaged in through choice, but can be reclaimed as sites of agency and creativity. These relations often collapse into instrumentality when we push

them towards a Eurocentric scientific understanding of microbes, therefore it is important that we are able to engage with this knowledge on its own terms, as tacit, embodied and relational. Therefore as well as sharing the recipes and poems developed by my collaborators that I have shared throughout this thesis, I have developed a series of outcomes, including care packages, tasting workshops, a recipe and poetry book, and a speculative soundscape made up of the stories my collaborators and co-facilitators told each other through the project. In order to understand the research fully, I would encourage the reader to familiarise themselves with these using the links on Page 18.

Disruptions in language and representation offer researchers the opportunity to begin to unravel what's taken for granted in everyday practices. They allow us to better understand people's fears and desires to do with digital technologies, and working with these ideas tell us about the cultural understandings that underpin them (Knox, 2017). These affective infrastructures reveal how our semantic assumptions about life, food, care, place might differ across differential cultural constructions, and the ways that digital technologies have the capacity to re-inscribe how we are able to relate to each other across these differences. For *Kitchen Cultures*, our interactions in the kitchen were mediated through Zoom, phone calls, texts and voice notes, as well as the sharing of foods across distance and songs digitally. We instinctively tried to find ways of relating across distance through our shared experiences, where even within the same language, words might be understood differently. Yet our microbial interactions were geographically bounded. One way in which we sought to address this disconnection due to distance was by sharing ingredients and recipes by post, and again later, through my creation of care packages to send to people to taste the recipes we had developed. Another way was more conceptually, through the poetry workshop and the sharing of songs and stories.

Watson et al note that digital technologies became important as a way of enacting intimacy and sociality over distance during the COVID-19 pandemic lockdowns (2021). In not being able to build the practices of metabolic intimacy in-person through making together in the moment, in the same kitchen, I was unable to shape the research in ways I would have done if not for COVID-19. The multimedia practices in which my collaborators were engaging, of sharing recordings and images and songs and recipes via text became an important way of reflecting different ways of knowing and enacting culture. Each of these interactions represents a form of engagement that resulted in the co-creation of a shared multi-sensory language which we developed over the course of the project, that reflected embodied experiences and comfort levels with different technologies. They offered each of my collaborators agential modes through which to engage in the project, which in turn shaped further forms of engagement and understanding. The practice of engagement worked through emergent and iterative processes

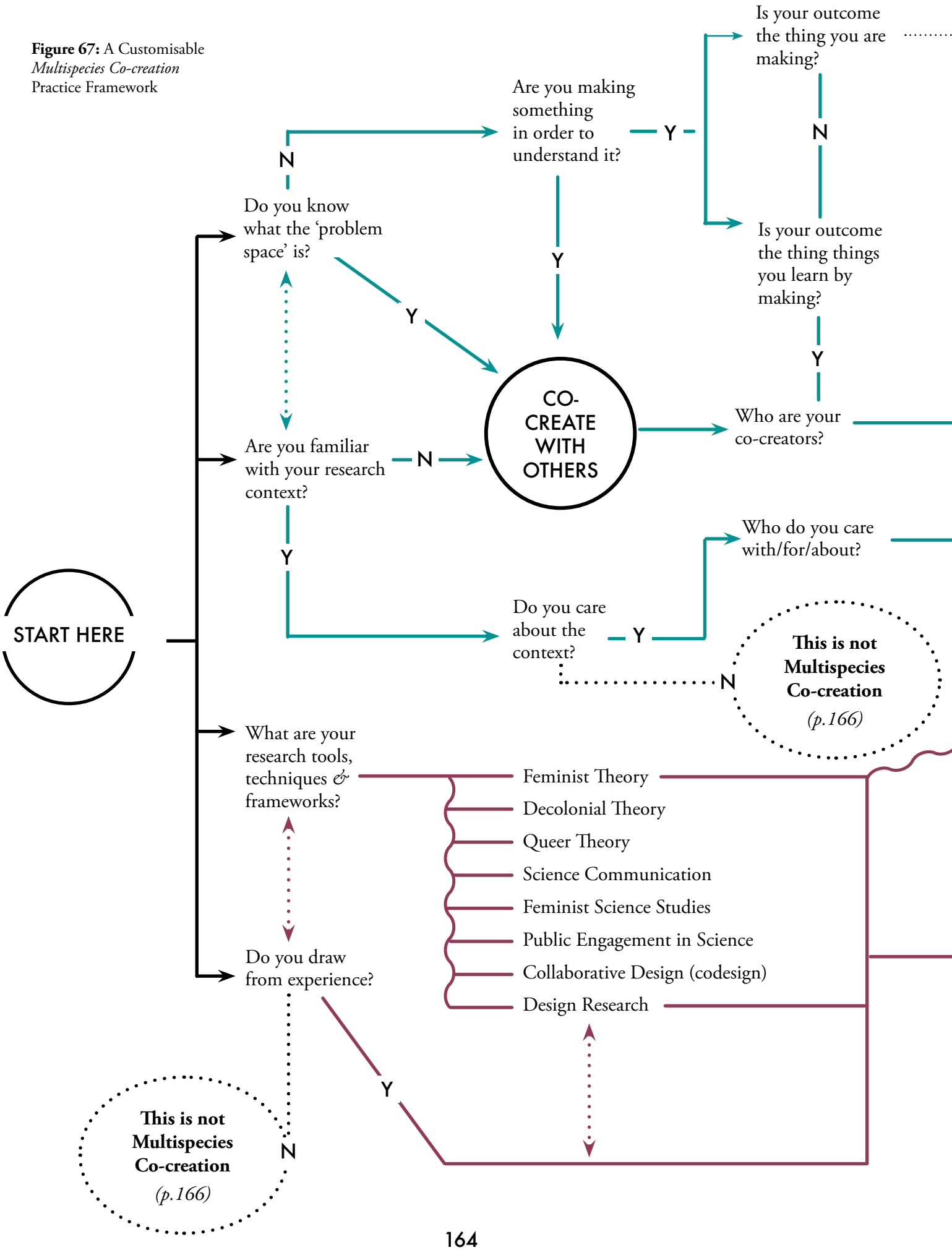
that reflected the practices of cooking and fermenting we were engaging in individually. Similarly, the iterative practices of listening, remixing, reflecting, making, collaborating, discussing and tasting with which I was engaging became a form of artistic analysis through which I re-presented the work for others to consume. I have disentangled these through a practice of listening, remixing and tasting as I developed the *Kitchen Cultures* outcomes for public consumption as another form of engagement.

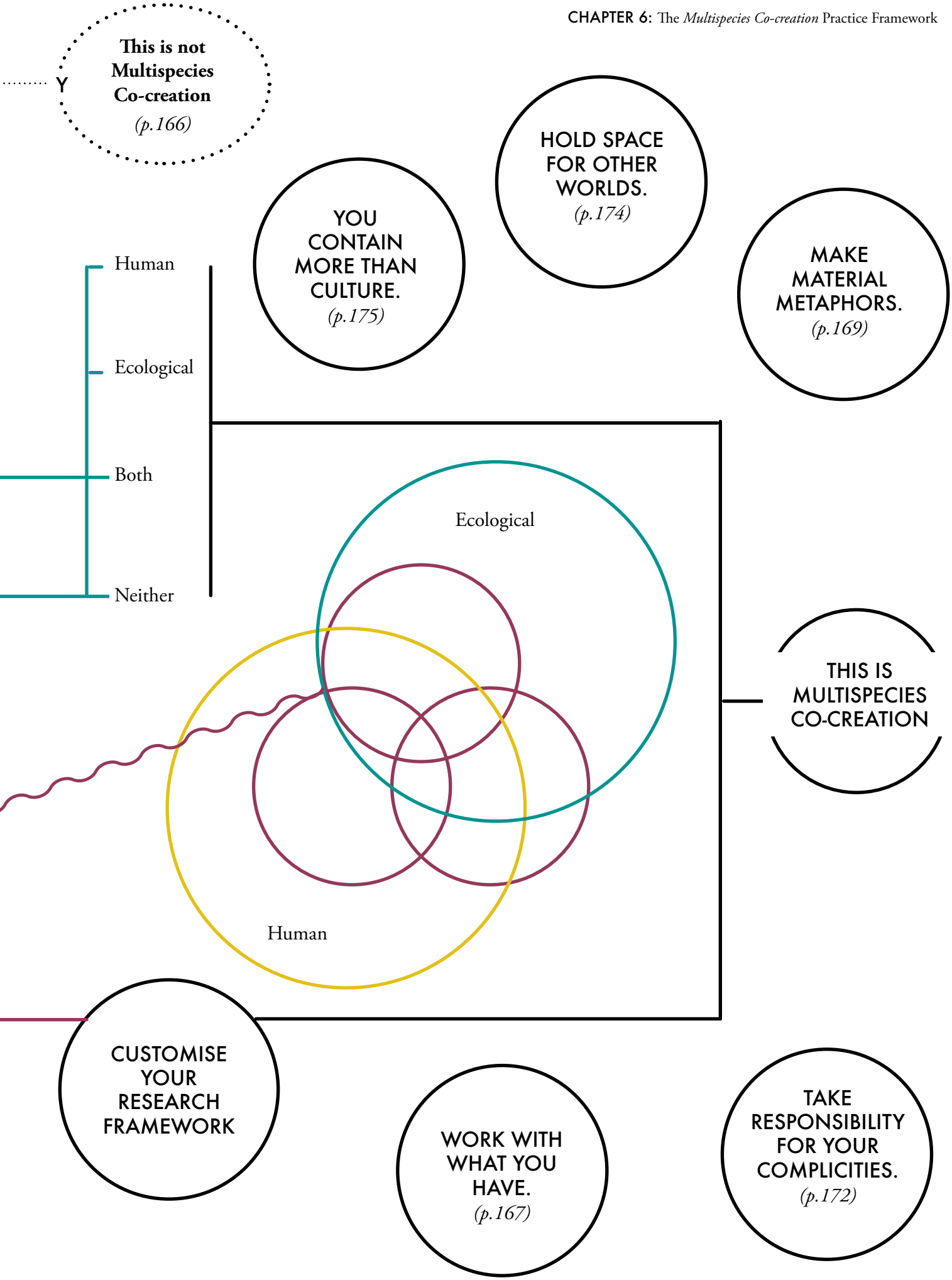
In the next chapter, I give an overview of the practice of *multispecies co-creation* as a framework for research. This is a practice framework that pushes back in important ways against the ontological positions to which we have become accustomed as designers and researchers. These positions include: the idea that co-designers sit outside the context in which we're designing; that the problem-spaces we are negotiating are fixed in time and space; that technological and scientific knowledge is unassailable except by 'experts'; and that Global Majority food practices hold only 'cultural' knowledge. I'm also sceptical of the recent tendency within design to 'borrow' or 'be inspired by' both 'nature' and 'Indigenous communities' as a way to respond to ecological concerns. I wish to suggest that rather than borrowing simply the *tools, techniques* and *frameworks* designers find useful from ethnographic research, we also familiarise ourselves with debates around how these might entrench normative hierarchies. As a comparatively junior discipline, design has a lot to learn from social research. Yet it similarly has much to offer. Designers are creative, adaptable, and responsive to context, and many of us also possess important iterative and technical skills that might be useful for a variety of potential activities towards ethical worldmaking. We are able to work through acts of *making-with* that are important for tacit knowledge generation. And yet I would suggest that the complexity and nuance that lives in these practices are often lost when we re-situate them within contexts for which they are not suitable, and often, in these cases, can do more harm than good. If we are to engage in design as a practice of ethical worldmaking, we cannot expect to progress beyond simplistic and binary 'solutions' to complex world problems unless we understand our practices as explicitly political, and politically situate ourselves in response.

Chapter 6

The *Multispecies Co-creation* Practice Framework

Figure 67: A Customisable *Multispecies Co-creation* Practice Framework




Y
This is not Multispecies Co-creation
(p.166)
HOLD SPACE FOR OTHER WORLDS.
(p.174)
YOU CONTAIN MORE THAN CULTURE.
(p.175)
MAKE MATERIAL METAPHORS.
(p.169)
Human
Ecological
Both
Neither
Ecological
Human
THIS IS MULTISPECIES CO-CREATION
CUSTOMISE YOUR RESEARCH FRAMEWORK
WORK WITH WHAT YOU HAVE.
(p.167)
TAKE RESPONSIBILITY FOR YOUR COMPLICITIES.
(p.172)

In the previous chapters of this thesis I outlined my explorations of practices of food preservation and transformation (such as dehydration and fermentation) as a way to explore feminist ecological concerns to do with relationality, care and agency with diverse communities. I did so as a practice of public engagement through collaboration making, that I have developed into a framework for *multispecies co-creation*. The work culminated in a research residency with *Eden Project*'s *Invisible World's* exhibition, called *Kitchen Cultures,* as part of which I worked through fermentation practices in the kitchen with women from the Global Majority from diaspora communities living in the UK, as 'invisible' communities of human and microbial cultures. I developed this methodology of fermentation as *multispecies co-creation* in order to engage communities that are often overlooked or marginalised by scientific and ecological discourses in the North (namely Global Majority women) in the kitchen. I explored how to use practices of fermentation to understand how my collaborators engage in embodied feminist multispecies ontological making through practice in the kitchen, which the COVID-19 lockdown forced to be carried out through a digital media practice.

The *Multispecies Co-creation Framework* I have set out on the previous page is one way that designers and researchers might work with communities whose everyday practices contain important knowledge about how we could live more sustainably with (more-than-)human others. Follow the process, and you can build your own lens and research practice. Alongside the framework, I have provided a set of propositions that 'bubbled up', each of which is followed by a story. Through these stories, the situated and contingent nature of the project is foregrounded. I use these as a way to reflect on the specificities of this practice in terms of what it can offer those of us working in design with (more-than-human) others, particularly when those others comprise invisible communities and cultures. This is a form of what Mike Michael has called 'anecdotalization' as a way to engage in 'inventive problem-making' (Michael, 2012a, p.35). If done well, he argues that anectodalisation can be a way for researchers to critically reflect on the research process as a material-semiotic negotiation between the past and the present, in ways that trigger conceptual reorientations (Michael, 2012a). I therefore use the practice of anectodalisation to engage with what I learned as a designer through the specific ways in which I created, facilitated and explored the knowledge that emerged, and the ways that my proposed aims and the work that emerged diverged.

6.1 This is Not *Multispecies Co-creation*

Multispecies co-creation is not:

6.1.1 Careless

This is a practice-framework that demands you take a positionality, and that requires a care-ful negotiation of the political, social and cultural factors at play.

6.1.2 Outcome-focused

While products, services and information design can be valuable, there is value in making-together that goes beyond the production of products, services and information design.

6.1.2 Experience-extrinsic

You are part of the work, and your experience will shape it. You must be willing to acknowledge this.

6.1.3 Apolitical

If we are to create ethical forms of design research, we must be willing to position ourselves explicitly politically.

6.2 Work with what you have

> 'We had no other choice but to turn our ice cream tubs into containers for food, or turn our biscuit tins into knitting kits or first aid kits... When you leave home and with little access to material resources, your class status may change too, and you learn to make the most of what you have. Sustainability is as much about saving money so you can care for your family…'

For my human collaborators, in moving between cultural contexts, they learn to adapt and work with what they have in the new contexts. Yet they also hold onto the parts that make them who they are by sharing recipes and stories, and using, sometimes in adapted forms, the processes. When I moved my practice from my own kitchen to the demonstration kitchen at *We the Curious*, I found that the contents of my containers fermented faster, and I hypothesised that this might be because the microbiome of the kitchen in which I was working was more microbially 'alive'. My microbes had adapted to their new environment, yet they worked through the same process. Kefir cultures change in new environments, but they retain their essential characteristics, which only emerge through process and taste. When my Kitchen Cultures collaborators negotiate and adapt a recipe to work in a new context, sometimes in entirely new countries or during COVID-19, when their home microbiome is less 'alive', they are using a wealth of embodied and practical knowledge in order to 'know' how to maintain human and microbial cultures. When they worked with each other, in the more successful instances (such as in the case of Rinkal and Soha's pickles) they are similarly valuing and adapting to each other's knowledge and practices. In the recipes they share, they ask you to think about whether you intend to refrigerate your pickles, as that will change the way you prepare the recipe. This is an explicit acknowledgement of the ways that we instinctively adapt recipes is an important instance of agential negotiation to (more-than-human) contexts.

When discussions on fermentation as microbial symbiosis and multispecies entanglement didn't necessarily create engagement, I found ways to draw out the knowledge of my collaborators through other modes. I chose to negotiate

this space by carefully and deliberately refusing to overwrite the existing material knowledge contained in food practices with more recent 'scientific' knowledge. While trying to stay true to the experiences of my collaborators, it was important not to fetishise the cultural origins of these practices themselves: the heart of this project is cross-contamination and cross-pollination of ideas and experiences, and the adaptation and evolution that is both necessary to fermentation and to migration. If I insist on a reification of Indigeneity (Weismantel, 1988), or a 'romanticization of lay knowledge' (Irwin and Michael, 2003, p.39), I am in danger of instrumentalising these relations, and it is this form of design that Escobar is concerned pushes relations 'into an objectifying and individualizing mode of hierarchy and control' (2018, p.214). He argues instead that collaborative design research is 'always emergent', in two registers of emergence, by the designer and her collaborators (2018). These registers of emergence crystalise temporarily, in ways that echo Mercedes Villalba's formulation of fermentation as a space where temporary bubbles might emerge, in which we may gather and act. Many ideas to do with multispecies entanglement were embedded within the *practices* through which we were working, and emerged, refermented, agitated, mixed up, through the media through which we were connecting and communicating. It was my 'speculative commitment' to microbes that committed the work to be about *multispecies co-creation*, even when the multispecies was less explicit. As practitioners, it's easy to lose sight of our adaptations as we move, yet practices of accountability, to ourselves, to each other, to our ideas, can be one important way of holding firm.

Fermentation is a co-creation practice that flourishes through contamination, encounter, and intergenerational knowledge, and microbial history (much like migrant history) is the history of surviving adversity via collaboration and adaptation. In working through fermentation as a speculative practice, I situate my collaborators' embodied experiences, knowledge, conditions through conceptual practices such as poetry and storytelling that activate memory and imagination in ways that can pluralise narratives of food futures and sustainability. Their responses through different forms of media is its own 'fermentation' of knowledge and practice, that I took and further 'remixed' for consumption by a different audience. These acts of 'contamination' push back against forms of instrumentalisation and speak to real world contexts in ways that are complex and contextual (and important on their own terms). These practices exist not only in the past, but are continuously in flux as communities are displaced from the 'originating' geographies and eras of the human-microbial practices in question (de la Cadena and Blaser, 2018; Escobar, 2018; Hall, 2015). The practices of relationality with which my collaborators and their ancestors have been co-existing, and which they have adapted according to their circumstances, are a matter of daily practice. My collaborators' understanding of microbes is connected to the food that they make in

complicated and often contradictory ways. In asking Rinkal to speak of the practices of pickling and fermenting which evolved in her community and culture (which is a culture we partly share) as a matter of survival in relation to an imposed framework of 'multispecies entanglement', I was overlooking the multispecies practices in which she does engage on a daily basis.

6.3 Make Material Metaphors

I wanted to explore food fermenting as a material practice to reduce food waste, and as I felt it offered a fruitful and generative metaphor through which to frame discussions about sustainability, collaboration, migration, adaptation, colonisation and care. I felt fermenting could be a familiar practice through which to engage people from diverse cultural and geographical origins, and a set of concepts which we can use to discursively engage with urgent political questions, fermentation offered a relational paradigm through which to understand our (humans) own position as participants within ecology. Much like human cultural arrangements, different forms of fermentation offer varied symbiotic arrangements, and it is this perhaps what makes it both such a compelling practice, and a rich metaphor for migration, identity, extraction and the complex legacy of colonialism on many of our communities. As designer Renata Leitão argues, we need new metaphors to build new worlds (Leitão, 2023).

I continued to explore the practice and metaphor of fermentation in my own kitchen during lockdown, a time when we were distancing ourselves from others, and others' microbiomes as a deliberate act of collective care. We no longer gathered around food and drink, or shared breath and touch and other more immediate forms of contact. For me, working through fermentation was a way of connecting to others through a shared microbial commons. However, since we weren't able to come together in-person, I found that the metaphor didn't necessarily land for my collaborators. I suspect this is partly because of COVID-19, and partly for the other many reasons (linguistic, cultural, symbolic) that I have discussed on why microbial and ecological thinking is already exclusionary for women from the Global Majority. The work therefore became a practice of ontological adaptation (for me), that worked through the embodied practices that my collaborators and I were working through. By which I mean, it was about how the knowledge was framed, and who got to frame it, and through which modes. One of these modes was poetry.

Poetry can be a way for us to share experiences across (cultural and geographic) divides; it is not a luxury but a necessity (Lorde, 1985). By setting the scene using poems that used food metaphors and leading us through a process that invited us to do the same, Asmaa allowed us a space in which to explore how we relate to food and culture differently, and more abstractly. It is a way of tapping into those places and modes of being that Vee refers to, when she

Figure 68: Rinkal, Kitchen Cultures, 2020

‘...my carrot and beetroot pickle, which I made 10 days ago… I can smell every single spice inside the jar. When I taste it, it’s nice and crunchy, and I feel tanginess, sweetness and saltiness as well. It’s SO pickle-y.’ – *Rinkal*

speaks about how we use creativity to combat scarcity; or that Pepa refers to, when she speaks about how she is disconnected from her culture by both her gender and the expectations of it; or how Soha's queerness creates both a bridge and barrier between her and the other women in her life. When Pepa speaks of her relationship to her father through the metaphor of an artichoke heart, we feel ourselves choking on that distance; as Soha speaks about meeting someone she wants to cook for forever, and how ghee can be a gift, we feel tender and in love; when Fatima's grandmother's 'soft papery' hands engage in the act of rubbing beans, so carefully, our hands and our hearts ache; or when Rinkal's daughters sing about rice and carrots with spice, we feel hope and loss in equal measure. These metaphors are a way of framing care, that speak to my collaborators' relationship to others, and the foods that form part of these relationships. The stories they tell embody feminist herstories in important ways, and offer us new generative modes to understand culture, care, women's lives and multispecies relationality in the home and kitchen.

6.4 Take Responsibility for your Complicities

Fermentation is an act of creating the conditions in which certain organisms can thrive, however this is not an innocent act. In order for some organisms to thrive, others must perish, be consumed or be transformed in ways that mean they may no longer even resemble the original. It is the controlled decay of a food/vegetable/substrate, that allows for something else to emerge. Sometimes we sterilise, boil and bake, other times we sun dry and salt, and yet other times we soak, rub, wait, watch, smell and taste. By engaging with practices in which our grandmothers, aunts, and other ancestors had engaged, several times we found ourselves awed by the time and care that went into the practices and spoke about how we felt connected to these others by engaging in these practices. Much like human cultural arrangements, different forms of fermentation offer varied symbiotic arrangements, some of which are actively harmful for the organisms, some of which are 'colonised' and 'extracted' from. This is perhaps what makes it both such a compelling practice, and a rich metaphor for migration, identity, extraction and the complex legacy of colonialism on many of our communities.

Through each of the activities my collaborators and I engaged in as part of the recipe development, we were in constant negotiation with the microbial ecosystems of our respective kitchens. This is something that we do instinctively, often unthinkingly, in our own kitchens. I wash my hands and clean my surfaces, I measure out ingredients and spices, I sterilise my jars, I taste and I adjust based on my preferences on a given day. I do this always with the assumption that I am the one making the choices, and yet, I am a microbial ecosystem of my very own. My bodily microbial ecosystem is in constant interplay with my environments, and I am a complex organism with genetic markers from an entirely different one. Some of my microbial companions can

dictate what I choose to eat (Vuong *et al.*, 2017), and different spices allow different microbes to flourish (Lee, Jung and Jeon, 2015). The recipes we develop are as a result of taste and preference, yet these co-evolved alongside our microbial companions. The microbiodiversity of the ecosystem I inhabit, even hyper-locally, is maintaining itself through my actions in the kitchen. We cannot separate our individual health from the health of our environments, and this is in fact a global interweaving of interdependence that manifests in the most mundane and domestic of acts.

As part of working collaboratively, it is important that we situate our own positionality from the outset. It would be remiss of me to overlook the fact that the primary research project and subsequent outcomes would not have been possible without the support of several academic and artistic institutions. By which I mean, not simply moral support, but material and financial support that in many ways shaped the direction of the project. The first of these is of course my academic institution, through whom I received funding to conduct the research, and then to attend Interactivos? and do my residency with *WtC* in 2019. In 2020, the research funding from the *Eden Project*, the link with the *Invisible Worlds* residency and the COVID-19 lockdown had the most impact, forcing me to take a step back and reframe the work as remote engagement. As part of this, Eden provided some material support such as ring lights, tripods and adapters for people to record themselves at home. At every step, the work was shaped by the imperatives of the people I was working with. I needed this money and materials to do the work, and to pay my collaborators and contributors, and there is no doubt in my mind that if I hadn't received it, the project would have been very different. Yet these are the collaborations that kept the project grounded and relevant to the imperatives of our changing world, that are then (I hope) adopted by the cultural institutions as part of their missions[13].

I am also a middle-class, able-bodied, upper-caste Hindu femme, and I must be aware of the position I occupy in relations to other women, femmes and nonbinary people of colour. This is something I've had to be very aware of as part of my own experience of race, as someone who is facilitating this project. I have to careful that the practice that I am describing as symbiotic is mutual, or at least commensal, rather than parasitic, and as part of that, I had to make a choice that required a different form of extraction. One of the ways I embodied this was by starting to eat meat at the beginning of 2020. I was vegan when

13 For example, Fatima and I spent a significant amount of time compiling a list of speakers and making suggestions to the Eden Project Communities team about who we would 'share a platform' with at the Eden Project's World Food Day (See Appendix D). This was not simply about our political positionality, but the idea that we might be the only 'token' Black/brown speakers and workshop leaders sat ill with us, particularly since some of our collaborators would also be attending.

I started the project and had been for about five years by then. Yet as (often) the only vegan in the community kitchens where I was spending my time in 2016-2018, I started to feel very much as though unless I was organising around veganism directly, mine was an individual choice, which felt like consumer capitalism rather than a form of radical politics. Then when I began this project, I couldn't taste the foods that people wanted to share with me, and that felt not only rude, but as though I was cheating myself, and them, of an important shared experience. I also cannot separate that from the fact that I was raised in an environment where food was always connected to moral purity. I refuse to claim eating meat as a moral or ethical choice, yet it did offer me a chance to connect with people through food in new ways.

6.5 Hold Space for Other Worlds

I have come to think of co-creation as a practice of 'holding space'. This term is one that is common in practices of facilitation for grassroots activism. This term is a way of creating a pedagogic space in which views can be shared in supported and respectful way, and in which collaborative learning can occur. One way to formalise this is by creating a Community Agreement (See Appendix D). Within this agreement, we agreed to be respectful of difference, and of the different ways in which collaborators were able to engage in the project. My co-facilitators and I were keen to work in a way that was not appropriative or extractive and was respectful of and careful with the knowledge of others (See Appendix D). There were many different identities, cultures and positionalities at play through this collaboration, and by agreeing from the outset to be respectful of difference, we were able to hold ourselves, and each other to account in terms of how we interacted with each other. I also set up an access fund so that my collaborators could be paid for their time. I do think this was important for mitigating barriers to access, however it created its own hierarchy, in that, as the holders of the purse strings, Fatima and I were never truly part of the community of collaborators. Since we initiated and recruited for the project, and framed the interactions, this hierarchy might have been equally present if they had been engaging in the project without payment.

One way in which paying collaborators impacted the research relationship is that once the initial interaction was complete, only those people who had the time, capacity and inclination were able to take part in subsequent events and feedback on project outcomes. This might also have been due to the distanced nature of the project, as we couldn't hold in-person workshops so had to rely on people finding the time in their daily lives. During COVID-19, many of our collaborators caring responsibilities increased. It's also harder to form relationships online, or where interactions are time-limited like they were in our weekly workshops. This is particularly the case when there might be other barriers between you, such as linguistic, cultural or technological ones. Yet these collaborations and considerations meant that the themes within

Figure 69: Fatima preparing veg for achar, Kitchen Cultures, 2021

the project could never become too abstracted and had to contend with the everyday realities of working with others in the context of my collaborators' lives. Where technological barriers were issues to be surmounted, with varying degrees of success, the language and cultural differences within my different communities shaped the language of the project. These limitations became their own opportunities, as each of my *Kitchen Cultures* collaborators had their own preferred way to engage: some wrote poetry, some told funny stories in the workshops, some called me up to relate their days, and some made pickles. I was keen to validate each form of engagement on its own terms, and to have the outcomes in some way reflect each one, which led to the multimedia outcomes.

6.6 You Contain (More-Than-)Culture

Through this practice I mobilised the concept and practice of fermentation as an act of *multispecies co-creation*, both with the microbial organisms with whom we share our planet and our bodies, and without whom we could not live in this world, and the people, cultures and histories that have shaped this practice. The (rationalist, scientific, Eurocentric) category of human has often (in the name of science) been denied to the large majority of the human population, in particular those of us who live within gendered, racialised,

Figure 70: Kitchen Cultures raw mangoes (Wikimedia Creative Commons)

Sibutseng's mango achar

Ingredients

1kg raw mangoes

200g dried red chillies

100g mustard seed

2 tsp black pepper

1 tsp turmeric

1/3 cup salt

1/3 cup salt to add to cold water

Method

1. Chop the mangoes, add 1/3 cup of salt and place heavy weight (at least 2kg) on it, and leave to sit for 48 hours
2. After 48 hours, drain the liquid
3. Boil 1l water, add 1/3 cup of salt and put aside until completely cool
4. Blend chillies with the salted water
5. Grind mustard, turmeric and black pepper, add and stir
6. Add ground paste to mangoes and mix well
7. Serve immediately or store in a jar!

Figure 71: Kitchen Cultures scotch bonnets

Vee's escovitch pickle

Ingredients

- A big bunch of thyme (8-10 sprigs)
- 1 bottle of white wine vinegar (500 ml)
- 1 tbls of refined sugar
- 10 pimento seeds
- 3 scotch bonnets
- 1 white onion
- 1 red pepper
- 1 yellow pepper
- 2 carrots (peeled)
- 1 tbls sea salt
- 1 tbls black pepper

Method

1. Chop up the peppers, onion, and carrots julienne style and set aside
2. Heat up vinegar on a medium high heat and bring to a boil. Add salt, pepper and sugar. Bring it down to a medium low heat and add thyme, pimento seeds and carrots.
3. After 1 min add the peppers and chopped scotch bonnet (you can add the scotch bonnet whole if you don't want too much spice) simmer for 1 min
4. Add white onion and simmer for 5 mins or until onion is translucent

Notes: This pickle is traditionally served with Escovitch (Jamaican fried fish). See *instagram.com/diasporadishes* for the full recipe.

Figure 72: Eklass, Kitchen Cultures, 2020

‘I wish for everyone in the world to live with food and water… why not, if we are wishing?’ – *Eklass*

disabled, and/or economically disenfranchised bodies or geographies (Yusoff, 2018; McKittrick, 2015; Braidotti, 2013; Haraway, 2008). I question this space between human and dehumanised as a way to highlight how even when the participants are human beings, there is not an equal agency between the designer and her collaborators. In learning to think through the other-than-human, in collaboration with the people who are living through these modes, we might find new ways to live ethically and collaboratively in a world that we share with multiple species (including 'other(ed)' humans). As I have noted, there are hierarchies and intersections to negotiate, but we can only do that if we are conscious of the ways of thinking, knowing and being that we 'give air'.

This work negotiated the contested space between nature and culture, a binary that separates us as humans from the world (Leitão, 2023; Haraway, 2006). However, this is a bifurcation that didn't occur in other parts of the world, or when it did, took vastly different forms. The diverse cultures at play in fermentation situate human and non-human beings as part of complex webs of interdependence and shared kinship, and challenge essentialising categories such as 'human' and 'other'. Humans are a part of nature, and nature is part of us; thinking and making through more-than-human modes might offer novel ways to re-imagine our relationships with other organisms, and with each other, as symbiotic and co-constitutive. However, as biologist Lyn Margulis notes, symbiosis is not always a beneficial process for all organisms involved; in many cases it is simply commensal, benefiting neither, and in others still, it is parasitic, with one symbiont is extracting what it needs to survive and flourish from another (Margulis, 1981). In looking to nature, as many designers are now doing, to create new 'sustainable' ways of living, I urge you not to overlook two things: firstly, that nature is not always (if you'll excuse the anthropomorphism) kind, or just; and secondly, that nature is sometimes indistinguishable from culture, since we are always already entangled with the world around us in everything that we do.

In multispecies cosmopolitics, kin relations are enacted through 'indigestion and infection, rather than reproduction' (Haraway, 2013). I read this to mean forms of kinship enacted through shared multispecies relations that are *work through practice*, rather than biological inheritance. As a result, for the more-than-human cultural practices with which I was working in the kitchen, this infection worked twofold. Firstly materially, in the form of the microbial inoculations in fermenting, and the acts of cleaning and sterilisation, and the material collaborations in which myself and my human collaborators were engaging. And then again metaphorically, in terms of the ideas, concepts, recipes and stories which we were sharing with each other, and the shared culture, language and the practices that were created as a result. *Aunty knowledge* is therefore the forms of knowledge that include care practices

such as fermenting, cooking for and eating with (human and nonhuman) others, that I argue figure their own forms of no less valid multispecies cosmopolitics. They are practices of engagement that are intended to invite an attunement to the relational dimensions of life, in ways that are attentive to the here and now, instead of imagined pasts or speculative futures.

Stengers asks how we as researchers mobilise knowledge in ways that might allow us to feel 'the smoke in our nostrils' of witches who have been burned in the past (Stengers, 2018, p.103). In other words, how do we make urgent our complicities and our ethical responsibilities, and I cannot help but read this as a call to embodiment. Annemarie Mol discusses how metabolic processes such as eating have been persistently downgraded in the knowledge economies of European nations and their colonial descendants (Mol, 2021). She asks what would happen if we were to stop celebrating human cognitive reflections *about* the world and instead take our cues from metabolic engagement *with* the world? In eating we might know the world in new ways, beyond the cognitive. It is this idea that shaped the care packages, imperatives behind the 'Eating (as) ecology' tasting workshops, and even, in part, the speculative soundscape. Every act of mundane, everyday co-creation in the kitchen was a performative interaction of relational dimensions through which situated collaborative knowledge is enacted across difference (biological, dialogical and ecological). Inviting embodied *and* cognitive engagement with the recipes by tasting them, and talking about their herstories and their potentials, offered participants more creative ways to relate to the ideas around relational and multispecies ecologies that were explored in *Kitchen Cultures*.

Figure 73: Kaajal making escaviche, Kitchen Cultures, 2021

Conclusions

You Contain *More Than Culture*

Contains culture
I am a container
I am a plastic tub
I am the ice cream tub that my baa uses
To store achar, biscuits, sewing supplies
I contain culture
I contain more than culture
I am microbial
I am magical
I am ecological
(I am practical)
I am not the hero of this story
I will not give you botulism
But I can hold space
For your stories
And my stories
Which together (given time)
Might contaminate each other
Transforming each other
Becoming something new
(If we let it)
Something microbial, magical, ecological (practical)
That can adapt to fit
That transforms, as it is transformed
That is liquid
I am liquid
I am earth
And when I die, I will become ash and earth
I will become nutrients, nitrogen, carbon

Figure 74: Kaajal beetroot ferment

I am in and of the world,
contaminated, impure
I change, I adapt to fit
Into the spaces I am afforded
Yet I remain,
Bubbling
Creating space
Containing space
Becoming culture.

This thesis explores the concept of co-creation as an act of co-production with publics on two levels: firstly, as a material practice through which to 'culture' ingredients in collaboration with the microbial cultures on our foods, in and on our bodies, and those that live in our homes and kitchens. Secondarily, this works as a means to explore the epistemic and metaphoric world-making in which humans engage when we make with each other, as a practice of human cultural production. The work focuses on exploring how these kitchen practices mediate our understanding of 'invisible communities', whether these are the ones that we cannot see because they are too small, too big or too abstracted, or whether they are those that have been (deliberately or incidentally) invisibilised through unjust sociotechnical arrangements. Ultimately, the work outlines a practice framework for practice researchers working in public engagement on topics to do with sustainability, culture and climate.

The work engages with practices of care with women in the kitchen, in particular those who have been displaced from the geographies and climates in which they (both the knowledge and the people) originated. As Indigenous scholars have noted, *multispecies cosmopolitics* such as entanglement and relationality have their roots in the cosmologies of Indigenous and colonised peoples from the Global South (Yusoff, 2018; Horton, 2017; Todd, 2016; Todd and Gómez-Peña, 2015; Horton and Berlo, 2013). As Vandana Shiva and other Global Majority feminists have argued further, the historic oppression of women is inextricably tied to the exploitation of many of the natural resources which form the basis of food production (Shiva, 2009; Avakian, 2005). By working through *multispecies co-creation*, I believe that we as practitioners and researchers gain novel insights into how to engage with marginalised communities, as well as how we might engage with ecology using these knowledge practices. More importantly, by doing so in collaboration with the communities in question, we create new solidarities with comrades in the important global struggle against climate change.

The work engages with literature and practices related to collaborative and participatory design and further brings together interdisciplinary theories and approaches from Science Communication, Cultural Studies and Feminist Environmental Humanities. As a practice-based researcher, I also bring to bear my own experience, knowledge and agenda on the subject matter, as well as creating and contributing to the contexts in which this knowledge is produced. As such, the research and interpretive analysis is largely informed by art and design practice, in that it takes reference from and is inspired by the work, yet is a deliberative, subjective reading that is underpinned by a reflexive and auto-ethnographic account on the part of myself, as an active participant in the work. This is a deliberate foregrounding of perspective that looks to push back against 'the god's eye trick' (Haraway, 1988), of presuming an omniscient and impartial account of research on the part of the social researcher. It is likely that the work will be of interest to designers working in spaces of social innovation,

as well as activists, scholars and practitioners seeking context-specific partial accounts of food-based engagement and more-than-human co-creation.

In order to develop *multispecies co-creation* as a *practice framework* for design research in the kitchen, I started with my experience of dehydration with Global Majority women in Spain with *Interactivos?,* and built on the practice of fermentation as engagement through the residency at *We the Curious*. With *Kitchen Cultures* I sought to further develop *multispecies co-creation* as an exploration of fermentation practices from the Global South. I chose early on in this project to hold the of fermentation lightly, and let my collaborators take the lead on how the project emerged, 'allowing the self-organizing dynamic to take off and do its thing' (Escobar, 2018, p.xv). Yet a surprising number of the recipes did turn out to be ferments, or to contain fermented ingredients. These outcomes tell me that, despite the many ways that the language we are working with seems unable to contain or represent this knowledge, the *practices* themselves allowed tacit and subtle relational knowledges to 'overspill' (Michael, 2012b). This 'overspill' then afforded me the opportunity to further develop *multispecies co-creation* as a way to explore how tacit, performative and embodied knowledges on *nature-cultures* are negotiated in the kitchen by women from the Global Majority diaspora.

This knowledge, which I called *aunty knowledge,* is a *feminist ontology* of diasporas from the Global South. *Aunty knowledge* is *tacit,* in that it lives in the act of fermenting, cooking and eating; *performative*, in that it emerges through practice, and it is *embodied*, in that it can be registered and shared through the senses. As a result of COVID-19, where the interactions couldn't take place in person, I further drew inspiration from diaspora media practices as ways to facilitate forms of intimacy over distance. As a result, I developed a *set of practice outcomes* in order to share what I learned about *aunty knowledge* through their own forms of tacit, embodied and performative public encounter. These outcomes included (but were not limited to) the following:

- *Kitchen Cultures:* A Book of Recipes, Poetry, Stories and Activities
- *Eating (as) Ecology:* Four Tasting Workshops, two hybrid/online, and two in-person in London and Sheffield respectively
- A *Care Package* made up of recipes developed by myself and my collaborators that was sent to online workshop participants
- *Sonic Cultures*: A 'speculative' soundscape remixed from recordings of meetings, poetry, voice notes and sounds of cooking/fermenting designed to be listened to while cooking and fermenting at home in your own kitchen.

Documentation for each of these can be found either in or by following links in the Appendices document, and further reflections on them can be found in Appendix D. I argue that each of these multimedia outcomes create

opportunities for new meanings on *multispecies entanglement* to emerge through re-presentation. The practices of making/remaking, mixing/remixing and fermenting in new social contexts in which I engaged became their own reflexive reiterations through which new cultures emerged.

The overspill was also useful in that it allowed me to explore: how we create moments of human (and non-human) connection during a pandemic; how we develop a practice of caring through food, when we can't physically feed each other; how we share cultures, when we cannot gather around a table, laughing, joking, gossiping, singing, sharing. These are concerns that diaspora communities have been contending with for generations, and lockdown was a time where it became a useful set of tools to tap into for research. We know how to 'activate memory and imagination' (Stengers, 2018, p.108) across distance, whether temporal or geographic, using the tools that we have available. We do it through embodied modes such as poetry, sound, image, by sharing recipes and stories and jokes and songs. All my aunties know how to use WhatsApp, because WhatsApp is how we communicated with our families in our countries of origin prior to lockdown. We take pictures and videos to share with aunts and sisters back home, and we record voice notes to communicate with younger relatives when there isn't a shared written language, or when the language in question isn't easily supported by the technologies.

Another question is then about the ways these practices allow us to render tangible the invisible relationships between nature/culture and microbial/human. *Aunty knowledge* is an ontological framework that relate culture *and* ecology through a practice of *multispecies co-creation*, as a collaborative encounter between humans *and* microbes that is enacted through cooking and fermenting. This *tacit*, *performative* and *embodied* knowledge is represented through recipes and multimedia practices as an evocation of multi-sensoriality. These allowed me to reframe existing knowledge in the form of media outputs in ways that could invite new insights into how we negotiate multispecies ontologies. Much like microbial symbioses, the material practices of collaboration at play within co-creation are not always non-hierarchical, or even non-extractive, but in fact require much more complex and contextual analyses that are situated in the experiences of the people and organisms we are working with. I therefore further developed *multispecies co-creation* as a practice framework for designers and social researchers working through more-than-human making. I share these in Chapter 6 alongside a series of (non-exhaustive) recommendations for co-designers working on topics to do with food, culture and climate with people from the Global South.

With *Kitchen Cultures*, I found fermentation to be an evocative metaphor and material to explore topics to do with symbiosis, collaboration and adaptation, and a useful practice through which to explore experiences of migration as practices of sustainability, survival, and material care. For my collaborators,

fermentation was not a useful metaphor for their experiences, yet my co-facilitators and I were able to encourage them to develop their own food-based metaphors as a way to tell their own stories. This is a facilitation of agency that was central throughout the project, and of moving with the context and the content that I argue shapes its own feminist multispecies ontology. It is an area I am continuing to explore through my ongoing practice and comprises an area of study that I have begun to think of as that of the 'more-than-cultural', in that it looks to Global South food practices as containing more than simply cultural knowledge.

For the designers among you, *multispecies co-creation* offers you tools, metaphors and frameworks that you can use as part of your own practice of more-than-cultural making. I want you to use them to facilitate the discovery of *aunty knowledge* that can emerge through practical encounters and multisensory engagements. As you borrow these tools, remember where they come from, and honour their origins (but remix them as you see fit for your context). I hope it will inspire you to engage with your own daily practices of cooking, eating, cleaning, breathing, digesting, excreting, feeding and making with a more intentional awareness of how they are practices of entanglement with the world around you. I remind you that in order to better understand this work, you will need to make and eat these recipes, listen to the soundscape and read the poetry, as these comprise the other half of this work, without which this thesis is incomplete. In so doing you will become part of this work, metabolically and metaphorically, and this work will become part of you.

Figure 75: Kitchen Cultures wild garlic

Untitled VI

An immense garden
        Grandma is seating on a corner
        Looking at a plate from
All angles.
It smells like Lima and Ayacucho
Londres and Barranco.
Mum has never tasted anything like
this before.
Food I wasn't brought up with
Food I grabbed on the go,
        From the hands of other women
        From the people I got to know
Loud music.
        Fruits of all wonderful colours
And the presence of women
        women of my life.

Untitled V

Dried soy meat
so bored
so bored
        so bored.
The same always the same
Everything was a good reason to
escape.
Kitchen was never fun.
I was so bored, so dried.
Tasted like earth, floor
discomfort
Emptiness, soil.
Now that I remember
Everything makes sense
        It wasn't the flavours
        But he protein, the energy
        The care
        Not always flavour means
                love
and not always
        repetition means
                apathy
        indifference
Dried, reduced, concentrated
beliefs, desires.
        A kitchen packed with
        thoughts and books
        with just a few spices.
A kitchen made of survival
Dried soy you tasted like
soil, like ground
        Like her shoes walking
        Around the world.

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