

## MAKING-DO/MAKING SPACES: EXPLORING RESEARCH-CREATION AS AN ACADEMIC PRACTICE TO STUDY FERMENTED FOODS

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**Abstract:** *This paper explores fermented foods as a medium for studying the relationship between humans and microbes. Framing fermentation as an iteration of research-creation, making and doing fermented foods provides fertile ground for a more complex framework for studying interactions between humans and microbes. Specifically, this paper argues that research-creation makes space for understanding bodies as sites for knowledge production and for acknowledging knowledge(s) as being variable and dispersed across multiple bodies. Research-creation enables different scales of analyses, combining thinking and doing in ways that challenge dominant paradigms to produce quality knowledge.*

*Keywords: research-creation, fermentation, knowledge production, interactivity.*

**Résumé :** *Cet article explore la fermentation d'aliments en tant que média permettant d'étudier la relation entre les humains et les microbes. Lorsqu'elle est considérée en tant qu'itération de recherche-création, la pratique de la fermentation offre un terrain fertile pour une étude plus approfondie des interactions entre humains et microbes. Plus précisément, cet article fait valoir que la recherche-création ouvre un espace de réflexion dans lequel ces organismes sont considérés en tant que sites de production de connaissances et que cette dernière peut être de nature variable et dispersée à travers plusieurs organismes. La recherche-création permet par ailleurs d'effectuer cette analyse à plusieurs échelles en alliant la réflexion à la pratique de manière à remettre en question les paradigmes dominants de production de la connaissance.*

*Mots-clés : recherche-création, fermentation, production de connaissances, interactivité.*

## Make/Do

It is a curious thing that in the Latin-based languages the word for *to make* is also the word for *to do*. The Latin root for making and doing – *facere* – animates languages in ways that, in a postgraduate context, conflate “to do research” and “to make work.” The blurring of these lexicons is where I take my cue for research-creation because making/doing comprise key aspects of scholarship in subject areas (such as communication studies or food studies) where materiality matters.

Together, making/doing inform a secondary curiosity: *bricolage* and the improvisational figurations of work. *Making-do*. Or, more colloquially, “I made-do.” To make-do is an idiomatic expression where one suffices with what is provided or one does as well as possible with someone or something. In the introduction to Michel de Certeau’s *The Practices of Everyday Life*, editor Luce Giard references *bricolage* as “artisan-like inventiveness” (1998, p. xix) while other editions frame it as “poetic ways of ‘making do’” (1984, p. xv). Thus, the phrase ‘to make-do’ characterizes the adaptive nature of one’s work ethic, the ability to tend to unpredictability and inventiveness, as well as the gumption to keep at it.

I invoke these two sentiments—the first being make/do with its etymological overlap and the second being make-do as an improvisational ethos—in figuring out how research-creation can be mobilized in an academic context. Many subject areas of today’s scholars cannot be contained nor explained by text: sound scholarship, arts-based practices (including bioart), textiles, haptics, and human-computer interactions (HCI) immediately come to mind. (The irony here is that I am attempting to encapsulate *in written text* how research-creation is an extra-textual affair!) As a communications scholar and food researcher, I am particularly vested in research-creation as an academic practice because food is a vibrant, lively material to study. The limitations of text are evident in how, as one colleague likes to remind me, the menu is not the meal. The materiality of food makes it a complex object of study, not an ontological steadfast, because food lives and dies to its own tune. Add to this some (even livelier) microbes and fermented foods are a messy matter, one that only research-creation can make sense of and adequately do it justice.

Research-creation makes space where traditional epistemologies and methodologies are delimiting. Specifically, it acknowledges multiple sites for knowledge production aside from empirically deduced knowledge-of-the-mind, and it allows multiple knowledges to exist, simultaneously, across different bodies. To extend food scholar David Szanto's argument that research-creation thoroughly and holistically deals with the liveliness and complexity of foods (Szanto, 2015), I argue that research-creation is *the only* approach to studying fermented foods that iteratively probes the human-microbe relationship without privileging one body over another.

### **Messy Relationships: a topical backgrounder**

Recent incidences of foodborne illness and drug-resistant superbugs characterize the messy and fraught relationship between humans and microbes. Yet, we are entangled across multiple scales: our histories enmesh from an evolutionary standpoint (Katz, 2012; Margulis & Sagan, 1986) and, in terms of size, our topographies overlap. From our guts to the greater ecosystem, human bodies and microbial bodies are inextricably linked, placing our collective wellbeing at stake. Given the pervasiveness of microbial life (as microbes are omnipresent in, on, and around us), how we relate to microbes is quite salient. To borrow a phrase from Bruno Latour, examining this relationship is not a matter of fact but a matter of concern that requires social, situated, and intersubjective perspectives (Latour, 2004).

At the same time, dominant perceptions about hygiene and sanitation portray microbes as teeming, ubiquitously, with malice (*pace* Pasteur/Koch). Indeed, media coverage on microbes tends to capitalize and sensationalize this matter: at worst, microbes epitomize a dystopian future; at best, much remains unclear about the precise connections between humans and microbes. The other extreme of romanticizing "friendly" microbes oversimplifies the ongoing, invisible negotiations of power and agency. Casting microbes as categorically good/bad flattens our relationship, often perpetuating the myth of human control and dominance. This leaves little room for nuance or for exploring other modes of relationality.

Rather than value the outcome of these relations, I am interested in how a more nuanced and complex rendering of the human-microbe relationship could help us imagine a different kind of relationality that does not fall back on the politics and ethics of anthropocentrism. What sorts of creations would it take to move popular perceptions beyond ‘good’ and ‘bad’ relations with ‘probiotic’ and ‘pathogenic’ microbes? I argue that research-creation can help formulate a more plural and just iteration of human-microbe engagement. By iterating through micro-models, research-creation provides hints that could be applied at larger scales of social interactions, aiming for a more adaptive theory that can deal with the precarity of the contemporary moment.

### **Fermentation as Subject and Methodology: A theoretical backgrounder**

I begin my theoretical argument that fermented foods function as a medium. Like conventional examples of media, food carries both content and relational messages and is produced, distributed, and consumed frequently and widely. For content, foods are the literal vehicles for delivering macronutrients (e.g. carbohydrates, fats, proteins) and micronutrients (e.g. vitamins, minerals). These molecules are subsequently decoded (i.e. digested) into meaningful units, like when fats are broken down into fatty acids and a glycerol backbone. Once absorbed, food-as-content can then be repurposed and mobilized by the body, recirculating nutrients where needed. Food also carries meaning. Food’s relational message is constructed in and through food rituals and customs. As examples, foods mean differently depending on how it is harvested (e.g. organic, farm-raised, industrial cultivation methods), on who prepared it (e.g. artisan, grandmother, migrant laborers), at what time (e.g. Sunday brunch, Seder, the last supper), how it is consumed (e.g. finger foods, chopsticks, feeding tubes), and in what environment (e.g. outdoor picnic, at the bar, soup kitchen). Each of these relational “messages” signifies differently and goes on to reinforce individual and collective identities.

Fermented foods, in particular, mediate cultural identities through a combination of environmental differences and making-do with available materials. For example, regional differences in microbiota may ferment the same foodstuff differently: the Korean *doenjang* and the Japanese *miso* are both

soybeans fermented by the microbial species *Aspergillus oryzae*, but both differ from the fermented soy product tempeh made from the *Rhizopus* species in Indonesia. Like preserving the protein-rich soybeans, European practices of fermenting fish arguably rose out of concerns for food security to ensure nutrient-dense meals in times of seasonal dearth or when travelling at sea for extended periods of time. Such practices date back 9,200 years in Sweden (Boethius, 2016) and back to Greek and Roman times (Visessanguan & Chaikaew, 2015). But the ancient European *garum*, or fish sauce, differs from the Thai *nam pla*, and both differ radically from the *garum*-inspired insect-derived “amino sauces” concocted by the test kitchens of Michelin-star restaurants (Evans, 2012). As a result, fermented foods may share the same medium, but they carry different messages that substantiate distinct cultures, customs, and identities.

That food can mean many things points to its capacity to carry and deliver these messages as a medium. Analogous to McLuhan’s example of the lightbulb, I consider the notion of medium, broadly, to mean “that [which] shapes and controls the scale and form of human association and action” (McLuhan, 1964, p.2). Fermented foods, as a medium, shape and control the human onto-story from the micro-scale of intestinal lining to the macro-scale of food cultures. They form communities of so-called fermentistas and enable the sharing of starter cultures and know-how. As an extension of ourselves, ferments encapsulate the social and dynamicity of material and semiotic exchange.

I use fermented foods as a medium to study the interactivity between humans, microbes, and microbial foods. Working with fermented foods as praxis challenges assumptions about agency in line with the linguistic and material turns that characterize contemporary academia (Austin 1962; Barad 2003; Bourdieu 1972; Butler 1993; Callon 2006; Chen 2012; Law 2008; Pickering 1995; Salter 2015). Relying on these “turns” allows me to account for the materiality of food (Atkins, 2009) as well as its performative nature (Szanto 2015; Law & Singleton 2000) to tease out the agentic capacities of acting and being enacted upon.

Employing a performative framework to fermented foods accounts for the constructed nature of knowledge production due, in part, to considering the

nonhuman. Jane Bennett, drawing on Latour, defines actants as being “either human or nonhuman: it is that which does something, has sufficient coherence to perform actions, produce effects, and alter situations” (Bennett, 2004). I take up the notions of actants, similar to Bennett, to deconstruct the interactions that take place between human and nonhuman forms without presupposing their humanistic origins or agencies (Bennett, 2010; Latour 2007). By including other actants in a given interaction, I situate the human-researcher as *one of many* constituents participating in a network of interactions. This notion of network aligns with a larger shift in ontologies, including assemblages (De Landa, 2016; Latour, 2007; Pickering, 1993), rhizomes (Deleuze & Guattari, 1987; Probyn, 2000), and entanglements within a larger web of multispecies relations (Haraway, 2016; Tsing, 2015). Though nonhuman actants and networks may seem like external (and therefore negligible) considerations, I argue that their inclusion necessarily decentralizes the human. Such inclusions serve as baseline givens in an *a priori* approach to study human-microbe interactions.

Research-creation may not inherently include actants and networks as part of its methodological creed, and I am not here to police what counts (or should not be counted) as research-creation in definitive terms. Instead, I use this opportunity to reflect on my own work with hopes of grounding research-creation as an academic practice. Specifically, I included the aforementioned discussions on actants and networks because I consider research-creation as a more comprehensive way of including other ‘forces’ that may have been cast aside as peripheral, mundane, or seemingly unimportant. As I will discuss further into my argument, these sidelined knowledges and knowledge-producers are not a coincidence; instead, they are systemically relegated to positions of lesser value due to the conflation of mind, intellect, and human (over, say, discussions about the corporeal, relational affect, and subjectivity). Particularly with studies about human and nonhuman (i.e. microbial) interactions, I need a methodology that displaces the focus from the primacy of Man.

To account for the complexity of real-time, sensory interactions within a network of human and nonhuman entanglements, I rely on research-creation to engage with food because it allows me to work with a material’s affordances and its limitations. As explained by communications scholars Owen Chapman

and Kim Sawchuk, research-creation challenges the protocols of academic inquiry in which, “quite often, scholarly form and decorum are broached and breeched in the name of experimentation” (2012, p. 6). Focusing on experimentation prioritizes the processual over the final product, which sometimes allows for other, unintentional findings to emerge. Fermentation allows for the making, thinking, and doing of food as simultaneously subject and method. As a methodology, fermentation enables the study of a complex set of performative interactions through an equally complex set of iterative, reflexive, and participatory approaches.

Using fermentation to ground my work in concrete examples, I argue that research-creation makes space for multiple sites for knowledge production and multiple types of knowledges to exist simultaneously.

### **Making Space for Multiple Sites for Knowledge Production: ‘doing’ to know**

Instead of relying on the rational mind and the texts it can produce, research-creation accounts for bodies and body-parts as sites for knowledge production. With fermentation in particular, knowledge is produced in and through bodies, problematizing the separation of head work and hand work that have historically been kept separate with Cartesian philosophy and Enlightenment notions of the Self. Philosopher Deane Curtin argues that these bifurcated ideas stem from Platonic dualisms, which, consequently, “is not an accident” since the “[o]ntological separateness of each of the dualistic pairs guarantees their non-interaction” (1992, p. 5). Feminist theorist Elizabeth Grosz contextualizes this mind/body separation in gendered terms, where “mind is rendered equivalent to the masculine and body equivalent to the feminine” (1994, p. 14). Thus, the privileging of intellect over manual labor—or, the logical extensions of such a belief that privilege man-over-woman and mind-over-body—portrays bodies as incapable of knowledge production.

However, since fermented foods are constantly in a state of becoming and transformation, bodies must become attuned to biochemical changes to know when/how to eat a ferment. Building on the work of philosopher Lisa Heldke, I conceive cooking to be a “mentally manual activity” where my nose and my

hands stand as proxy to the “capital-I” self (1992, p. 203). When I am baking, my nose knows when the bread is done; my ears can hear if its center is fully baked when my fingertips tap on the loaf’s underside. Whether the proof is visual, olfactory, auditory, or tactile, I can assess the doneness of food and ferments only if I sense their signs through my peripheral organs. Working with fermented foods in particular, research-creation validates and reifies embodied knowledge because I must imprint these senses onto my body as physical memories to carry over into my next cooking episode.

Consider the difference between soda bread, sourdough bread, and popovers. Soda bread is leavened by the chemical reaction that takes place between sodium bicarbonate (better known as baking soda) and acid from buttermilk (or equivalent dairy) to produce air bubbles that allow the bread to rise. Popovers are made from a batter with more liquid; when this water-based liquid is thrown into a piping hot oven, the batter is leavened due to the steam generated from the batter’s high water content. (In other words, popovers in a lukewarm oven would make flour-based hockey pucks.) In comparison: sourdough breads are leavened from the chemical interaction between yeasts and the bread flour: the yeasts convert the carbohydrates in flour into carbon dioxide (i.e. air). However, compared to the soda bread and the popovers whose leavening time is on the order of 30-45 minutes, sourdough bread leavened with yeast takes anywhere from 4 to 12 hours. The temporal variety depends on the ambient conditions (such as temperature and humidity) that favor yeast growth because the yeasts need to first multiply to a population size great enough to leaven an entire loaf-to-be.

Even still, the air bubbles generated from the yeasts can only be successfully ‘trapped’ and baked into a fluffy, soft crumb if the gluten matrix is fully formed. A gluten matrix is food science lingo for the elastic nature of kneaded dough. It operates like a scaffold within which air bubbles from the yeast can stay until it is baked (thereby creating the air pockets of baked bread). Yeast in a non-kneaded dough will produce air but the air escapes and the resulting dough will not be leavened. (Again, flour-based hockey pucks.) All this to say: when working with (fermented) sourdough, I must rely on my eyes to see the sheen of the dough, indicating the formation of the gluten matrix; I must rely on my fingertips to sense how much the dough pushes back when I press a dimple in



the dough and check for the elasticity of the gluten matrix; I must rely on sense memory to know how much a dough needs to be ‘punched down’ and when I’ve overworked the dough; I must rely on my skin’s sense of humidity and temperature to know where the optimal place for yeast propagation could be (like the top of the refrigerator). Working with sourdough relies on knowledges about when-to and how-to intervene. Soda bread and popovers are a tried-and-true, mix-and-bake recipe. In comparison, sourdough is an ongoing conversation.

When ‘doing’ food, my bodily senses must “interpret” the actions of microbial life to “know” how they are transforming the food. The process is not objective, and I cannot rationally rely on measuring equipment and cookbooks to *think* my way to experimental success. Thus, research-creation functions as an alternative way of knowing and affirms “that one valuable way ‘to know’ is ‘to do’” (Chapman & Sawchuk, 2012, p. 14). Research-creation proposes alternate sites of knowledge production (e.g. the body) that are not traditionally validated/accepted/vetted by academia. As a result, research-creation could be one way to push back against assumptions we may hold about knowledge production within what Chapman & Sawchuk call “the ‘regime of truth’ of university-based research [and] the normative frameworks that have traditionally structured academic contributions to knowledge” (2012, p. 23). Texts may try their best to approximate this collection of knowledges; however, like many instances of making, doing can sometimes be the only way to learn and embody those knowledges.

### **Making Space for Multiple Knowledges: On working ‘with’**

Different sites for knowledge production make and circulate multiple knowledges. As discussed in the preceding section with sourdough bread, fermentation and its attendant knowledges (e.g. timing and when-to, the know-how, physical memories) are dispersed over multiple professions and practitioners with chefs, bakers, and do-it-yourself (DIY) fermenters who embody the practical know-how. Rather than that know-how being a unified entity, Szanto proposes research-creation as a way to enable researchers and audiences to accept messiness by “diffusing knowledge production across

multiple bodies and over multiple times” (2015, p. 15). Similarly, I conceive (food) knowledge to be dispersed across different bodies and to be situated, in a Harawayian sense, instead of being universal or absolute.

That knowledge is multiple, or that plural knowledges can manifest from a single subject, goes against academic (and perhaps scientifically skewed) ideas about epistemology. The existing model ranks research findings according to external, impartial validation, based on a productive model of knowledge-making that is often goal-oriented, objective, and distant. Here, the replicability and reproducibility of research findings are championed over subjective manifestations of knowledge.

Research-creation proposes knowledge as being unbound and disrupts these conventionally held ideas about epistemologies by (re)focusing on the processual and iterative exploration. Consistency across knowledge-makers become obsolete in the research-creation world because knowledge is particular to one’s embodied ethics. In more grounded terms, research-creation requires more of me than traditional, text-based work because I must continually engage with what is happening in real-time to capture all of the intermediary ‘data’ that emerges from my experimentation. Attuned, the quality of my ‘data’ can only be as good as my ability to participate *relationally* so that I can *feel my way* through the work. In this relational engagement, it matters who I am and what I bring to the ontological table of knowledge production. I embody my work, and my work animates my next steps. My work in research-creation becomes specific to me, my body, and my affect so that my research becomes quite *un-replicable*.

The work I do in a fermentation setting is even less replicable because I cannot control microbes. Here, research-creation makes space for working *with*, instead of working on, the materials at hand. I have to learn to work with microbes precisely because I cannot see, smell, or sense them directly; I can only see, smell, and sense microbes indirectly by tasting their effects. Furthermore, microbes are a living substrate with many instances of unpredictability. In the context of working with tissue cultures (another living substrate), Eugene Thacker notes that interventions are “indirect, facilitative [...] a series of treatments, actions of enframing, and shifts in contexts and

environments” (Thacker, 2006, p. 267). I see working with microbes in a similarly indirect manner of shifting environments: by tinkering with the salinity, acidity, and other environmental factors, I can only set up favorable/hostile conditions for microbes to thrive or suffer. Even when I deliberately add microbes to a ferment (e.g. packet of yeast to beer wort), the success of my ferment (as defined by deliciousness and safety in consuming the foodstuff) is not a guarantee. More harrowing is that my efforts to enable microbial growth may favor the growth of *other* strains *in addition to* my target microbes. In other words, my ability to select certain strains over others is severely limited and my ability to course-correct flavor may or may not have delicious, let alone safe, outcomes.

With fermentation in particular, the success of my edible foodstuff is predicated on my understanding and cooperating with the dynamic, transient, and unpredictable, not my ability to control the experiment, situation, or creative output. Thus, fermentation requires the work of affective relationality and ‘working with’ the materiality of the research ingredients involved. In so doing, knowledge(s) remain plural and diffuse across multiple bodies in ways that propose “new ways of modeling and materializing this knowledge” (Chapman & Sawchuk, 2012, p. 11). Research-creation enables interaction, feedback, and communication to occur between humans and microbes; in effect, it is communication in a different form. Thus, the work of research-creation combines making, doing, and thinking (and, just as well: remaking, redoing, and rethinking). The re- prefix and iterative nature of research-creation set up an ongoing methodological conversation between research subject, creative intermediates, and oneself. These are the practices with which I make/do.

### **Making Space for Rethinking “Recipes”: A guided ferment**

Rather than provide text-based absolutes (in the form of a standardized recipe), the following guidelines are meant to inspire the reader through a basic lactoferment. The intention is less about producing a final product and more about feeling one’s way through the iterative process in the spirit of making, doing, researching, and creating *iteratively*. Thus, certain descriptions are kept

open (instead of determinate) to make space for working with and tinkering through the work of research-creation.

### **Lactoferments**

The most common examples of lactoferments include sauerkraut and kimchi, but many plant-based materials lend themselves to being lactofermented rather easily. Chefs in Scandinavia, for example, lactoferment unripened strawberries and daisy buds to add aesthetic brightness to a dish.

### **Ingredients**

Some suggestions for vegetables:

**common cruciferous vegetables:** broccoli, cauliflower, brussel sprouts, kohlrabi

**leafy greens:** cabbage, Napa cabbage, kale, bok choy, collard greens

**root vegetables:** turnips, radishes, carrots, daikon

Some suggestions for fruits:

**unripened\* berries:** green strawberries, green raspberries

**unripened\* treefruits:** apples, pears, peaches

\*The use of unripened fruit, as opposed to ripened ones, deters opportunistic yeasts from consuming the fruits sugars and producing alcohol.

Some suggestions for other plant materials:

**edible flowers:** nasturtiums, daisies, elderflower/elderberry

**foraged plants:** fiddleheads, dandelion roots, lovage

**salt** (Note: a finer grain is easier to work with than coarse salt.)

**seasonings:** garlic, ginger, peppercorns, mustard seeds, dried herbs, scallions (to taste)

## Preparation

1. Slice ingredients to desired thinness (Note: It is easier to ferment vegetables that have been cut with the maximum surface area exposed. When slicing a carrot, for example, try cutting lengthwise instead of rounds to maximize the surface area of the cut.) While a mandolin may speed up this procedure, I personally prefer the lack of uniformity in the resulting ferment. Keep note of the textural properties of your ferments when you consume them for when you prepare your next batch.
2. Weigh the ingredients. Calculate 2%-4% of that weight; this calculation will be the amount of salt that will be sprinkled on top of the vegetables. So, for every 100g of foodstuff, use 2g-4g of salt. The amount of salt will depend on many factors including taste preference, season/ambient temperatures, and freshness of the vegetables. My suggestion: begin with 2% and double that amount if needed. But, again, keep your starting salinity in mind when you eat the finished ferment and adjust accordingly.
3. Sprinkle the salt over the sliced vegetables and mix together thoroughly. Let sit until the salt begins to extract the water inside the vegetables. This should look like small water droplets or beading on the cut surface of the vegetables. Thicker slices of vegetables should start to bend easily without snapping.
4. Begin to mix the vegetables and apply more pressure to soften the vegetables. Take note of how much force you're exerting onto the ingredients themselves: whatever you do not crush mechanically, the microbes will 'soften' biochemically. Begin to squeeze out as much liquid from the vegetables but do not discard this liquid since it will become the 'brine' in which the vegetables will ferment. This brine serves a protective function as vegetables submerged in it will not be oxidize or be vulnerable to ambient molds.
5. Place the softened vegetables in a lidded container and pour its liquid/brine on top. Press down until the level of the brine flows above the level of the vegetables. Place some form of a weight (such as small

plate) to keep them submerged under the brine. Ideally, you do not want any of your ingredients to be breaking through the liquid surface of the brine; access to oxygen may invite other microbes that will radically transform your ferment (into, likely, something potentially unfit for human taste buds). Sometimes, folks will place a plate underneath the fermenting container in case the lactoferment is so active that the juices overflow. I like to play my odds and lightly screw the lid to my fermentation vessel: if the top of the lid cannot be pressed inward, I know I need to “burp” my ferment (or I will have a tiny explosion on my hands very soon).

6. Depending on the season/ambient temperature, keep your ferment in an area too cool for just a t-shirt. In warmer climates, this might mean that you’ll have to store your ferment in the fridge. Left unattended, lactoferments can become effervescent (and, while this is a normal occurrence, it usually signals the final frontier of delicious terrain as the bacteria have lived through trajectory and are now being outnumbered by yeasts). When in doubt, trust your nose and your tongue; do not consume any ferment that tastes foul.
7. Check the ferment periodically for evolutions in taste and texture. Make note of what you did so that you can apply it to the next round of ferments. Experiment with intermediary ferments by adding fresh herbs or other vegetables to make an easy side dish. Try cooking it (e.g. sauté in a pan or throw into soups) for a different flavor profile. Study what happens when you place the fermentation vessel in a convivial area with lively music versus one that is cold, dark, and damp. Play Mozart. Play Elvis. See what other intangibles get taken up by your creation. Experiment freely. And, most importantly, make space for wonder.

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