Science and Performance: The(or)atrical Entanglements and Hauntological Relations

Coleman Nye

Act 1. Scene 1. Entanglements: Physics by Way of Performance[1]

In her article "Quantum Entanglements and Hauntological Relations of Inheritance," feminist philosopher of science Karen Barad goes to the theatre to think the "spacetime (re)configurings" of quantum physics (2010, 240). In "Act 1 Scene 1," Barad restages a private conversation in Copenhagen in 1941 that took place between German physicist Werner Heisenberg and Danish physicist Niels Bohr. She does this by way of a theatrical imagining of the two physicists (as actors) speaking (as ghosts) in the 1998 play *Copenhagen* by Michael Frayn. In this speculative performance of the possible conversation that took place between the scientists in Nazi-occupied Denmark, the spectral Bohr and Heisenberg meet in 1941 via the 1998 play in a 2010 article to debate the ethical implications of an atom bomb. In Barad's writing, the actors playing ghosts in *Copenhagen*, in turn, return "for the first time, again" (243) in yet another section of the 2010 article headed "Act 1, Scene 1." This time(s), they appear through the ghostly actors in *Hamlet*'s 1600 Copenhagen, but not before crossing times with Bohr's development of quantum physics in 1927 Copenhagen, which finds its untimely future-(not-yet)-past in 1945 when the United States drops atom bombs onto Hiroshima and Nagasaki:

> war time / science time / spacetime / imaginary time / mythic time / story time / inherited time / a time to be born / a time to die / out of time / short on time / experimental time / now / before / to-come /. . . threaded through one another, knotted, spliced, fractured, each moment a hologram, but never whole . . . (Barad 2010, 243)

In this heterogeneous history of the field of physics, Barad diffractively plays multiple times together-apart within and across a quantum field of "spacetimemattering." In so doing, Barad *enacts* quantum field theory. She puts Bohr's theory of complementarity into play, showing how time is not simply given, nor does it come to pass. Time is *made* and *marked* through material-discursive practices. This is one of Bohr's key insights: concepts such as time do not refer to fixed or stable things in the world. Instead, time is a "specific material arrangement of experimental apparatuses" (Barad 2010, 253), and it is one that leaves marks.

> It is not merely that the future and the past are not "there" and never sit still, but that the present is not simply here-now. Multiply heterogeneous iterations all: past, present, future, not in a relation of linear unfolding, but threaded through one another in a nonlinear enfolding of spacetimemattering, a topology that defies any suggestion of a smooth continuous manifold. Time is out of joint. Dispersed. Diffracted. (Barad 2010, 244)

I begin with Barad's 2010 article "for the first time, again" in this 2017 introduction because it does science as, in, and through theatre. But why go to the theatre to do physics? As Hamlet reminds us, "the play's the thing" (Shakespeare 1963). The theatre is an experimental apparatus for spacetimemattering *par excellence*. Theatre is a temporally heterogeneous and spatially heterotopic field that threads past, present, future together in dis/continuous here-nows and there-thens (Schneider 2011). In *Copenhagen*, a 1941 conversation in Copenhagen between two dead physicists is

played "live" across the bodies of two living actors who are not the dead physicists, but are not-*not* the dead physicists whom they body forth in the act of surrogation.[2] This happens again every time *Copenhagen* is staged in the layered present of a live performance; a conversation in 1941 Copenhagen takes place "for the first time, again" on stages in 2016 Los Alamos, 1999 Manhattan, 2018 Geneva. And while this conversation is a fictional rendering of a historical event that took place—that is, while this conversation, as it is written, never "happened" as a matter of historical record—when it is played on stage, the fictionalized event really *does* take place *again* and *for the first time*. As a matter of record and as a record of matter, it *actually happens*.[3]

Quantum theatre theory, the(or)atrical physics. Time is out of joint.

> *Copenhagen*/Copenhagen is haunted by its own internal fracturings/disjunctures that belie the presumed unity of places, spaces, times, and beings. A ghost that is the very specter of multiplicity itself haunts the play and the interpretation (of quantum physics that goes by the same name). *What if the ghost were taken seriously*? (Barad 201, 263, emphasis mine)

Theatre and performance haunt science as onto-epistemological practices and experimental apparatuses of spacetimemattering. This special issue is about, to borrow a phrase from Sarah Klein and Tyler Marghetis's article, "taking [this ghost of] performance seriously and literally." The hauntological relation of theatre to science and the performative promiscuities at play in scientific assemblages move centre stage in the different here-nows and there-thens of the textual, sonic, and visual materials that compose this issue.

Act 1. Scene 1. The(or)atrical Physics (*In Which We Take the Ghost Seriously)*

Stage Right:
[London, 1660] The ghost of Robert Boyle stands before a crowd of witnesses at the Royal Society. Boyle is staging an "experimental performance" for a number of guests (Shapin and Schaffer 1985, 30). Boyle stands beside a large contraption with a glass chamber at the top. Inside the chamber is a small bird. By pumping a gear on the side, Boyle attempts to make air visible and to demonstrate that air is connected to the maintenance of life. As the pumping slowly creates a vacuum, spectators can see air through its absence: the twitches, spasms, and gasps of the animal as it begins to suffocate. By breaking the seal, and letting air back in, the animal can be resuscitated.

Some people are amused, others appalled. Some leave. Others applaud. Boyle and members of the Royal Society are in the early throes of institutionalizing and standardizing experimental science. Performance is a key mechanism in the constitution of a matter of fact as Boyle sets the stage for spectators to experience that air is matter and the absence of matter is a vacuum.

Center Stage:
[Vancouver, 2017] The experimental sciences are marked by a deep and enduring theatrical convention of publicly staging experiments for spectators (Shapin and Schaffer 1985; Latour 1993; Hilgartner 2000; Morus 2010; Smith 2014). According to the *Oxford English Dictionary*, a "fact" is "a thing done or performed" or "the making, doing, or performing," as in the very process of accomplishing a proper knowledge object *as* itself.[4] In their history of the emergence of the experimental sciences in seventeenth-century England, Shapin and Schaffer show how early experimentalist Robert Boyle drew on theatrical practices in the constitution of a matter of fact,

from the explicit staging of experiments for a witnessing public to the "mimetic technologies" such as written scripts and protocols that allowed matters of fact to be replicated and their publics to be expanded (1985). Georges Canguilhem has described the laboratory in theatrical terms as "a place where artifices intended to make the real manifest are worked out" (1977, 73). And Bruno Latour illustrates how Louis Pasteur moved microbes from the real-artifice of his laboratory into the public domain through dramatizing his experiments in a "theatre of proof" (1977, 85).[5] In his play *Gaia Global Circus*, Latour has also turned to the theatrical stage as an experimental space uniquely suited to thinking through the layered times, materials, scales, lives, feelings, knowledges, worlds, and imaginaries at stake in climate change. In this work, theatre emerges as a practice of world-making and knowledge-making that is tightly interwoven with science, politics, and society. Latour's move to take theatre's hauntological relations to the sciences seriously marks a welcome and compelling departure from the works of many historians and theorists of science. While scholars in this field have generally embraced the theatre as a metaphor and model for scientific practice, they have shied away from theatre theory and practice, often reducing theatre to a "mere" representation of the world in opposition to the world-making "productivity" of performance. In this oppositional framework, theatre "shows" while performance "does."

There is a similarly rich history in theatre studies of tracing the traffic from science to theatre, from texts that explore how scientific theories, histories, or debates are conveyed in theatrical performances (Goodall 2002; Lustig and Shepherd-Barr 2002; Shepherd-Barr 2006; Bartleet and Shepherd-Barr 2013) to the influence of scientific theories of embodiment and emotion on theories of acting (Roach 1993). More recently, theatre scholars have become more attuned to the "two-way street of mutual influence" between science and theatre (Shepherd-Barr 2015, 3). This shift is most readily exemplified in the uptake of cognitive neuroscientific theories and methods to explore shared questions of affect and embodiment in theatre (McConachie and Hart 2010; Shaughnessy 2013; Blair and Cook 2016). Yet, as contributors to this special issue argue, for all of the richness of these theorizations of the traffic between science and theatre, many theatre and performance scholars have "glossed over the performed, practical, and situated features of science itself in favour of working with compatible frameworks and concepts that organize zones of shared interest and mutual exchange" (Klein and Marghetis 2017, 16). With the notable exception of Tiffany Watt Smith's excellent 2014 book on the theatricality of Victorian-era scientific looking in the work of Charles Darwin among others, practices of scientific knowledge-making remain largely uninterrogated within theatre scholarship. In this way, theatre risks falling back into the trap of simply conveying, transmitting, rehearsing, or staging a "black-boxed" science,[6] and scientific theories of embodiment and emotion are called on to legitimate, explain, or inform theatrical techniques such as actor training without accounting for the theatrical entanglements, embodied relations, and historical contingencies of scientific practice itself. As Klein and Marghetis observe, this process by which science is made to speak truth to theatre, while the performative and bodily practices of science are obscured, is in danger of reinscribing mind-body dualism and undervaluing embodied modes of knowing (35).

In the video and text of "Analyzing the Analyst" in this issue, Yelena Gluzman beautifully develops a research methodology that takes theatrical, social scientific, and cognitive neuroscientific approaches to embodiment as interconnected, yet non-equivalent modes of experimental inquiry. Gluzman choreographs an empirical research project that works from *within* an interrelated field of concerns, practices, and sites for performing bodily interactions *in* and *as research* in innovative ways. Gluzman's video project draws together recordings of an interaction between strangers in a gallery as part of a participatory art installation (*your position*), footage of Gluzman and cognitive

neuroscientist Jaime Pineda in a lab analyzing the recordings of the gallery interaction, and rehearsal scenes in which actors re-perform Gluzman and Pineda's analysis of the art piece. The video works across multiple scales, each of which refuses fixity and division: the viewer of the art gallery footage finds herself affectively and interpretively implicated in the awkward interaction between strangers in the gallery; she then finds herself thinking with and against the cognitive neuroscientific attempts to interpret and "code" the expressions and gestures in the video; and these expressions and gestures of scientific interpretation are differently put into play by actors who repeatedly attempt to re-enact the analysis. At no point is anyone, including the spectator, positioned outside of the interpretive frame of thinking and making. What results is a powerfully layered and insistently iterative account of the "material and discursive conditions through which a phenomenon can be experienced, interrogated, or known" (Gluzman 2017, 115) that refuses to sit still, to move unidirectionally, or to step outside of the deeply embodied and multi-scalar process of coming-to-know. In this way, Gluzman puts her model of "Research as Theatre" (RaT) (forthcoming) into play, as she uses the heterogeneity and theatricality of research as a resource for performing thinking in its multiplicity, situatedness, and irreducibility, rather than treating it as "noise" to be contained or silenced within the experimental context.

In line with Gluzman's project, this special issue proceeds from the premise that the lab and the theatre, and science and performance more broadly, are not separate domains or disciplines, but are rather complexly commingled sites for generating a mimetic play of naturalcultural possibilities. Rather than reinforcing disciplinary divides between the social sciences, humanities, and natural sciences, or between science, performance, and theatre by making recourse to comparison and critique or by drawing on "traffic" metaphors, the articles and materials in this issue think these fields together-apart, to borrow Karen Barad's phrase (2014), as entangled, intra-related, but not commensurate sites and practices of making-knowing. As such, this issue is invested in undisciplining approaches to science and performance as we work to trouble the conjunctive "and" that both separates and conjoins.

Act (w). Scene hϕ£∃. Diffractive Histories and Hauntological Relations (*In Which Spectres Abound*)

> "Enter the ghost, exit the ghost, re-enter the ghost." (*Hamlet*, quoted in Derrida 1994, xix; quoted in Barad 2010, 245)

"A ghost that is the specter of multiplicity itself" (Barad 2010, 263), which haunts seemingly unified objects of knowledge and intervention (plays, quarks, particles, bodies) has often gone by the name of performance. In the fields of science and technology studies (STS) and performance studies (PS), performance and performativity have offered robust theoretical frameworks for examining how scientific and social acts of world-making emerge through a diverse set of material and semiotic practices that un/fold in and over time. By centring process and power, performance theory has opened up spaces to examine how knowledge practices and objects are materialized, enacted, and achieved in a shifting field of relations. As early as 1979, Bruno Latour and Steven Woolgar turned to the language of performance in their attempts to move beyond a metaphysics of truth in the sciences, and to show how scientific knowledge is not simply holding up a mirror to fixed and immutable "natures," but is instead a set of culturally and historically contingent practices of materializing natures *as* natures. At roughly the same time, theorists in performance studies (Turner

1982; Schechner 1985) and feminist theory (Butler 1990) re/turned to theories of performance from linguistics (Austin 1955) and sociology (Goffman 1959), and performances of theory in various art practices, to analyze anew the ongoing composition of social life and subjectivity through repetitive, embodied acts of doing (*as)* that appear to congeal over time into being (*as is*).

The cross-pollination between the fields of STS and PS in recent decades has been rich, particularly in feminist and postcolonial approaches to science and technology that explore the complex matrices of power and manifold formations of knowledge that are unevenly at play in studying and shaping our naturalcultural worlds.[7] While many thinkers and makers have turned to the potentials of performance to think and do otherwise, articles in this issue make clear that there is nothing inherently radical about performance's place in the sciences. Historically, performance has played a central role in stabilizing dominant regimes of evidence and authority—from the laboratory as a "theatre of proof" (Latour 1993) to the theatre as a laboratory of the social. Indeed, a range of uneasy compromises, ongoing complicities, and unruly connections crop up at the conjunction of science and performance. What types of knowledge, expertise, and agency have these performances actively silenced, excluded, or foreclosed? Are the performing arts and experimental sciences non-innocent in regimes of power and knowledge, as likely to advance as to disrupt sociopolitical systems of inequality, exploitation, or extraction?

Stage Left:
[London, 1660, by way of Santa Cruz, 1997] The ghost of Robert Boyle stands before a crowd of witnesses at the Royal Society. In this "theatre of persuasion" (Haraway 1997, 25), Boyle stands beside a large contraption with a glass chamber at the top. Inside the chamber is a small bird. A ghostly technician who is hidden beneath the floor pumps the gears. A crowd of wealthy men and women look on. As the pumping slowly creates a vacuum, they can see air through its absence: the twitches, spasms, and gasps of the spectral animal as it begins to suffocate. Boyle looks on passively and states, "It is not I who say this [vacuum is real]; it is the machine" (Shapin and Schaffer 1985, 77). He is the model of science's new "modest witness"—"the legitimate and authorized ventriloquist for the object world, adding nothing from his mere opinions, from his biasing embodiment" (Haraway 1997, 24). The desired effect of his performance of transparency is the obfuscation of his own embodiment, situatedness, and subjectivity. But something runs amok; the unseemliness of theatricality tugs at the seams of Boyle's performance.

A few of the women in attendance are appalled. A womanly apparition steps up and says, "It is you who built this machine and it is you who are using this machine to kill this animal. And if *you* will not break the seal and let air back into the chamber, *I* will."[8] The other women join her in demanding that Boyle resuscitate the bird at once. The women's names are never listed among the witnesses who attested to the validity of the experiment. Their "biasing embodiment," it seems, got in the way of disinterested and credible scientific looking because they insisted on seeing the theatrical seams of Boyle's production. In getting it wrong, in failing to properly see Boyle as invisible and themselves as passive onlookers, these unruly women disrupt the theatre of proof by treating it like the theatre. Unlike performativity, which is marked by a thrall toward ontological coherence (when a performative is felicitous, it effaces the conditions of its construction), theatre is defined through its ontological undecidability (the not-not or both/and) in which the artifice and scaffolding never recede from the scene of the so-called "real."[9] Through their attunement to this theatrical interstice between seeming and being, these spectating spectres see the possibility to enact an otherwise in which the bird doesn't die and the fact doesn't matter.

Boyle and a few of the other wealthy gentleman make arrangements to meet at night to avoid such interruptions again. After a hotly contested visit by Margaret Cavendish in 1667, the Royal Society excludes women from entrance until it is legally required to open its doors to women again in 1945. Spectres abound.

In *Modest Witness*, Donna Haraway returns to Robert Boyle's 1660 account of his air-pump demonstration to offer a "diffractive reading" of how the experimental performance of making a matter of fact was simultaneously a performative process of making race, class, and gender. Haraway reminds us that women were forcibly evacuated from the space, both epistemologically and literally. Working-class men, too, were excluded except when a select few were made to dis/appear as invisible lab technicians under the floor, working the air-pump's bellows (Shapin 1989; Haraway 1997). The theatrical stage also haunts science's theatre of persuasion. The ghost from *Hamlet* re-enters in 1660: apparitions and caricatures of women and colonized peoples were regularly played across the bodies of actors on early modern stages, while women were expressly prohibited from performing on public stages and racialized populations were infrequently cast at best. In this same time, through epistemic, economic, and militaristic imperialism, Britain was working to consolidate power and property with the resurgence of witch hunts and the ongoing process of violently colonizing the Americas, the Caribbean, and parts of the African continent (Federici 2004). In ensuing centuries, racialized and gendered populations resurface in the halls of the Society and on the stages of the theatre as research objects and cultural oddities. But spectres of other subaltern stories, subjectivities, and sciences also abound within and beyond these particular configurations of spacetimemattering. How to let the ghosts speak?

"Diffraction patterns record the history of interaction, interference, reinforcement, difference" (Haraway 1997, 273). Diffraction is a methodology that attends to how exclusions matter.

Center Stage:
[London, 1613, and/in New York, 2014, by way of Vancouver, 2017] Jennifer Park's article in this issue moves between the early modern stage and the contemporary humanities laboratory in her "diffractive reading" of gender-in-the-making within the heterogeneous histories of performance in/as/and alchemy. Park charts the temporally promiscuous crossings of gendered metaphors, as they are materialized in scientific, literary, and theatrical practices of knowing and making glass vessels. She begins with John Webster's 1660 play *The Duchess of Malfi* in which a male character fantasizes that a female character's womb is made of glass, her reproductive insides rendered available to the theatrical and scientific gaze. Park then leaves the theatre to go next door to the glass-houses in which alchemical practices were staged for publics. In these spaces, alchemists created and used glass vessels as artificial wombs, acting out masculinist fantasies of mastering women's bodily natures and achieving male reproduction through the creation and control of glass wombs. Park powerfully demonstrates how gendered inequalities were made and remade through these different theatrical and scientific practices of staging and intervening in women's bodies, and illuminates the fraught ways these histories haunt contemporary scientific and humanistic modes of inquiry. In the scientific laboratory today, Park argues, the guise of neutrality works to efface and inadvertently replicate the gendered histories embedded in everyday glass instruments. In humanities laboratories at Columbia University where historians reenact early modern alchemical experiments, they, too, risk reproducing the charged performance histories of scientific protocols and materials if they don't attend to the spectres of gender they body forth. Through her compelling cartography of the metaphorical and material lives of glass vessels, Park makes visible the dissonances, resonances, and tangles of different disciplinary and disciplining practices, and illustrates how they mimic and

mutate the broader field of power relations in which they are historically enmeshed. As Susan Leigh Star reminds us, "power is about *whose* metaphor brings worlds together, and holds them there" (1991, 52).

In Jane Long's video "Subjective Object," a latex-gloved hand provocatively rubs a glass petri dish as white text runs under the screen, asking "can I get a witness?" Seconds later, witness mutates into whiteness: 1930s-era big band music plays as Long stands before a white wall in a white labcoat; she slowly sterilizes her face with a sponge, pulls back her hair, and then begins to apply white face paint with her latex gloves. In this slice of time, Long stunningly and playfully remaps zones of in/visibility and in/authenticity in the raced and gendered performance cultures of science. She paints on the positionality of white masculinity that haunts science's objectivity in the enduring figure of the "modest witness" (Shapin and Shaffer 1985; Haraway 1997) and the framework of science as a "culture of no culture" (Traweek 1988, 162). This is a culture, Long confides at the beginning of the video, that she used to love and a language that used to be her own. But now, she tells us, she is working to "put all of the personality and culture back into the gridlines."

As she plays the whiteness of the modest witness across her body against the backdrop of the laboratory and the soundtrack of the stage, Long also surfaces present histories of racial caricatures in blackface minstrelsy, natural history, and colonial science that continue to consolidate the epistemic authority and racial authenticity of white masculinity through inauthentic postures. After whiting up, Long gazes into the camera, her face slack, "neutral," the model of the modest witness. She then contorts her face into a series of expressions that are reminiscent of the silent screams in Butoh dance. As Long claws at her whitened face and rolls her eyes back in her head in an act of immodest witness, and then morphs back into the modest witness, gloved, goggled, protected from contamination, the ghost of Niels Bohr momentarily returns to the scene: war time, science time, inherited time, experimental time, a time to be born, and a time to die converge in the brief glimpse of the ghastly, ghostly dance of atomic horror realized in Hiroshima and Nagasaki. "Do you wanna hear a joke?" Long asks. "Do you know why you can't trust an atom? Because they make up everything."

Long's video together with her lab notebook entitled "Everything and Nothing" model an alternate mode of witness; she performs what Rebecca Schneider has recently termed "wit(h)ness" (Schneider 2017). Long bears witness to science and performance's "imperialist white-supremacist capitalist patriarchal" habits of knowing (hooks 2004, 17). But she also, at the same time, performs *withness* as she attends carefully and bodily to the constitutive exclusions that matter, that persist, that unsettle, that take flight. According to Barad, concepts are momentary acts of differentiating, of making cuts within an inseparable field of matter and meaning, observer and observed. As such, a concept—objectivity, time, race, atom—is always haunted and de/composed by all that is excluded in its very being/becoming-determinate. Writes Long in her lab notebook,

> If we only focus on a part of the SINE wave, it can appear to be a linear plot. If we only focus on the black boy's organs that weren't hit by the bullet in the pathology report, then the black body appears healthy and fine . . . That's the problem, isn't it? (W)hole. I saw this on Andre's wall once. He made a typo. But that's what it is.

Long resituates the scene of research within this "(w)hole of history" (I riff here on Suzan-Lori Parks' phrase from *The America Play*). Long "dig[s] for bones, hear[s] the bones sing, write[s] it down" (Parks 1995, 4); she incorporates these stories and songs in her lab notebook and repopulates

the laboratory with her own body and the many other non/human bodies, knowledges, and times that make up science's hauntological relations. This (w)hole, Schneider reminds us via Parks along with black and indigenous feminist thinkers like Patricia Hill Collins and Leanne Simpson, is the "both/and" of performance, history, repetition, knowing, being, un/becoming—both here-now and there-then, both violence and freedom, both no one and know one, both inside and outside. Though this practice of *immodest wit(h)nessing*, Long takes these ghosts seriously; she lets them speak: "The inside only made from the outside closing in."

In their contribution to this issue, social scientist Sarah Klein and cognitive scientist Tyler Margetis bring what I am calling "immodest wit(h)ness" into the cognitive psychology lab as a research methodology. Klein and Marghetis ask, how do we "take scientific performativity seriously and literally" in our research practice? How do we acknowledge and approach the multiply entangled relations of researcher and researched, and how do we attend to the iterativity and contingency of research as a situated, embodied practice that is at the same time a technique of power? Is there a way to take up these performatic in/determinacies as an epistemic and experimental tool, rather than as a threat to be managed and expunged (Gluzman forthcoming)? Klein and Marghetis respond to these questions by designing a flexible and reflexive research apparatus, which they call "experiment performance" (EXPF). EXPF draws together protocols from ethnomethodology (Harold Garfinkel) and performance art (Adrian Piper) as a way of doing scientific research and social theory differently. As they show through a detailed account of EXPF, the improvisational and "response-able" structure of EXPF allowed them to continually "become-with" (Haraway 2007) themselves, each other, the research subjects, the cognitive objects, and the broader infrastructures and norms that enable and constrain their scientific practice. This project beautifully reconfigures experimental relations in the sciences and the social sciences, as it powerfully models "response-ability" by cultivating the "radical ability to remember and feel what is going on" and "work[ing] to respond practically" (78) from *within* a shifting field of knowledges, histories, and relations. The implications of EXPF are far-reaching, as Klein and Marghetis put into play a social/scientific practice that is willing and able to work with the ghosts that go by the names of implicit assumptions, epistemic erasures, power dynamics, colonial histories, and performative contingencies (Subramaniam 2014). In short, they show us that it is possible and necessary to hold on to the (w)hole.

> To address the past (and the future), to speak with ghosts, is not to entertain or reconstruct some narrative of the way it was, but to respond, to be responsible, to take responsibility for that which we inherit (from the past and the future), for the entangled relationalities of inheritance that "we" *are*, to acknowledge and be responsive to the noncontemporaneity of the present, to put oneself at risk, to risk oneself (which is never one or self), to open oneself to indeterminacy in moving towards what is to-come. (Barad 2010: 264)

Can I get a witness?

Vahri McKenzie probes the limits of reflexive and participatory models of wi(t)hness in science and performance in the context of big data and digital surveillance. If Boyle's theatre of persuasion constituted differentiated "publics" through performances of technological transparency and modest witness, how do contemporary formations of surveillance in theatre and science flip the script, converting private acts of looking into public forms of information through the *appearance* of technological transparency? This is the question McKenzie asks in *Only the Envelope*, a work of live art that invited subject-participants to watch a video while wearing a wireless eye-tracking device and

being monitored by "scientists" (actors) who stood alongside them in the viewing space. McKenzie hoped to render the pervasive and often opaque technologies of surveillance visible and contestable for participants. Wit(h)ness, here, was an invitation to bear witness to the ways in which surveillance is always with us, and to draw out the unequal entanglements of freedom and control, informant and informed, knower and known in the context of digital governance. Yet, to McKenzie's surprise, institutional ethical protocols around consent in the live science-performance setting scripted more conventional active-passive research roles, and participants modelled compliance rather than critique. This performance made visible the ways in which informed consent in performance/science, much like in online platforms wherein "consent" is often necessary for access and use, works to conceal through a gesture of transparency and to disempower through a script of participation.

~~Act sf. Scene SF~~. Inheriting the Future: Technoscientific Histories-to-Come

SpaceTime Coordinates: indeterminate, untimely.

Center Stage:
[Champaign, 2016] A figure in a tight white face-covering full body suit stands still on a small platform. The figure's back is connected to a large piece of white drywall by several cables. As the figure slowly begins to move, its cybernetic skin is rendered taught and it emits a low electronic hum as it gently pulls and breathes against the cables. The figure begins to remove its white skin, but there are only more layers of the same whiteness beneath, each still tethered to the wall. Slowly, sensuously, the faceless body pulls against the cables and tears jagged lines through the wall. Bright white light shines through these tears. As the body moves more deliberately against the wall, more "light/lifelines" bleed brightly through the cuts and dissonant, pulsing electronic sounds fill the space. The sounds grow louder, more frenzied as the figure breaks apart the wall, revealing more light as each chunk is ripped away. The figure is self-described Miami-born, mixed Latinx queer artist Erica Gressman performing *Wall of Skin* at a symposium on the theme "Being Brown, Being Down: Performances of Spic and Span." Just outside of the building that houses this *Wall of Skin*, someone has scrawled "build the wall" and "deport them." Donald Trump's presidential campaign to "Make America Great Again" is underway. He is not the president. This is where Sandra Ruiz's article "Organismal Futurisms in Brown Sound and Queer Luminosity" ends, as it offers up other histories of the future. In this piece, Ruiz turns and re-turns us to Gressman's Brown, queer cyborgian performance as an invitation and an imperative to "inhale and exhale against the tempo of the world's dominant sound and light system" (2017, 80).

> *En unas pocas centurias*, the future will belong to the *mestiza*. Because the future depends on the breaking down of paradigms, it depends on the straddling of two or more cultures. By creating a new mythos – that is, a change in the way we perceive reality, the way we see ourselves, and the ways we behave – *la mestiza* creates a new consciousness (Anzaldúa 1999: 102).

Gressman's sonic skin is made from inexpensive technology—a simple circuit connected to light-sensitive photocells. The circuit's voltage oscillates between two states, producing clicking sounds. As more light hits the photocells attached to Gressman's bodysuit, the oscillation increases in frequency, blurring into seamless, yet unsettling electronic tones. Within the white male-dominated DIY electronic music world, these types of light-sensitive circuits are typically contained within an

enclosure like a black box and controlled manually—blocking or allowing light to influence the circuit and make sound. Gressman disrupts this control-based paradigm's separation between body and technology, observer and observed, actor and object by shifting the sites of sonification to the material intra-actions unfolding at the intersections of her body, the technology, and the architecture of the room.[10] The space of the performance itself becomes the black box, its inner workings open and exposed, yet also contained, containing all of the non/human actors inside its walls—the inside only made from the outside closing in.

Ruiz illuminates how Gressman hacks experimental genres of punk, performance art, sound art, and electronic music in *Wall of Skin*, while at the same time unsettling the genres of experimental life that emerge from the sciences of "Man." By remixing these epistemic and aesthetic genres in her "science of oppositional ideology" (Sandoval 1991, 2), Gressman's performance of Brown futurism materializes a space for thinking and being "human after [and before] Man" (Wynter 2003), one that turns to multiplicity over singularity, entanglement over autonomy, movement over fixity, knowing *with* over knowing *that*. Circuiting Gressman's more-than-human cyborg through Chela Sandoval's decolonial feminist theory of oppositional consciousness, Ruiz powerfully illustrates how "colonized peoples have already developed the cyborg skills required for survival under techno-human conditions" (1991, 375). For Ruiz, Gressman's cyborgian performance offers up Brown sounds and queer luminosity as unsettling bodily technologies of fugitivity and capture, which refuse to resolve into dominant structures of language, vision, and mattering. As Ruiz explains, Gressman's singing cybernetic skin "is the site that frees her from the limiting constraints of the human, but that also binds her to her own skin and laboured breath" (2017, 80), and it is one that extends multiply into the space of the room, as she transmutes racializing technologies—skins, walls, sights, circuits, breaths—into a shared sonic environment that privileges noise over signal.

In their video "when they are anonymous they are free," &/[also turns to textural electronic soundscapes to think beside and beyond dominant social and technoscientific frameworks of mattering. Shimmery electronic sounds play as glitchy speckles of white crackle against a black screen. The flickering white specks eventually resolve into white text, which moves quickly in two densely layered rows against the black. While language enters the frame, it is in constant movement, refusing fixity as the eye struggles to capture words, phrases, moments of meaning in flux. In order to "interpret" the video according to available grammars of intelligibility, the viewer must press pause again and again. The viewer's value systems and epistemic frames are rendered visible with each button push: culturally-inflected expectations of stability, legibility, and coherence converge to script stilling the frame so as to facilitate reading and "knowing." Like the laboratory rat in the "Skinner box" who is rewarded with food or cocaine with each button push, a rush of pleasure emerges from what is momentarily apprehended.[11] And yet, for the rat and viewer alike this moment of capture is fraught. In the video, each frame of fragmented visual-grammatical meaning captured in the "paused" text is only made available through stopping the play of lights and silencing the play of sounds. Each still is only a fragment, a hole in an infinitely larger and smaller whole that is dis/continuously unfolding—"more noise . . . they are," "am i full of love . . . when they are," "to cyborgs of color . . . anonymous," "muscle is meat is technology . . . i am." If "knowledge is made for cutting" (Foucault 1984, 88), &/_[prompts the viewer to ask, what is lost with each "cut" into a continuously shifting and heterogeneous field of spacetimemattering? How do these exclusions matter? How do these cuts land on bodies, mark them, bind them?

The text in &/_['s video does eventually slow down, as the question "bind your body?" lingers on the screen, white lines framing it from above and below. The query comes into and out of focus as a

solid white line cuts across it and recedes, again and again, and the sound becomes deeper, harsher. The patterns of thick white-on-black lines on the screen are chest binders are binaries are equal signs are cuts are prison bars are categories are inside are outside are walls are skins are white are black are together are apart are closed are open. To bind is to hold, to contain, to fix in place; it is also to cohere, combine, form an attachment; and it is a predicament—to be caught in a tight spot. "Entanglements are relations of obligation—being bound to the other" (Barad 2010, 265).

Both Ruiz and &/_[enact reconfigurations of spacetimematterings—partial and capacious models for knowing and being together-apart without closure in a future-past dense with im/possibilities. They show us how the practice of SF—"science fiction, speculative fabulation, string figures, speculative feminism, science fact, so far" (Haraway 2016, 3)—is always already a part of our world-making practices. By working from within these temporal and epistemological tangles, they illustrate the possibility and necessity of re-making matter and meaning, listening to the ghosts, and re-membering what might yet have been. In their practices and processes of SF, they don't offer a way out of the trouble. They don't give us a resolution. They don't promise repair. They insist that "the past is never closed, never finished once and for all," but this also means that "there is no taking it back, setting time aright, putting the world back on its axis" (Barad 2010, 264). "There is no erasure finally," writes Barad (264). And this is both the promise and the peril of our entanglements.

"Mattering is still a question," writes &/_[(2017, 119).

Stage Left:

> "Only by facing the ghosts, in their materiality, and acknowledging injustice without the empty promise of complete repair (of making amends finally) can we come close to taking them at their word." (Barad 2010, 264)

[London, 1660 by way of the future] Let us return once more to the spectral scene of matter-in-the-making at the Royal Society. The ghost of Robert Boyle is onstage. The bird is in the glass orb, suspended, like Schrödinger's cat, in an in/determinate state between life and death. Some ghosts are in the audience. Others are beneath the stage. Most of the ghosts are outside. Which ghosts do we let speak here-now-there-then? Which "corpses" might speak anyway, out of turn or in error, by an accidental slip of the tongue or trip of the foot, or as fearful screeches and a flurried beating of wings (Ridout 2006)? What possibilities emerge for knowing and being *otherwise* in these contingencies, excesses, slippages that expose and disrupt the material and discursive frameworks of making facts matter? This is the question of mattering that theatre re/plays for us anew in each iteration.

My hope is that the disparate works that hold together in this journal issue offer up ways of doing science *as* theatre, inviting us to engage in practices of immodest wit(h)ness, to let the ghosts speak, to face them in their materiality and heterogeneity, and to attend carefully, insistently to the question of mattering that de/composes the matter of fact. Because the fact isn't the only matter. "Dark matter, still matter, don't matter, or hardly matter's all something that matters" (Long 2017).

How do we want Boyle's science play to end again, for the first time?

Notes

1. This introduction playfully mimics the structure of Karen Barad's article "Quantum Entanglements and Hauntological Relations of Inheritance." Like Barad's piece that structurally seeks to disrupt conventional narratives of linear history, scientific progress, and spatial unity through a disjointed writing style, this piece, too, invites the reader to "jump from any scene to another . . . and still have a sense of connectivity through the traces of variously entangled threads" (2010, 245).

2. For more on theatre's fitful temporalities and tangles of "liveness," see Rebecca Schneider's book *Performing Remains* (2011). Here, I also draw upon Richard Schechner's fundamental theorization of the not-not, or both/and in theatre, as he explains that the actor on stage is not Hamlet, but is not-*not* Hamlet (1985, 110). Finally, the place of surrogation and/as performance has been richly theorized by Joseph Roach in *Cities of the Dead* (1996).

3. In her essay "Possession," playwright Suzan-Lori Parks describes how she uses "the theatre like an incubator to create 'new' historical events":

> Since history is a recorded or remembered event, theatre, for me, is the perfect place to "make" history—that is, because so much of African-American history has been unrecorded, dismembered, washed out, one of my tasks as a playwright is to . . . locate the ancestral burial ground, dig for bones, hear the bones sing, write it down. The bones tell us what was, is, will be; and because their song is the play—something that through a production *actually happens*—I'm working theatre like an incubator to create "new" historical events (1995, 4–5).

4. *Oxford English Dictionary Online*, "fact."

5. Latour also applied this theatre of proof model to his own social scientific and historical research in the 1999 exhibition *Laboratorium* curated by Hans Ulrich Obrist and Barbara Vanderlinden. In this piece, Latour organized a public series of demonstrations in which he re-enacted famous historical experiments as a way to think about the conditions under which experimental objects are materialized in and beyond the laboratory (Latour 2001).

6. In *Science in Action* (1987), Bruno Latour uses the term "black box" to describe an object, concept, system, or technology whose internal workings and historical contingencies are rendered opaque while at the same time self-evident. Mirror neurons, as they are often taken up in theatre studies, would be one example of a black box.

7. For excellent examples of this interdisciplinary work, see the two special issues of *Catalyst* guest edited by Banu Subramaniam and Angela Willey on the theme of "Science out of Feminist Theory" (2017a and 2017b), as well as the special issue of *differences* guest edited by Sophia Roosth and Astrid Schrader on the theme of "Feminist Theory out of Science" (2012).

8. I am fictionalizing the details of an actual encounter that Boyle recounted in his *New Experiments Physico-Mechanical Touching the Spring of Air* (1660). I come to this scene by way of Elizabeth Potter's *Gender and Boyle's Gas Laws* (2001), which was cited in Donna Haraway's *Modest Witness* (1997). These two books provide the historical and theoretical basis for this passage.

9. In her forthcoming chapter "Research as Theatre (RaT)," Yelena Gluzman explores the research potentialities that inhere in theatricality's overt intentionality and artifice. She argues that it is precisely in its infelicity and its "outness" about the material and discursive contingencies of its production that theatricality opens up spaces to carefully attend to making and doing in our research. In my own research on contemporary technoscientific cultures of speculation and risk (Nye 2012), I look to the ways theatricality is also non-innocent in regimes of power. From cloning and patenting genes to selling genetic futures, processes of "making up" biological matter and meaning have moved centre stage in biocapitalist regimes of knowledge and intervention. My work explores how a genetic science that is increasingly "out" about its theatricality has opened spaces for constructing and contesting the political, economic, and social dimensions of

technoscience and more broadly, of "life itself." At the same time, I attend to the ways in which speculative practices newly obscure, exploit, or imagine social inequalities.

10. I am indebted to Peter Bussigel for his insights into the technological intricacies and performance histories of light-sensitive audio synthesizers.

11. I am grateful to Yelena Gluzman for her comments on an early draft in which she pointed out the similarity between a viewer pressing pause in the video and a rat pressing a lever in the lab.

References

_[, &/. 2017. "when they are anonymous they are free." *Performance Matters* 3 (2): 119.

Anzaldúa, Gloria. (1987) 1999. *Borderlands/La Frontera: The New Mestiza*. San Francisco: Aunt Lute Books.

Austin, J. L. 1955. *How to Do Things with Words*. Cambridge, MA: President and Fellows of Harvard College.

Barad, Karen. 2007. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham, NC: Duke University Press.

———. 2010. "Quantum Entanglements and Hauntological Relations of Inheritance: Dis/continuities, SpaceTime Enfoldings, and Justice-to-Come." *Derrida Today* 3 (2): 240–68.

———. 2014. "Diffracting Diffraction: Cutting Together-Apart." *Parallax* 20 (3): 168–87.

Bartleet, Carina, and Kirsten Shepherd-Barr. 2013. "Guest Editorial: New Directions in Theatre and Science." *Interdisciplinary Science Reviews* 38 (4): 292–94.

Blair, Rhonda, and Amy Cook. 2016. *Theatre, Performance and Cognition: Languages, Bodies, and Ecologies*. New York: Bloomsbury Methuen Drama.

Butler, Judith. 1990. *Gender Trouble: Feminism and the Subversion of Identity*. New York: Routledge.

Canguilhem, Georges. 1977. *Idéologie et Rationalité dans l'Histoire des Sciences de la Vie*. Paris: Vrin.

Derrida, Jacques. 1994. *Specters of Marx: The State of the Debt, the Work of Mourning and the New International*. New York: Routledge.

Federici, Sylvia. 2004. *Caliban and the Witch: Women, the Body, and Primitive Accumulation*. Brooklyn: Autonomedia.

Foucault, Michel. 1984. "Nietzsche, Genealogy, History." In *The Foucault Reader*, edited by P. Rabinow, 76–100. New York: Pantheon.

Gluzman, Yelena. 2017. "Analyzing the Analyst: An Experimental Data Video for Thinking Theatre and Cognitive Neuroscience Together." *Performance Matters* 3 (2): 107–18.

———. Forthcoming. "Research as Theatre (RaT): Positioning Theatre at the Centre of PaR and PaR at the Centre of the Academy." In *Performance as Research: Knowledge, Methods, Impact*, edited by Annette Arlander, Bruce Barton, Melanie Dreyer-Lude, and Ben Spatz. New York: Routledge.

Goffman, Erving. 1959. *The Presentation of Self in Everyday Life*. New York: Doubleday Anchor.

Goodall, Jane. 2002. *Performance and Evolution in the Age of Darwin: Out of the Natural Order*. New York: Routledge.

Haraway, Donna. 1997. *Modest_Witness@Seond_Millenium.FemaleMan©_Meets_OncoMouse™*. New York: Routledge.

———. 2007. *When Species Meet*. Minneapolis: University of Minnesota Press.

———. 2016. *Staying with the Trouble: Making Kin in the Chthulucene*. Durham, NC: Duke University Press.

Hilgartner, Stephen. 2000. *Science on Stage: Expert Advice as Public Drama*. Stanford: Stanford University Press.

hooks, bell. 2004. *The Will to Change: Men, Masculinity, and Love*. New York: Atria Books.
Klein, Sarah, and Tyler Marghetis. 2017. "Shaping Experiment from the Inside Out: Performance-Collaboration in the Cognitive Science Lab." *Performance Matters* 3 (2): 16–40.
Latour, Bruno. 1987. *Science in Action: How to Follow Scientists and Engineers through Society*. Cambridge, MA: Harvard University Press.
———. (1988) 1993. *The Pasteurization of France*. Translated by Alan Sheridan and John Law. Cambridge, MA: Harvard University Press.
———. 2001. "The Theater of Proof: A Series of Demonstrations." In *Laboratorium*, edited by Hans Ulrich Obrist and Barbara Vanderlinden, 185–90. Cologne: Dumont.
———, and Steven Woolgar. (1979) 1986. *Laboratory Life: The Construction of Scientific Facts*, 3rd ed. Princeton: Princeton University Press.
Long, Jane. 2017. "Subjective Object." *Performance Matters* 3 (2): http://performancematters-thejournal.com/index.php/pm/article/view/114/149.
Lustig, Harry, and Kirsten Shepherd-Barr. 2002. "Science as Theatre: From Physics to Biology." *American Scientist* 90 (6): 550–55.
McConachie, Bruce, and F. Elizabeth Hart, eds. 2010. *Performance and Cognition: Theatre Studies and the Cognitive Turn*. London: Routledge.
Morus, Iwan Rhys. 2010. "Placing Performance." *Isis: A Journal of the History of Science Society* 101 (4): 775–78.
Nye, Coleman. 2012. "Cancer Previval and the Theatrical Fact." *TDR: The Drama Review* 56 (4): 104–120.
Parks, Suzan-Lori. 1995. *The America Play and Other Works*. New York: TCG Books.
Potter, Elizabeth. 2001. *Gender and Boyle's Gas Laws*. Bloomington: Indiana University Press.
Ridout, Nicolas. 2006. *Stage Fright, Animals, and Other Theatrical Problems*. Cambridge, UK: Cambridge University Press.
Roach, Joseph. 1993. *The Player's Passion: Studies in the Science of Acting*. Ann Arbor: University of Michigan Press.
———. 1996. *Cities of the Dead: Circum-Atlantic Performance*. New York: Columbia University Press.
Roosth, Sophia, and Astrid Schrader. 2012. "Feminist Theory out of Science: Introduction." *differences* 23 (3): 1–8.
Ruiz, Sandra. 2017. "Organismal Futurisms in Brown Sound and Queer Luminosity: Getting into Gressman's Cyborgian Skin." *Performance Matters* 3 (2): 72–91.
Sandoval, Chela. 1991. "U.S. Third World Feminism: The Theory and Method of Oppositional Consciousness in the Postmodern World." *Genders* 10: 1–24.
Schechner, Richard. 1985. *Between Theatre and Anthropology*. Chicago: University of Chicago Press.
Schneider, Rebecca. 2011. *Performing Remains: Art and War in Times of Theatrical Reenactment*. New York: Routledge.
———. 2017. "Amongness, Besideness, Withness." Paper delivered at the conference "The Future of Reenactment," Duke University, Durham, NC (April 20).
Shakespeare, William. 1963. *The Tragedy of Hamlet, Prince of Denmark*. New York: Signet Classic.
Shapin, Steven. 1989. "The Invisible Technician." *American Scientist* 77 (6): 554–63.
———, and Simon Schaffer. 1985. *Leviathan and the Air Pump: Hobbes, Boyle, and the Experimental Life*. Princeton: Princeton University Press.
Shaughnessy, Nicola. 2013. "Introduction: Operating in Science Theatres." In *Affective Performance and Cognitive Science: Body, Brain and Being,* edited by N. Shaughnessy, 1–24. London: Bloomsbury.
Shepherd-Barr, Kirsten. 2006. *Science on Stage: From* Doctor Faustus *to* Copenhagen. Princeton: Princeton University Press.
———. 2015. *Theatre and Evolution from Ibsen to Beckett*. New York: Columbia University Press.

Smith, Tiffany Watt. 2014. *On Flinching: Theatricality and Scientific Looking from Darwin to Shell Shock*. Oxford: Oxford University Press.

Star, Susan Leigh. 1991. "Power, Technology and the Phenomenology of Conventions: On Being Allergic to Onions." *Sociological Review* 38 (S1): 26–56.

Subramaniam, Banu. 2014. *Ghost Stories for Darwin: The Science of Variation and the Politics of Diversity*. Urbana: University of Illinois Press.

_____, and Angela Willey. 2017a. "Introduction to Science Out of Feminist Theory Part One: Feminism's Sciences." *Catalyst: Feminism, Theory, Technoscience* 3 (1): 1–23.

_____, and Angela Willey. 2017b. "Introduction to Science Out of Feminist Theory Part Two: Remaking Science(s)." *Catalyst: Feminism, Theory, Technoscience* 3 (2): 1–9.

Traweek, Sharon. 1988. *Beamtimes and Lifetimes: The World of High Energy Physicists*. Cambridge, MA: Harvard University Press.

Turner, Victor. 1982. *From Ritual to Theatre: The Human Seriousness of Play*. New York: PAJ Books.

Sylvia Wynter. 2003. "Unsettling the Coloniality of Being/Power/Truth/Freedom: Towards the Human, After Man, Its Overrepresentation—An Argument." *CR: The New Centennial Review* 3 (3): 257–337.

Shaping Experiment from the Inside Out: Performance-Collaboration in the Cognitive Science Lab

Sarah Klein and Tyler Marghetis

Collage of video stills from EXPF: Shaping Experiment. Sarah Klein and Tyler Marghetis (2015a).

As part of the "practice" and "performative" turns, Science and Technology Studies (STS) scholars directed their attention to local, tacit, and embodied practices by which science and its phenomena are enacted and maintained.[1] While much has been written about how scientists are performatively entangled with their research objects, STS scholars tend to reproduce empirical distance and transparency in their descriptions of scientific practice. That is, they do not take their own performances seriously enough. Performance Studies (PS) models how to take performance seriously through its radical centring of performance as knowledge-making and as a legitimate mode of scholarship, often figured against dominant, western, scientific modes of knowledge-making (Conquergood 2002). However, in its engagements with science, particularly with the cognitive sciences (Blair 2008; McConachie and Hart 2006; Shaughnessy 2013), performance studies has largely glossed over the performed, practical, and situated features of science itself in favour of working with compatible frameworks and concepts that organize zones of shared interest and mutual exchange, including conceptual blending, affect, embodiment, and mimesis. Here, we explore a possible configuration for STS and PS scholarship to take scientific performativity seriously and literally, by making performances together.

Sarah Klein is a writing instructor at the University of California, San Diego, where she earned her PhD in 2017 in communication and science studies. She is an ethnographer of cognitive psychology and neuroscience, and studies how research methods travel through time and space. **Tyler Marghetis** is a postdoctoral research scientist in the Department of Psychological and Brain Sciences at Indiana University. He studies the limits of human understanding, especially those limits that derive from our brains, bodies, cultural tools and practices, and social interactions.

This paper centres on an "experiment-performance" that we have dubbed EXPF. This performance took the laboratory-based experiment in cognitive psychology and sought to invert its implicit power relations. Each performance of EXPF began as a standard experiment: a subject comes into the laboratory, is greeted by experimenters, gives informed consent, and completes a standard computer-based psychology experiment. At that point, however, EXPF diverged from orthodox scientific methodology by transferring agency from the "experimenters" to the subjects. At the end of the experiment, before they were informed of its research goals, subjects were asked for suggestions on improving the experiment—and, before the next subject arrived to participate in the experiment, we had to implement these suggestions, whether they were about the nature of the experimental task ("add music!"), the attendant paperwork ("maybe ask if people are depressed?"), or even the experimenters' appearance ("wear white labcoats!"). What began as a standard laboratory experiment quickly transformed into our subjects' vision of what the experiment "should" look like. Subjects were no longer just targets of scientific inquiry, but active crafters of scientific activity.

EXPF, therefore, was an experiment about experiment. As the product of collaboration between an ethnographer of science (Sarah Klein, or SK) and a cognitive scientist (Tyler Marghetis, or TM), EXPF looped theories of performative entanglement and reflexivity into a collaboratively devised research apparatus that reflexively addressed the performative character of research practice in our respective fields. EXPF thus rearranged materials and practices local to the cognitive psychology lab to enact "response-ability"—between researcher and research subject (ethnographer of science and cognitive scientist), and between researchers and research subjects (experimentalists and experimental subjects).

Subjects, Objects, and Their Mutual Response-Ability

Cognitive psychology experiments require the ongoing enrolment of participants, who are regimented in subtle ways to perform both as data sources and as ideal subjects. Cognitive psychologists both rely on this entanglement to produce subjects' experimental performances and recognize it as an epistemic threat (Klein 2014; Morawski 2015). The configuration of contemporary scientific psychology that casts the subject as an epistemic threat is fairly recent (Danziger 1994; Morawski 2015; Martin 2013). Danziger and Martin both trace the rise and fall of nineteenth-century introspective practices of self-experimentation that configured the experimental psychologist as both subject and observer of mental phenomena: researchers experimented on themselves, and were seen as legitimate observers of their own mental phenomena. Subjectivity was subsequently bracketed or "banished" from experimental psychology as introspectionism declined and psychology sought to prove itself among the natural sciences (Danziger 1994; Martin 2013). The roles of subject and observer/experimenter were separated in experimental practice, and the field promoted externally observable and measurable responses over introspective accounts. Even as it worked to fashion itself as an objective science, scientific psychology could not banish subjectivity completely. Indeed, between 1950 and 1970, scientific psychologists experienced a period of "epistemological dizziness" as they confronted and critiqued their dominant research paradigm, allowing anxieties about the "experimenter-subject system" (Morawski 2015, 574) to surface and acknowledging the cultural (and causal) complexity of the experimental situation. Among these anxieties emerged a concern about how "expectancies" and "experimenter bias" shaped the performances of research subjects (Morawski 2015, 593; Rosenthal 1963, 2009; Rosenthal and Fode 1963). What STS scholars call "methodological entanglement" persists as a practical concern for cognitive psychologists today

when subjects alter their performance to conform to the perceived aims of the researcher, a set of phenomena psychologists call "expectancy effects."

At the same time as asserting scientists' entanglement with their objects, STS scholars tend to reproduce empirical distance in their own work, masking their performative entanglements with their research sites. Here, we begin with the symmetrical observation that both ethnographers of science and cognitive scientists are part of layered research apparatuses of observers and observed.[2] Operating from the (now widely accepted) principle that research practice is performative, and that researchers are entangled with our research objects, in the approach developed in EXPF, *we threw ourselves into this entanglement rather than attempting to know it only in order to limit it*. Instead of focusing on drawing a line between authentic and inauthentic phenomena, we actively intervened in experimental practice, manipulating and rearranging it. EXPF was an experiment in becoming response-able on multiple relational scales: the long-term, leisurely entanglement between the two collaborators as we conceived of and implemented this project; the more constrained timescale in which we modified each iteration of the performance; and the brief, punctate, but iterated encounters between us, our apparatus, and the ever-changing experimental participant.

Our performance thus aimed to intervene in this locus of experimental performativity. What if entanglement is not ignored or managed as a threat, but engaged as a resource? What emerges when, instead of intervening on submissive subjects, the experiment becomes malleable and responsive, conforming to subjects' impressions of and aspirations for science? And what would happen if, instead of being unobtrusively observed, experimental researchers were involved in studying their own practices?

The term "response-ability" that we take up here is a normative ethical position that we locate in feminist, posthumanist, and agential realist work on how to act and think (and research) with and within more-than-human worlds (Haraway 2007; Barad 2008; Despret 2008). Donna Haraway describes response-ability as an imperative to cultivate "a radical ability to remember and feel what is going on and performing the epistemological, emotional, and technical work to respond practically" (2007, 75). Cultivating the capacity to respond is not only for the researcher as a way to "remember and feel" their entanglement—it necessarily means cultivating the entity under study's capacity to respond. Response-able research creates set-ups and questions in which its research subjects are interested, and which allow them to become interesting.

Performance as Method: Research Design

We align EXPF with recent moves in STS toward design, "Making and Doing" and a "collaborative turn."[3] Our move to engage experimentally with and manipulate the situated materials and embodied routines of research is an example of what Yelena Gluzman (2017) calls "Research as Theatre" (RaT). For Gluzman, RaT is a way of taking performativity seriously by engaging with the theatrical properties of research: "theatre performance is central to the performativity of scholarship, allowing scholars to engage not only with the *fact* of performativity, but rather with the concrete, situated *processes by which scholarship is materialized*" (Gluzman 2017, 2). The RaT perspective, with which we identify EXPF, opens STS methodologically to intervening by re-staging the social and material mechanisms of scientific practice.

We draw on and hope to magnify underexplored affinities between two approaches: ethnomethodology[4] and performance art. Ethnomethodology is compatible with theories of performativity in locating the reproduction of social worlds not just in discursive formations, but also in the everyday, the ephemeral, and the embodied. Harold Garfinkel's insistence on local, context-embedded meanings and practices is exemplified in his remarks on the "awesome phenomenon" of everyday indexical action and expression (Garfinkel 1967, 11). Indexicality, for Garfinkel, describes the "incarnate" relationship of an utterance or action to its accumulated and ever-unfolding context. Garfinkel references unavoidably indexical scientific language (5) to exemplify how an indexical expression requires its context, but for Garfinkel, there is no context-free, "objective" expression, only indexical expressions enacted in and enacting different contexts.

The ethnomethodological approach typically manages the problem of the colliding, entangled worlds of the analyst and the worlds they analyze by requiring what Garfinkel (1992, 2002) called "unique adequacy," in which the analyst comes as close as possible to being a member in the community of practice under study.[5] While of course we drew and built on the familiarity we had with one another's disciplinary practices, our orientation was not primarily one of "uniquely adequate," if detached, observation. We turned instead to Garfinkel's well-known "breaching experiments" (1967), which encouraged intervention as a mode of revealing social worlds.

Garfinkel's breaching experiments were exercises developed for his students that encouraged them to disrupt or "breach" ordinary social situations to illuminate unwritten rules and implicit structural features, or "background expectancies" (Garfinkel 1967, 36) of those situations. Examples of Garfinkel's breaching experiment "assignments" included having students haggle with grocery store clerks, repeatedly ask for clarification during small talk, and behave as a lodger in their own homes. The notion that breach, breakdown, or disruption of ordinary activity can reveal its implicit indexical properties both precedes and pervades Garfinkel's work,[6] but what distinguishes his breaching experiments is that they turn this principle into a method for making these implicit indexical features accessible to study. The disorder that a breach elicited would demonstrate how delicate "order" was, and how tenuous its maintenance. While breaching was developed mainly as a pedagogical tool and has never been the primary method for doing ethnomethodological analysis (Rawls 2002, 8), we maintain that breaching has empirical potential beyond its demonstrative function. We turn to another breaching tradition in performance art to further elaborate this potential as we take it up in our own project.

Performance studies makes something akin to a "breach" the rule rather than the exception, not only in its foregrounding of performative practices and embodied knowledges, but also in its simultaneous challenge to institutional categories of what counts as scholarship or research method.[7] We want to highlight compatibilities between Garfinkel's breaching experiments and avant-garde performance traditions that adopt strategies of disruption in order to reveal and critique aesthetic, political, and social norms by way of the formal conventions, routines, relations, and roles through which they are articulated. The performances of Adrian Piper are especially good examples of this, since they, like Garfinkel's breaching experiments, intervene in and reveal *indexicality* in the makeup of everyday reality. In drawing out these resonances, we aim to amplify the empirical functions of performance and the theatrical properties of research.

While it is possible to recognize reflexive strategies in many art movements (and individual works) on the basis that a movement or a piece reworks or challenges the style, technique, or strategies of its predecessors, we want to highlight a tradition in performance art that employs a strategy of

disrupting or rearranging interactional, institutional, or perceptual norms. Yoko Ono's "Cut Piece" (1965) and Marina Abramović's "Imponderabilia" (1977/2010) breach social norms of personal space, trust and intimacy by inviting (or impelling) audience members into novel intimate encounters, like being asked to cut, and entrusted with cutting, the clothing the performer is wearing (Ono 1965), or having to brush up against a performer's naked body in order to fit through a gallery's entrance (Abramović 1977). Adrian Piper's work, especially her "Catalysis" series (1972–73), not only enacts similar breaches but stages them in public and claims them as an empirical strategy. Piper's work stages direct encounters that call attention to the *here-and-now* of the cultural and perceptual resources activated in that situation, particularly resources used to enact and maintain categories of race and gender (Piper, 1989). The *here-and-now* out of which Piper composes her performances, she terms the "indexical present" (Piper 1990). Piper's indexicality resonates with Garfinkel's in its description of the relationship that holds together actions and their contexts and is likewise disrupted and revealed by breaching. However, Piper understands and accounts for the encounter differently.

Piper's "Catalysis" series explored the routines underlying xenophobia by disrupting perceptual and categorical boundaries as individuals encounter her in public. In these performances, Piper breached perceptual norms in public spaces by encountering their inhabitants in various states of abjection: her interventions included browsing through a bookstore after brining herself for days in a mixture of vinegar, eggs, and cod liver oil, walking across Union Square in Manhattan with her clothing covered in wet oil paint, and riding the bus with a red towel stuffed in her mouth (Lippard and Piper 1972). Piper does not understand these interventions primarily in terms of breaching behavioural norms, but rather as altering perceptual expectations. She writes of "Catalysis III" that in crossing Union Square covered in oil paint, she aimed "to behave normally and simply alter [her] physical appearance in the way that one would sculpturally alter an object with respect to material" (Piper 1996, 262). She writes of another performance, identifying it with her approach in "Catalysis": "Again, the idea is not to violate conventions of behavior but simply to set myself up as an altered object of perception, and explore those differences" (264). In the sense that she was manipulating variables of perceptual objects, Piper was working with methods not unlike those of a psychology experiment (though the variables she manipulated were embedded in a minimalist art tradition rather than a laboratory practice). To apply the terms of the shifting configurations of the psychology experiment in the nineteenth and twentieth centuries, Piper was not the subject and the observer (as with an introspectionist research configuration) but the observer and the "catalyzing" stimulus, and her "subject" was not simply the individuals she encountered, but the perceptual system she disrupted.

We locate EXPF as joining two empirical breaching traditions: an ethnomethodological intervention and a performance repertoire. Garfinkel and Piper each reveal the indexicality of everyday life/the indexical present through breaching, but their respective approaches suggest different configurations of who and what is being breached and where and how the indexical present is registered. Garfinkel asked students to take note of the responses of those in the situation, locating the breach in the activity and empowering the breacher with the empirical capacity to log its effects. When Garfinkel's student introduces a breach, they themselves remain unbreached, able to introduce the breach and catalogue what happens. Piper, on the other hand, did not describe these encounters primarily in terms of their effects on the people around her, saying she had *not* been "cataloging the kinds of reactions I have gotten" (Lippard and Piper 1972, 77). She describes, instead, a turn inward, becoming attuned, through these encounters, to "the boundaries of [her] own personality" (77). In Piper's indexical present, encounters are not reduced to responses to be catalogued but are

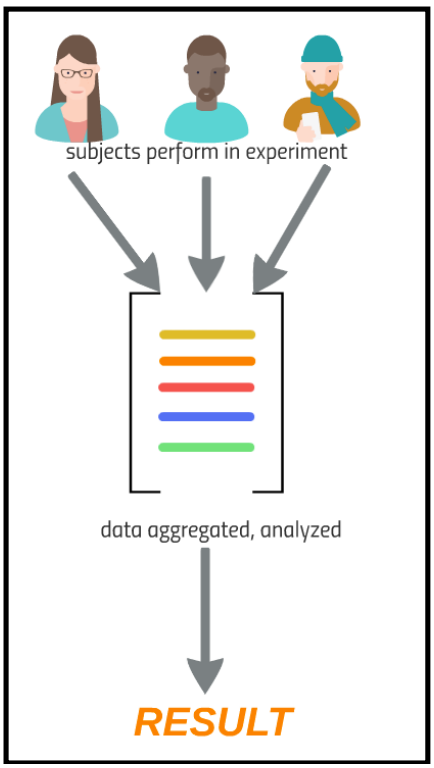
opportunities for phenomenological research on the limits of the socially constituted self. As catalyzing instrument and observer, Piper breaches not only the emerging context but also herself.

In EXPF, the system we aimed to breach was the agential-empirical structure of the experiment. Unlike the breaching experiments and interventions of Garfinkel and Piper, we aimed not to disrupt our participants' tacit expectations or perceptions directly but to channel these expectancies and experiences into a materially different relation with the experimental design. Bracketing any proper cognitive hypothesis, we instead made subjects' experiences and expectations—ordinarily ignored, redirected, or managed—into an independent variable, which would act upon the experiment's design, the dependent variable. The ethnographer and cognitive scientist, in the role of experimenters, had to make revisions following the subjects' suggestions, inverting the usual arrangement where the subject follows directions given by the experimenter in performing the experimental task.

Our breach of the experiment's agential-empirical structure rested on two connected features: the debrief and EXPF's iterative design. Debriefing after participation in psychological studies is an important convention, often required by and written explicitly into ethics protocols. The debrief typically involves the researchers asking the participant what they thought the experiment was testing before revealing its purpose and clarifying any questions they had (Kimmel 2004, 61–62). In addition to clarifying the experiment's purpose for ethical and educational purposes, this procedure may also provide valuable information to the researchers about participants' interpretation and experience of the experiment. This is often done to confirm that participants were *not* able to guess the experiment's true purpose: since participants are known to reshape their behaviour to conform to their interpretation of the experiment—part of the expectancy effect phenomenon called "demand characteristics"—hiding the experiment's true purpose can be considered methodologically critical. In fact, data from participants who guess the experiment's true purpose may even be removed from any analyses. Debriefing in typical cognitive psychology experiments, then, can have an ethical function for participants as well as an epistemic function for researchers in sorting good from potentially compromised data.

In EXPF, our lengthy debrief interview resisted the distinction between authentic and inauthentic data, instead aiming to channel the "distorting" power of the subject's impressions back into the experimental design, gathering impressions and suggestions that would become the revisions that we would implement before the next subject arrived. Debrief feedback became our key data and crucial mechanism for our performance, which encompassed the unfolding, iterative experimental activity as an agentially re-configured whole.

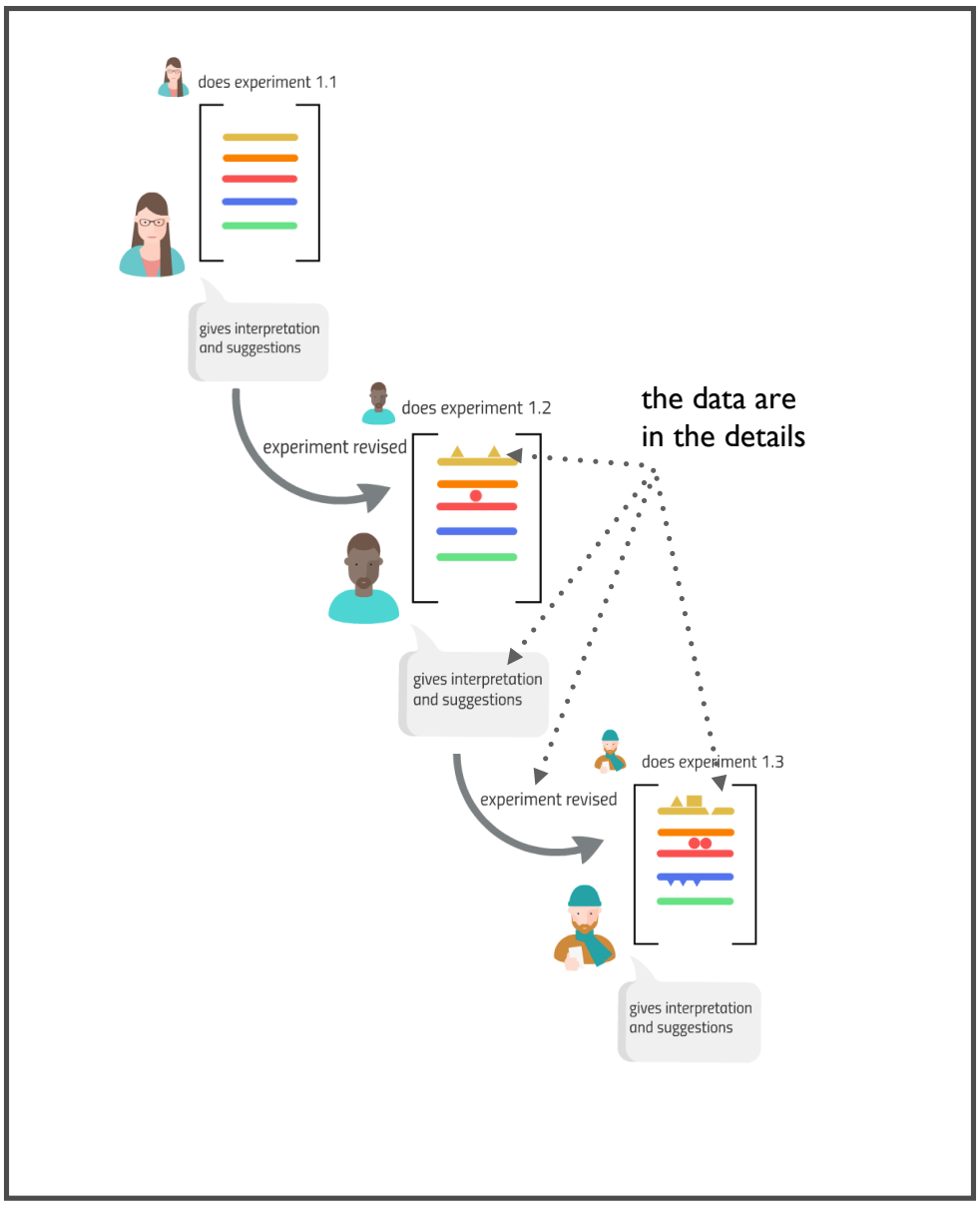
In a typical cognition experiment, all subjects run in the same experiment, with subjects distributed across two or more experimental conditions, data is aggregated, and, if all goes well, researchers get a statistically significant result that allows them to make a claim about cognition. In this model, *repetition* is what affords its statistical power to locate and stabilize cognitive processes inside of people. In contrast, for EXPF we turned to *iteration* to register indexical features of experiment that undergird its capacity for repetition.



Typical experimental design.

In order to do this, we found inspiration in research on cultural transmission that has adopted a novel methodology: "iterated learning." The iterated learning paradigm resembles the "telephone game" in which a message transforms as it is whispered around a circle. In an iterated learning experiment, the behaviour or messages produced by one subject are given to the next subject, creating " transmission chains" that distil the central features of social transmission and cultural evolution (Kirby 2014, 109). The way the learned behaviour (a drawing, gesture, language, song) transforms as it moves through the chain can help answer questions about how structure emerges in linguistic and cultural evolution, or about how constraints (such as learner's biases) shape transmission (109).

For EXPF, we adapted the structure of the "transmission chain" from iterated learning. Instead of transmitting a learned behaviour, our subjects encountered and revised the experimental design itself. After the first subject, each subsequent subject would experience an experiment that had been revised by the impressions of the subject who had come before. In this design, the experimental activity itself was rendered response-able to subjects' reported interpretations and suggested revisions. In rendering the experiment response-able in this way, the transformations to the experiment became our primary source of data, not about a cognitive process happening inside a person, but about performative entanglement within the experimental system.



EXPF Experimental Design. Klein and Marghetis (2015a).

Methods/Score

We recruited participants using the university's online system for recruiting and managing volunteers for psychology experiments, who can participate in exchange for academic credit. Our subject pool thus consisted of students who were taking lower division courses in psychology or cognitive science. We recruited a total of twelve subjects. The first six subjects participated in a first transmission chain. We then "re-set" the experiment to its "original" or base settings before recruiting and running another six subjects in a second transmission chain. For an ordinary psychology experiment, one relying on averaged electrophysiological or behavioural data, this would not be a sufficiently large sample. But as an experiment in response-ability, with the goal of enabling iterative transformation, we suspected this small sample would suffice to observe iterative change—and perhaps even the emergence of stable interpretations. By running more than one chain,

moreover, we hoped to illustrate the ways that seemingly inconsequential decisions can have surprisingly large implications for the eventual emergence of response-able entanglements.

When participants arrived at the lab, they completed a consent form.[8] We then brought them into the testing room, where they first filled out a short demographic questionnaire. Next, we had participants complete what appeared to be a standard computer-based cognitive psychology experiment which instructed them to respond to a set of stimulus images[9] by pressing keys and typing words. In the original setting of the experimental task, we followed the convention of having two "blocks" with a break in between, and in the second block had subjects inverse which keys signified like/dislike. We used ePrime, a software program for running experiments in cognitive psychology, to run the computerized experimental task, which included on-screen instructions.

Once this experiment-like experience ended, we had a debriefing/feedback session where we asked a subject for their thoughts on the experiment's purpose and design and entered their responses in a Google form. Whenever possible, this debrief was videotaped. In our debrief/feedback interview, we first asked subjects a set of general questions about their interpretation of the experiment's purpose and their performance:

1. What do you think was the purpose of this experiment? In other words, what question was it asking?
2. Do you think your behaviour helped you answer this question? (Y/N)
3. How do you think you behaved, relative to the question you think the experiment was designed to answer?

We then asked the subject for general suggestions on how to improve the experiment given their interpretation, followed by a set of questions about how to improve specific areas of the experiment. We asked them for feedback on how they might improve the demographic questionnaire, the instructions, the task, the stimuli, the layout of the space, and the experimenters. After this, we did a final, "genuine" debrief, revealing that we were interested in the expectations and experiences of experiment and explaining their place in the iterative structure. Ironically, because we followed the deceptive convention of keeping our true purpose hidden until the end, subjects were not aware of their structural power until they no longer had it.

After a subject left, we had to respond to and resolve their feedback before the next subject arrived. Our score required that we attempt to respond to all their suggestions, although this was balanced with the goal of generating an experience for the next subject that was not completely incoherent, unethical, dangerous, or otherwise unviable as a convincing performance of a "psychology experiment." We had around an hour to decide on the response and make the revisions to the experiment before the next subject arrived. Whenever possible, we took the subjects' suggestions literally (for instance, add more images of emotions; remove or modify a question in the questionnaire). Sometimes, though, because of ambiguity in the subject's responses, or because of limitations of the programming software, ethics protocol, or the short time we had to implement revisions, deciding how to respond involved compromise and consensus. Coming to a quick consensus on the revisions to be done became an important part of performing our score. These revision sessions were videotaped whenever possible[10] and their decisions logged in a document in each subject's folder.

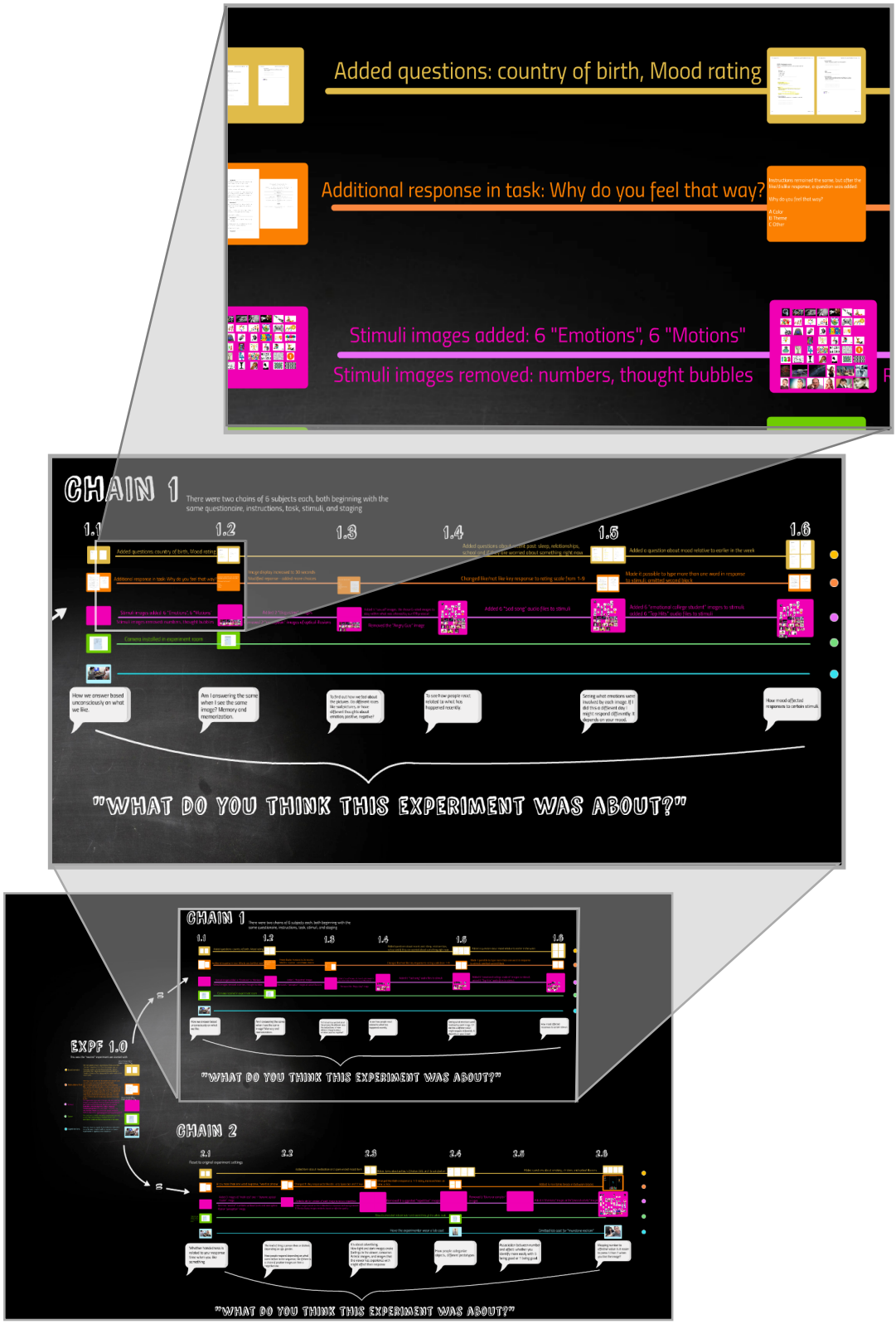
In order to keep track of revisions, we maintained a digital folder for each subject in the chain, containing sub-folders of materials for each revisable channel of the experiment (questionnaire, instructions, task, stimuli, space/layout, experimenters). Between participants, before beginning the process of revising the materials, we would duplicate the preceding participant's suite of folders. In each iteration's folder, we included a document outlining the specific changes that would be reflected in the next iteration (so that we would not have to search for the changes in order to find them).

In the following analysis, we offer two accounts of our performance which reflect the two configurations of breaching as a method introduced earlier. The first, following Garfinkel, locates the effects of the breach in the activity into which we intervened, and captures it by logging the responses of participants and the corresponding changes to the experimental materials. By foregrounding the revisions to the design, this account renders invisible the work of eliciting, negotiating, or implementing the revisions by which the experiment transformed. The second, informed by Piper, misses broad patterns and sequences of transformation, instead foregrounding moments in our encounters with subjects, with one another, and with the experimental apparatus, reflecting on how the breach operated on us as part of the experimental system.

What Happened? [I] Visualizing the Shape of EXPF

One of the ways we sought to capture and understand what happened in EXPF was by making a visualization that depicted EXPF's iterative structure and logged the changing shape of the experimental design. Using online Prezi software, we organized the interpretations and revisions into an interactive timeline for each chain. This visualization, pictured below (and available in its interactive format at http://prezi.com/9mvzknsutm2u/) registers the transformation to the experimental materials across each horizontal "channel," including zoomable versions of the revised materials (questionnaire, stimuli, etc.), for each iteration in the chain, grouped vertically. Between each set of materials runs text descriptions of the revisions made between each iteration, and a distilled version of each subject's reported interpretation of the experiment appears in a speech bubble below the corresponding iteration.

The visualization represents how the experiment changed as subjects experienced and revised it. As a catalogue of responses and revisions made through the entire performance, it can ground some broad observations about how experimental performances are maintained. It also allows us to speculate materially about the relationship between expectancy and performance, and between subjects and objects of cognition, in other words, the agential and empirical features of experiment.



Stills from visualization of EXPF, with magnified details. This visualization can be explored at http://prezi.com/9mvzknsutm2u and includes logs of revisions and zoomable versions of iterated experimental materials (Klein & Marghetis 2015b).

The first thing to note is that the two chains were very different despite beginning with the same settings. The first chain "became about" emotion and mood halfway through, winding its way through imagined research questions (and corresponding feedback and revision) about unconscious preferences, memory, race and response to images, and the effect of participants' recent life events on their affective response to images. The second chain began with an interpretation that the experiment was testing the relationship between handedness and speed of response, circled marketing and prototypes, and ended up cohering with two back-to-back interpretations about the mapping of affective value onto number ratings.

Chain 1, which "became about" mood, saw corresponding revisions made to three channels: the questionnaire, the stimuli, and the experimental task. The questionnaire in chain 1 grew from two to four pages, incorporating, at subjects' suggestion, items about country of birth and various questions about mood, and then questions about recent problems with sleep, relationships, and school. Subjects had us revise task parameters, adding a third response to the task: following the like/dislike and typing a word in response to an image was added the oddly reflexive question, "Why do you feel that way?" This question had its reflexiveness quashed (or rather, scientized) by the same subject's suggestion to add a multiple choice selection that accompanied it: "a) color, b) theme, c) other." The stimulus set ballooned, adding more items than were deleted, including incorporating images of "motions," "emotions," "disgusting" and "sexual" images, and even adding music into the stimuli, first "sad songs," then, presumably in response to the "sad songs" Google found for us being too unpopular, a selection of happier "top hits." It is possible to speculate that, for instance, the questionnaire had an important role in shaping the emergent coherence of the interpretation of mood. However, it's equally possible that a less obvious change, such as more time to look at the image before responding, could have informed the revision-interpretation arc. Instead of speculating about specific chains of influence, we suggest that the overall shape of the experiment, as a kind of behavioural sculpture, unleashes and thus demonstrates the range and power of the invisible traffic of expectancy.

The fact that the two chains transformed in completely different ways, along with subjects inferring different research questions, demonstrates that a diversity of interpretations are plausible in subjects' responses to any experiment, in spite of efforts to mask or obscure its research question. Materializing these interpretations by implementing subjects' suggestions led to new interpretations, and in each chain, a kind of interpretive coherence emerged, with previous interpretations beginning to re-occur, in whole or in part, in subsequent subjects' feedback. By asking subjects to respond to the experiment by making revisions, and in passing these modifications on, EXPF not only registered what participants thought the experiment was about, but also exposed and amplified how they imagined experimental design to work. The subjects became, indirectly, the designers of the experiment, and emergent coherences illuminated loops or eddies in the activity where some feature of the experiment caught the interest of the subjects.

What EXPF materialized was precisely the invisible indexical traffic that threatens the integrity of the typical experiment through dreaded "expectancy effects." Treating this traffic not as a threat, but as a constitutive agential feature of experiment, EXPF showed that hiding the purpose of an experiment doesn't stop interpretations from arising and may not stop these interpretations from mattering. EXPF's distinct chains and emergent coherence suggests that, rather than working to keep them separate, centring subjects' experiences of/in research design might have value for improving research design. While EXPF bracketed having a cognitive hypothesis, it made use of the routines and materials of experiments that ordinarily investigate basic cognitive processes in healthy

adults. EXPF's iterative feedback mechanism could, for instance, be adapted to help ground experimental design in the experiences of neurodivergent people, rather than being anchored to the premises of the scientists about the condition under study.

Garfinkel's breaching experiments were pedagogical exercises that functioned mostly to demonstrate the indexicality on which everyday action rests. The demonstration comes from observing and logging what happens, how a situation falls apart or transforms in response to a breach. Because EXPF was iterative, unlike Garfinkel's episodic breaching experiments, we were able to track transformation across the iterative chains. This iterativity renders EXPF as not only demonstrative but also speculative. Based on the observation of two distinct chains, we could ask what would it look like if we carried out ten or even one hundred chains. How many different interpretations of the original settings would that generate? Within each chain, subsequent subjects began to converge on a recurring interpretation near the third or fourth iteration—though different chains led to different interpretations—even though the score dictated that we respond only to the suggestions of the current subject. Could we then speculate about whether the emergence of interpretive coherence had a predictable shape, and if so, what would happen if the chains continued for twelve, twenty-four, fifty iterations? Based on observations of particular sequences of revision and interpretation, we could ask whether certain changes were more suggestive than others, even suggestive of a given interpretation, or whether a more powerful factor shaping interpretation came from the psychology or cognitive science courses the participant happened to be taking. These questions were primarily speculative and channelled the richness captured in the performance and organized by the visualization as a jumping off point to imagine how we might generalize beyond what our initial data could support.

Our visualization registers transformation by foregrounding the marks made on the materials proscribed by our revision "channels." By illustrating, through material traces, how our design unfolded iteratively, one effect of this visualization is to objectify experimental performativity. The visualization is a log, similar to the logs Garfinkel instructed his students to keep of their breaching experiments. The transformations logged in the visualization demonstrate how much "expectancy" may be holding up an experiment—how interactional resources or semiotic cues are drawn upon in constructing a legible experience of experiment. The transformations, in their variation and iterative emergent coherence, ground speculations about how that coherence emerges and about what it means. They also suggest that the relations between empiricism, subjectivity and experimentation can be reconfigured, such that other experiments and empirical configurations are possible.

What Happened? [II] Becoming Instruments

While the visualization simplifies the relationship between the participants' experience and the transformations to the experimental design, these transformations were never a direct imprint of participants' impressions and expectancies. To transform the experiment was *work*: We were responsible for carrying out EXPF, including eliciting feedback, deciding how to respond, and implementing the revisions, usually within the hour or so between participants. This work was located in interactions: between the experimenters and subjects, between one another, between ourselves and the material and performative infrastructure of the experiment we were working on. Many of these interactions were recorded on video; others are recalled with the help of the visualization, or from fieldnotes. The following account reports and reflects on the experience of enacting our breaching experiment. Informed by Adrian Piper's breaching method, we position

ourselves as catalytic agents but also as part of the system being breached and thus as instruments to register its effects. Here we describe the work of enabling response and becoming response-able, anchored in fieldnotes and recollections.

Deciding how to implement the subject's interpretations and suggestions was itself an act of interpretation and negotiation. Sometimes this was because the suggestions they made were ambiguous, and sometimes it was because they were impossible (time constraints, constraints of the program architecture, constraints of the IRB ethics agreement under which we operated, and so on). Becoming responsive forced us to continually and improvisationally negotiate material and temporal constraints in the experimental design under revision. This negotiation often involved confronting our own institutional and disciplinary roles; while the ethnographer of science and the cognitive scientist were, according to the score, equal co-conspirators in this performance, the reality of our disciplinary training and differential expertise meant that some negotiations (e.g., how to design new stimuli) were decided by appeals to authority or practicality. Becoming responsive thus forced us to continually confront the boundaries of our own score, by balancing between what was logistically possible, what was true to participants' feedback, and what was going to allow our performance to continue to "work."

Over the course of EXPF, some subjects suggested revisions that required compromise to implement given our time and technical constraints and our commitment to responding. In negotiating how to respond, we encountered how and where the experimental design was malleable, and how and where it was more inflexible. For instance, subject 1.4 suggested that we incorporate sad music videos into the stimuli set, but the E-Run software could not play video files. In order respond to their suggestion within the constraints of what we could accomplish with the program in around forty-five minutes, we compromised and used audio clips of "sad songs" rather than multimedia videos. At times, the workarounds we compromised on would introduce unsuggested changes, like when subject 2.5 suggested we add a "Tetris[11] break" between blocks of the experimental task. When we discovered the computer on which we were running the experiment couldn't download new software, we decided to instal the game on the computer in the adjacent testing room, which introduced a room change and additional experimenter-participant interactions that had not been part of the feedback. The work of responding to subjects' feedback revealed emergent hard and soft components of the experimental design. Sometimes, this process revealed a kind of stiffness or procedural inertia, while at other times the process revealed unanticipated porousness between parts of the design, inviting unplanned ripples into the performance. While encounters with the affordances and constraints of infrastructures of experimental design are already part of the everyday work of experimentation, EXPF reconfigured the conditions under which we had those encounters. The iterative aspect of EXPF meant that we encountered the design again and again in rapid succession, and the agential inversion of EXPF opened the horizon of possible changes beyond one constrained by the scientists' viewpoint.

In addition to putting us into an unpredictable creative interaction with the material infrastructure of the experiment, EXPF also necessitated revising our understanding of our score. In the following fieldnote excerpt, some of these contact points emerge. It begins by invoking our expectations and desires for EXPF in characterizing what "went well" about the first day of data collection, which included running two subjects, and goes on to discuss a conundrum that emerged regarding limits on our role as performers and experimenters.

> Things that went well—the first sub was very willing to talk and give her interpretations. We made changes as best we could. The second subject was less talkative but still made suggestions and changes—a procedure for how to debrief amongst ourselves and make the revisions before the next person is becoming clear.
>
> Interesting:
>
> The interpretations of the subs are not necessarily coherent, nor are the changes that they suggest. For instance, the first subject suggested that we add a multiple choice question into the task, to ask why the person liked or disliked the image; but did not explicitly suggest that we change the instructions (probably because the instructions prompt came before the task prompt). Not sure if we should go back and prompt her to standardize this. The 2nd sub's experiment was missing an instruction about this—I tried to smooth it over, but T says not to editorialize and just to let it be confusing if that's what it is. He says "it's their responsibility." At the same time, we are the ones mediating how to implement the changes. (SK, EXPF Fieldnotes, May 6, 2015)

Amid early uncertainty about how EXPF would work, a key concern was whether the participants would give us enough feedback to make iterative transformation possible. Their willingness to talk was key for our aim—having collected that talk, we were then able to try out how we would respond to that feedback in deciding what revisions to implement. It seemed, after the first day, that our debrief interview was working to elicit enough feedback, that is, enough feedback that we had changes to implement. The "procedure" that was becoming clear was that we would discuss how the subject debrief had gone, come to a consensus on what changes to make, summarize them in a word processing document, and then divide up the work of making the revisions.

The second part of the fieldnote goes on to describe a decision we faced about what to do if revisions introduce incoherence. The "incoherence" we are concerned with in the excerpt is not that we don't understand their interpretation, or that a given interpretation does not seem to follow from the previous one, but that following the participants' suggestions as given could mean the revisions could make the experiment incoherent for subsequent participants. Since a central goal of our performance was to invert the standard power relations *within a psychological experiment,* we were compelled to filter subjects' suggestions through our own perceptions of what changes were possible without destroying the performance's legibility *as an experiment*. Maintaining that legibility, however, did not mean that each iterated version of the experiment would have the internal coherence that is often a goal of "real" experimental design. The performance's debrief procedure, for instance, despite its exhaustive questions, couldn't ensure that the participant's interpretation would be reflected evenly in their suggested revisions, or that their revisions would never contradict one another. This fieldnote, therefore, expresses concern about the "incoherence" that would occur for the following participant if we followed their suggestion to change the parameters of the response to the images, without making an accompanying revision to the instructions. We faced a dilemma when introducing the next participant to a revised component of the experiment—if it is too confusing they might not know how to proceed. The fieldnote reports an attempt to smooth the explanation over when explaining the instructions to the next participant, but when one of us (SK) mentioned this to the other (TM), he responded that we should try "not to editorialize," that it was "their responsibility." This response invokes our role with respect to our score, to temper an impulse to manage the experience of the participants. It thus asserts that the responsibility of maintaining the

coherence of the experiment belongs to the participants, both as suggesters of revisions and as recipients of (potentially disjointed) iterated experimental materials. Allowing the participants to be "responsible" for the experiment's design, as suggested in this interaction, meant we should leave any emergent procedural contradictions to fester—if the experiment becomes incoherent to participants as a result, so be it. This dilemma exemplified the tensions we faced in performing and thus encountering our score. What was more important, adhering strictly to the score we had imagined for ourselves (by not filling in gaps in participants' feedback, not making any change that wasn't explicitly suggested), or responding in such a way that would enable EXPF to go on?

It turned out that neither holding subjects "responsible" (in TM's words), nor the complement of that goal, rendering the experiment response-able, were as straightforward as we had imagined. Ultimately, the iterations of the experiment didn't render it so incoherent that it stalled or stopped, but neither were we able to maintain the perfectly detached role invoked in the excerpt. This was because in giving participants agency over the experiment's design, we had to deal with their categories for experiencing the experiment, which did not always neatly line up with our conceptualization, with the categories embedded in our technologies, or with the boundaries imposed by our institution.

In the process of implementing revisions, we found that the infrastructure of the software did not abide by the same distinctions that we had devised for ourselves and presented to participants. We had divided the "task" and "instructions" into two separate channels/folders, with two distinct corresponding questions in our debrief interview. However, in responding to suggestions, we encountered mundane interdependencies in the infrastructure of E-Run that muddied this distinction.

E-Run administered the on-screen instructions, the stimuli, and the instruments for capturing different kinds of responses, and the interdependence or independence of these different components was not transparent to the participants. In order to revise a like/dislike key-press response into a 1-5 rating scale, for example, the new response keys would automatically be displayed in the on-screen instructions. For other parts of the experiment, the on-screen instructions were the only visible indicator of that task for the participant. For example, when participant 2.1 suggested we revise the task to make it possible to type more than one word in the text box, the only way to communicate that revision to the next participant was to change the on-screen instructions regarding how many words they could type ("a word" became "word or phrase"). The part of the program that defined how many words or characters could be typed into a field was invisible to participants. It was not until we were faced with the concrete task of making specific revisions that we encountered the gap between how we had conceptualized the experiment's channels, the way they were integrated by the software program, and by extension, how they were distinguished (or not) for participants. We had conceived of our role as one of mediation between the iterated materials of the experiment and the elicited feedback of participants, but becoming response-able put us into unexpected positions and encounters. In this example, we encountered the software infrastructure as a mediating instrument between our idealized performance score and the emergent, local categories of the participants in their given iteration.

"Making the Call"

These examples of becoming response-able in EXPF focused on our encounters with components internal to the experimental activity—between a participant's interpretation and the constraints of the materials we were working with, or between our conceptualization of the "channels" of the experiment and the categories and coherences that emerged for participants. In addition to those encounters, some suggestions and contingencies also forced us to contend with ethical and institutional boundaries of our experiment-performance. In the following fieldnote, one of us (SK) describes a decision to ignore part of a participant's suggestion because of the risk of introducing certain "dangerous" images into our stimuli.

> The 2nd sub didn't like the optical illusion images, and since she thought we were investigating something to do with memory, she told us to remove them. She suggested we replace them with images of disgusting bugs—we actually decided not to use bug images but instead the images that came up in Google when we search "disgusting" that don't include bugs, in case people have phobias of bugs. Making the call of what is ok/isn't ok is an interesting limit. (SK, EXPF Fieldnotes, May 6, 2015)

We decided against using images of "disgusting bugs" because we did not want to introduce potentially upsetting or traumatizing images into the stimulus set. We had made a similar decision in the first chain when a subject suggested we add "more sexual images." Our compromise was to omit any graphic sexual images from our image search and select only G-rated images. Images of "disgusting bugs" or "sexual images" risked falling outside the bounds of what our ethics approval allowed. These decisions differed from the compromises described in the previous section because the constraint was not technical or originating from our vision of how our score would work. These suggestions, which were technically simple to implement, forced us to bump up against institutionally imposed ethical constraints about what should and shouldn't happen in a cognition experiment, or more accurately, what can happen in a cognition experiment without submitting a new application to our university's Institutional Review Board. What materialized in response to these suggestions was our own cautious and conservative interpretation of our institution's definition of potential harm, or "making the call of what is ok/isn't ok." In other words, our performance's transformation was also shaped by institutional limits, insofar as our decisions reproduced them. EXPF could not, in fact, become just anything. The sudden appearance of the institution's vision of experiment in our response to any slight suggestion of "riskiness" illuminates the broader institutional context in which research regularly operates, with its own set and scale of norms and rules. As anyone who has had to revise their research protocol knows, procedural inertia functions from the institutional scale too, making particular research configurations and interventions more and less possible.

At the same time as we were carrying out a performance aiming to open experiment to iterative transformation, we wound up enforcing our institution's vision of what constituted a low-risk research encounter. Our ability to suddenly switch gears from responsive implementers to institutional enforcers is somehow poignant, revealing how rooted our own responses were in the broader system we were working to breach.

Breaching the agential structure of the experiment, of which we were a part, meant breaching both ways: we breached the experiment, and the experiment breached us. This account, anchored in reflection and fieldnotes, is informed by Piper's "catalytic" approach to breaching, which positions the performer inside the system of perception that she breaches, assigning her the roles of catalyst and observer, and enabling her to observe not only the ripples in the situation but "the boundaries of [her] own personality" (Lippard and Piper 1972, 77). With EXPF, we breached the conventional structure of the experiment, and we were also inside of the system that we breached, enabling us to meet the boundaries of our materials, of our performance score, and of our respective, situated socialization as researchers. Making EXPF response-able entailed opening the experimental apparatus to reorganization by those experiencing it from the inside. Becoming the instruments of that transformation forced us to encounter the indexical infrastructures internal and external to the experiment, including interactional routines, software, hardware, and ethical and institutional norms, which are co-authors of research design.

Conclusion: Indexicality and Response-ability for Interdisciplinary Collaboration

EXPF breached the performative structure of "experiment" by rearranging its agential configuration in order to register and amplify its invisible constitutive contextual traffic—or as Piper and Garfinkel might have termed it, its indexicality. Our intervention was not episodic, like Garfinkel's breaching experiments and Piper's Catalysis, but iterative. This allowed us to create iterative chains of heres-and-nows that were mutually and sequentially implicated. We have tried here to account for what happened in these iterative chains in two different ways. Each provides a way to slice through the indexicality that EXPF made available. Looking at EXPF as a kind of material-semiotic sculpture, as conveyed by our digital visualization, presents a clean, ideal version of EXPF as we imagined it: a catalogue of iterated impressions and transformations to the performative structure of the experiment, leaving its marks on the shape of the activity and its accompanying material remains. This sculptural representation highlights the richness of the indexical resources that hold up an experiment, invites questions about the origins and implications of the coherence that emerges in iterative research design, and even suggests that iterative, subject-centred design may have empirical potential as a research practice.

What the visualization masks, however, is the complex work of becoming response-able. This was where we engaged with—sometimes resisting, sometimes reinforcing—the tangle of relations and infrastructures and norms that enable and constrain the performance of a scientific experiment. As response-able implementers, we occupied a new relationship to the experimental apparatus, one that mediated between subjects and researchers. This forced us to repeatedly and improvisationally wrestle with the experiment's material, conceptual, and institutional constraints as well as with our own expectations as researchers with differing histories of engagement with experiment. Each decision, each struggle, and each compromise was for us a different "here-and-now" of experimental performativity, rendering sensible unexpected affordances, obstacles, and interdependencies in what might otherwise be an opaque and unquestioned procedure. In the encounter between responsive experiment and response-able subject, we became instruments of creative response.

Like good experimentalists and performers, we hoped that our design would "work," meaning both that each iteration would serve as a convincing instance of a psychological experiment and that repeated iterations would gradually reveal the background expectancies that undergird the very

possibility of psychological experimentation. Focusing on these transformations materialized the invisible subjective traffic of experience and expectancy and allowed us to speculate about what transformations and experiments are even possible. But it was also in encountering the experiment's stiffness, inertia, and resistance—the limits in its indexical traffic—that we could "remember and feel what [was] going on." We were forced to confront—in our materials, routines, and selves—the boundaries of the system we were aiming to breach. With each iteration there was the danger that the subject's suggestions would cause a chain to "collapse"—that is, to produce a new experiment that was impossible, ridiculous, unethical, or otherwise impossible to implement.

But this danger of "failing" was also the source of EXPF's power. Response-ability, as an ethic located in posthumanist frameworks, is a revision of "responsibility," which is bound up with, and assumes, a rational, liberal "willful human subject" and a separate entity for which they are responsible (Barad 2008, 172). Response-ability, in contrast, does not presume the existence of subjects and objects but treats them as emergent properties of what Barad calls an "intra-action" or what Haraway calls "becoming-with" (Haraway 2007, 2016). EXPF explored what it might mean to implement response-ability within a responsible research apparatus. We aimed to "remember and feel what is going on" and "work to respond practically" (Haraway 2007, 75) in an apparatus that, by design, both enacts rational human subjects and extracts cognitive objects from them. In the instances where responding faithfully to a subject's suggestion would not have been disciplinarily or institutionally acceptable—for instance, for ethical reasons—we were suspended between a local response-ability on the one hand and an institutional responsibility on the other. Rather than seeing these moments as failures because we faced obstacles to implementing our score, we understand these moments as places where, by bumping up against its limits, the performance illuminated the infrastructural and institutional power structures that both enable and constrain the production of psychological and cognitive knowledge objects.

EXPF was an experiment in cultivating response-ability for research subjects and in experimental design, but it was also an experiment in enacting responsive relationships between ethnographers of science and the scientists they study. When an ethnographer of cognitive science—the first author—began to collaborate with a cognitive scientist—the second author—that meant entwining our divergent motivations, concerns, and particular disciplinary subjects and objects. As a structured activity that is already built to be taken apart and reassembled, experiment lent itself well as a medium, object, and frame for our collaboration. For the ethnographer, this collaboration was and continues to be an opportunity to explore what enables experimental methods to travel in time and space, to consider the conceptual and practical limits of experiment, and to develop modes of engaging research practice that open its participants to co-transformation. For the cognitive scientist, the performance dovetailed with his interest in the emergence of stable knowledge from messy social interactions, and thus gave him an opportunity to think about his own epistemic practices—experiment design, data collection, statistical analysis—as yet another site in which stable facts emerge from material and social entanglements.

Our collaboration was a way to "stay with the trouble," to use Haraway's well-known expression. We began by working on a bit of localized "trouble" for experimental psychologists: the problem of expectancy effects. We inverted the experiment so that expectancy, instead of being managed, minimized, or bracketed, became something to which we were compelled to respond. Turning experiment "inside out" both meant returning agency to its subjects, and *at the same time* becoming part of a different kind of instrument—one that is no longer singularly and inwardly focused on its objects, but instead telescopes outward from the proximate experimental performance to the

material and social entanglements that ground it. This allowed us to reimagine experiment from a control-centred practice, into a flexible, response-centred practice, capable of registering and holding on to multiple scales at once.

This approach has implications for several ongoing conversations about reflexivity in research methods and interdisciplinarity. First, EXPF responds to calls for reflexivity in STS methods; second, it offers an alternative interdisciplinary relation between performance studies and cognitive science; and third, it intervenes, empirically and methodologically, in conversations about methodological entanglement and context-sensitivity within experimental psychology and cognitive science research. Each of these is premised on response-ability: between ethnographer and cognitive scientist, between scientific and artistic performance traditions, and between experimenters and research subjects.

EXPF responds to calls for reflexivity in STS methods by starting from the premise of methodological entanglement—making performances with scientists rather than bracketing those entanglements out. Our collaboration thrust us both into a new and precarious version of "unique adequacy" that did not take the stability of experimental methods as a given. The destabilization of the expert practice through breaching made the possibility of failure imminent but at the same time made it possible to inhabit and orient to experimental design in new ways. Empirically, this helped to illuminate the indexical structure of experiment, but it also opens up methodological possibilities by radically opening disciplinary practices to one another.

Similarly, EXPF offers an alternative model for performers and performance scholars to collaborate with cognitive scientists. Much work at the intersection of performance studies and the cognitive sciences aims to enact "a friendly symbiosis with cognitive science" (McConachie 2006, xiv; see also Blair, 2008; Cook 2007). In spite of criticisms of reductionism and hierarchical scientism, the imperative to pursue this symbiosis remains strong (Shaughnessy 2013). This symbiosis is enacted largely as an exchange, whereby science provides frameworks, paradigms, and authoritative weight, and performance provides vivid and visceral materiality. This has two related implications: the bodies and practices of *science* disappear, while the embodied knowledges of performance continue to be institutionally undervalued. Ironically, this exchange arrangement risks re-inscribing the mind-body dualism that much of the work on embodiment in both performance studies and cognitive science aims to undo. Our intervention attempted to resist this re-inscription by holding on to the embodied performances of science and scientists. Making performances together, and working with and on our own situated activity, can disrupt the dualistic exchange model of interdisciplinarity that often characterizes collaborations between cognitive science and performance. Remembering the bodies and performances of scientists is a levelling mechanism that makes it possible to share the onto-epistemic stage. Our approach thus explores an alternative model of interdisciplinarity that does not begin and end with an exchange of findings, frameworks, or fieldsites, but which is premised on making and inhabiting a performance together, thus becoming response-able to one another and entangling the methods by which we perform research.

Finally, the kind of response-ability that we cultivate in EXPF has implications for research practice in the psychological and cognitive sciences. Researchers in these fields are increasingly aware that the situated materials and practices of doing research with and on other humans matter, including in ways that are not yet understood. Considering cognitive scientific practices as central and integrally intertwined in the production of scientific findings has the potential to help these fields collect better data by shedding light on unconsidered variables and sources of bias. More ambitiously, we hope

that it could shape the direction of research questions or complicate underlying assumptions about the phenomena under investigation. The response-able design of EXPF could be adapted to help illuminate and remediate Eurocentric cognitive constructs, or neurotypical researchers' embedded assumptions about the cognition of neurodivergent people. Adapting this iterative approach could help anchor the research design in the experiences of those being studied, while simultaneously revealing the researchers' varied resources: implicit assumptions, procedural inertias, and institutional and technological infrastructures.

Ultimately we are not suggesting that performance-collaboration should displace classical experimental or ethnographic methods, or that it is the best or only way to bring performance and cognitive science together. Rather, we are arguing that, by adding it to our toolboxes, performance-collaboration has the potential to reshape the methods we use alongside it. Disciplinary frameworks, habits, and instruments can be re-assembled to be more dynamically responsive to the complex worlds they investigate. In taking performativity seriously by making performances together, we can develop research designs that "remember and feel" the ways that we are already acting together.

Notes

1. For laboratory studies of scientific practice see especially Latour and Woolgar (1979), Lynch (1979), Knorr Cetina (1981), Collins (1985), and Alac (2011). For scientific performativity, see especially Pickering (1995), Mol (2002), Barad (2008), and Law (2008).

2. Karen Barad's use of apparatus (2007) has been helpful for coming to grips with the cognitive psychology experiment as a material-semiotic arrangement through which a cognitive phenomenon is produced and the observer/observed, subject/object relational entities emerge. The layering of cognitive and social science apparatuses in this project takes advantage of the shared material-semiotic resources of human "subjects" and "researchers" to intervene in the spaces and practices between observers and observed.

3. These moves are characterized by a recognition among STS scholars that engagement with scientists need not be a choice between being distanced or oppositional (Klein and Gluzman 2015; Downey and Zuiderent-Jerak 2016). In locating EXPF in the midst of this collaborative turn, it joins an emerging cluster of projects between the arts, social sciences, and the cognitive/psychological/neuro-sciences aimed at exploring the boundaries and possibilities for interdisciplinarity. See, for example, Callard (2014) and Callard and Fitzgerald (2015) on collaboration across the social and neurosciences; and Zuiderent-Jerak (2015) on situated intervention in health care and the collaborative research projects between artists, scientists, and anthropologists of the Aarhus University Research on the Anthropocene (AURA) group led by Anna Tsing.

4. Ethnomethodology offers an orientation to situated action that can help us "remember and feel what is going on" in the context of the cognition experiment by treating rationality and objectivity as local and practical accomplishments rather than inherent human capacities.

5. There is a presumption here that good social research necessitates transforming the analyst, but that it leaves the research site for all intents and purposes intact. This presumption partially reproduces some of the boundaries between observer and observed/authentic and inauthentic phenomena that underlie most empirical claims, even as ethnomethodology challenges the distinction between subject and object.

6. A predecessor and contemporary of Garfinkel who was concerned with the empirical function of breakdown for revealing the structure of social life was Erving Goffman. In particular, Goffman's early studies of mental institutions and other stigmatized groups provided examples of interactional breakdown and stigma around which he built his dramaturgical theory of the self, which seeks to maintain "face" and avoid breakdown along with its damaging social repercussions.

7. For foundational work on performance as an intervention in the academy, see Conquergood (2002) and Taylor (2003), and moves to "Performance as Research" and "Practice and Research" in performance studies and theatre studies programs.

8. The consent form was a static part of EXPF, because the procedures of EXPF fit within the description of a computer-based cognition experiment in the "blanket" consent form that the lab used to cover a number of experiments implemented by its members.

9. We began both chains with the same starting set of image stimuli, which are available as part of the visualization here: http://prezi.com/9mvzknsutm2u/. We wanted the "base" stimuli to have the potential to evoke different interpretations, but not to overdetermine these interpretations by having them share obvious conceptual or physical characteristics or be otherwise categorized in terms of a single recognizable cognitive construct. Our solution to this problem was to create a script for ourselves on how to use Google image search to select images. In a move that served dual purposes of obscuring any single cognitive hypothesis in being cheekily self-referential, we selected six search terms from the psychology department's web page listing faculty research interests. These search terms were "addiction," "control," "child development," "language," "learning," "number," and "perception." Upon entering each of these into Google image search, we chose the first distinct six images for each term (no duplicates or near duplicates) that had no written text and were not graphic or predictably disturbing. This script also provided a procedure to follow later on when revising the stimuli in response to feedback, only extracting search terms from subjects' language.

10. We had planned to videotape each debrief and each revision session (though our camera arrangement and taping protocol was subject to revision). In many instances, we videotaped the debrief with the subject and some or all of the revision process. Exceptions included when a subject did not consent be videotaping, when a subject revised the placement and use of the camera, and when the battery ran out of power.

11. A popular, classic block stacking computer game.

References

Abramović, Marina. (1977) 2010. *Imponderabilia*, Museum of the Galleria d'Arte Moderna Bologna/MOMA, New York.

Alač, Morana. 2011. *Handling Digital Brains: A Laboratory Study of Multimodal Semiotic Interaction in the Age of Computers*. Inside Technology. Cambridge, MA: MIT Press.

Ashmore, Malcolm. 1989. *The Reflexive Thesis: Wrighting Sociology of Scientific Knowledge*. Chicago: University of Chicago Press.

Barad, Karen. 2007. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham, NC: Duke University Press.

Biagioli, Mario. 1995. "Tacit Knowledge, Courtliness and the Scientist's Body." In *Choreographing History,* edited by S. L. Foster, 69–81. Bloomington and Indianapolis: Indiana University Press.

Blair, Rhonda. 2008. *The Actor, Image, and Action: Acting and Cognitive Neuroscience*. London: Routledge.

Bloor, David. 1976. "The Strong Programme in the Sociology of Knowledge." in *Knowledge and Social Imagery,* 1–19. London, UK: Routledge & K. Paul.

Bröder, Arndt. 1998. "Deception Can Be Acceptable: Comment on Ortmann and Hertwig." *American Psychologist* 53: 805–806.

Callard, Felicity. 2014. "Hubbub: Troubling Rest through Experimental Entanglements." *The Lancet* 384 (9957): 1839.

Callard, Felicity, and Des Fitzgerald. 2015. *Rethinking Interdisciplinarity across the Social Sciences and Neurosciences*. London: Palgrave Macmillan.

Collins, Harry, and Trevor Pinch. 1982. *Frames of Meaning: The Social Construction of Extraordinary Science*. London: Routledge and Kegan Paul.

Conquergood, Dwight. 2002. "Performance Studies: Interventions and Radical Research." *TDR/The Drama Review* 46 (2): 145–56.

Danziger, Kurt. 1994. *Constructing the Subject: Historical Origins of Psychological Research*. Cambridge, UK: Cambridge University Press.

de Rijke, Sarah, and Anne Beaulieu. 2014. "Networked Neuroscience: Brain Scans and Visual Knowing at the Intersection of Atlases and Databases." In *Representation in Scientific Practice Revisited*, edited by C. Coopmans, M. Lynch, and S. Woolgar, 131–52. Cambridge, MA: MIT Press.

Despret, Vinciane. 2008. "The Becomings of Subjectivity in Animal Worlds." *Subjectivity* 23 (1): 123–39.

Downey, Gary, and Teun Zuiderent-Jerak. 2016. "Making and Doing: Engagement and Reflexive Learning in STS." In *The Handbook of Science and Technology Studies,* edited by Ulrike Felt, Rayvon Fouché, Clark A. Miller, and Laurel Smith-Doerr*,* 223–52. Cambridge, MA: MIT Press.

Dumit, Joseph. 2004. *Picturing Personhood: Brain Scans and Biomedical Identity*. Princeton: Princeton University Press.

Garfinkel, Harold. 1967. *Studies in Ethnomethodology*. Englewood Cliffs, NJ: Prentice Hall.

Garfinkel, Harold, and D. Lawrence Wieder. 1992. "Two Incommensurable, Asymmetrically Alternate Technologies of Social Analysis." In *Text in Context: Studies in Ethnomethodology*, edited by G. Watson and R. M. Seiler, 175–206. Thousand Oaks: Sage.

Garfinkel, Harold. 2002. *Ethnomethodology's Program: Working out Durkheim's Aphorism*. Edited by Anne Warfield Rawls. New York: Rowman & Littlefield.

Gluzman, Yelena. Forthcoming. "Research as Theatre (RaT): Positioning Theatre at the Centre of PaR and PaR at the Centre of the Academy." In *Performance as Research: Knowledge, Methods, Impact*, edited by Annette Arlander, Bruce Barton, Melanie Dreyer-Lude, and Ben Spatz. Routledge.

Goffman, Erving. 1959. *The Presentation of Self in Everyday Life*. New York: Doubleday Anchor Books.

Haraway, Donna. 1988. "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective." *Feminist Studies* 14 (3): 575–99.

Haraway, Donna. J. 2008. *When Species Meet*. Minneapolis: University of Minnesota Press.

Haraway, Donna. J. 2016. *Staying with the Trouble: Making Kin in the Chthulucene*. Durham, NC: Duke University Press.

Herzig, Rebecca. 2004. "On Performance, Productivity, and Vocabularies of Motive in Recent Studies of Science." *Feminist Theory* 5 (2): 127–47.

Kimmel Allan J. 2004. "Ethical Issues in Social Psychology Research." In *The Sage Handbook of Methods in Social Psychology*, edited by C. Sansone, C. C. Morf, and A.T. Panter, 45–69. Thousand Oaks: Sage.

Kirby, Simon, Tom Griffiths, and Kenny Smith. 2014. "Iterated Learning and the Evolution of Language." *Current Opinion in Neurobiology*, 28, 108–14.

Klein, Sarah. 2014. "Don't Blink: Performing Experimental Time in the Brain Laboratory." *Performance Research* 19 (3): 88–92.

Klein, Sarah, & Yelena Gluzman. 2015 "Experimental Methods." *2015 STS Making and Doing Program*. http://www.4sonline.org/md/post/experimental_methods.

Klein, Sarah, and Tyler Marghetis. 2015a. *EXPF: Shaping Experiment*. Experiment-Performance, San Diego, California.

Klein, Sarah, and Tyler Marghetis. 2015b. *EXPF: Shaping Experiment*. https://prezi.com/l1gg0gmectou.

Latour, Bruno. 2005. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Hampshire: Oxford University Press.
Law, John. 2008. On Sociology and STS. *Sociological Review* 56 (4): 623–49.
Law, John, and John Urry. 2004. "Enacting the Social." *Economy and Society* 33, no. 3: 390–410.
Lawrence, Christopher, and Steven Shapin, eds. 1998. *Science Incarnate: Historical Embodiments of Natural Knowledge*. Chicago: University of Chicago Press.
Lippard, Lucy, and Adrian Piper. 1972. "Catalysis: An Interview with Adrian Piper." *The Drama Review: TDR* 16 (1): 76–78.
Martin, Emily. 2013. "The Potentiality of Ethnography and the Limits of Affect Theory." *Current Anthropology* 54, S7: S149–158.
McConachie, Bruce, and F. Elizabeth Hart, eds. 2010. *Performance and Cognition: Theatre Studies and the Cognitive Turn*. London: Routledge.
Morawski, Jill. 2015. "Epistemological Dizziness in the Psychology Laboratory: Lively Subjects, Anxious Experimenters, and Experimental Relations, 1950–1970." *Isis* 106 (3): 567–97.
Morawski, Jill G. 2005. "Reflexivity and the Psychologist." *History of the Human Sciences* 18 (4): 77–105.
Ono, Yoko. 1964. Cut Piece, Yamaichi Concert Hall, Kyoto, Japan.
Orne, Martin T. 1962. "On the Social Psychology of the Psychological Experiment: With Particular Reference to Demand Characteristics and Their Implications." *American Psychologist* 17 (11): 776.
Ortmann, Andreas, and Ralph Hertwig. 1998. "The Question Remains: Is Deception Acceptable?" *American Psychologist* 53 (7): 806–807.
Piper, Adrian. 1970–1971. *Catalysis Series*. New York.
Piper, Adrian. 1986. *Cornered*. John Weber Gallery, New York.
Piper, Adrian. 1996. "Xenophobia and the Indexical Present II: Lecture (1992)." In *Out of Order, Out of Sight,* Vol. 1*, Selected Writings in Meta-Art 1968–1992*, 255–74. Cambridge, MA: MIT Press.
Rawls, Anne Warfield. 2002. "Introduction." In *Ethnomethodology's Program: Working out Durkheim's Aphorism,* by Harold Garfinkel, 1–64. Edited by Anne Warfield Rawls. New York: Rowman & Littlefield.
Rosenthal, R. 2009. "Interpersonal Expectations: Effects of the Experimenter's Hypothesis." In *Artifacts in Behavioral Research*, edited by Robert Rosenthal and Ralph Rosnow, 138–210. Oxford: Oxford University Press.
Rosenthal, Robert. 1963. "On the Social Psychology of the Psychological Experiment: 1, 2 The Experimenter's Hypothesis As Unintended Determinant of Experimental Results." *American Scientist* 51 (2): 268–83.
Rosenthal, Robert, and Kermit L. Fode. 1963. The Effect of Experimenter Bias on the Performance of the Albino Rat. *Systems Research and Behavioral Science* 8 (3): 183–89.
Rosenthal, Robert, and Lenore Jacobson. 1968. *Pygmalion in the Classroom*. New York: Holt, Rinehart & Winston.
Shaughnessy, Nicola. 2013. "Introduction: Operating in Science Theatres." In *Affective Performance and Cognitive Science: Body, Brain and Being,* edited by N. Shaughnessy, 1–24. London: Bloomsbury.
Star, Susan Leigh. 1983. "Simplification in Scientific Work: An Example from Neuroscience Research." *Social Studies of Science* 13 (2): 205–28.
Suchman, Lucy. 2007. *Human-Machine Reconfigurations: Plans and Situated Actions*. Cambridge, England: Cambridge University Press.
Suchman, Lucy. 2014. "Reconfiguring Practices." In *Representation in Scientific Practice Revisited*, edited by C. Coopmans, M. Lynch, and S. Woolgar, 333–35. Cambridge, MA: MIT Press.

Taylor, Diana. 2003. *The Archive and the Repertoire: Performing Cultural Memory in the Americas*. Durham, NC: Duke University Press.

Wood, Lisa, Juliane Jarke, and Lucas Introna. 2016. "Considering the Performativity of Our Own Research Practices." Panel presented at the *4S/EASST 2016 Conference*. http://www.sts2016bcn.org/sessions/t014-4-considering-the-performativity-of-our-own-research-practices/.

Woolgar, Steve. ed. 1988. *Knowledge and Reflexivity: New Frontiers in the Sociology of Knowledge*. Thousand Oaks: Sage.

Zuiderent-Jerak, Teun. 2015. *Situated Intervention: Sociological Experiments in Health Care*. Cambridge, MA: MIT Press.

Glass Bellies and Artificial Wombs: Gender, Science, and Reproduction in Early Modern Alchemical Performance

Jennifer M. Park

How can a man tell "signs of breeding" (Webster 1990, 2.2.2)?[1] In John Webster's Jacobean tragedy *The Duchess of Malfi*, Bosola, a hired spy, attempts to figure out if the titular character, the Duchess of Malfi, is pregnant. That the duchess's state remains a secret prompts Bosola to reference the voyeuristic properties of glassmaking.

> BOSOLA
>
> There was a young waiting-woman, had a monstrous desire to see the glass-house. . . . And it was only to know what strange instrument it was, should swell up a glass to the fashion of a woman's belly.
>
> OLD LADY
>
> I will hear no more of the glass-house, you are still abusing women! (2.2.5–6, 8–12)

By bringing together the components of the artisanal science of glassmaking—namely, the *glass-house*, or the site in which glass and glass products were produced, and the *glass vessel*, one such glass product—Bosola's fantasy depicts the means for voyeuristic male viewing of the inside of the female body, predicated on his own "monstrous desire to see." His voyeuristic impulse at this moment is knowingly embedded in the overlap between theatrical and scientific viewing, gesturing at once to the performative disclosure of the duchess's state of pregnancy for Webster's audience, and the early "scientific looking" (Tiffany Watt Smith 2014, 7) of artisanal glassmaking and experimentation.

The early moderns would have found the duchess's "glass belly," and the specifically masculine desire to see the female interior, literalized in the glass vessels that comprised early scientific inquiry and "laboratory" experimentation.[2] Bonnie Lander Johnson and Bethany Dubow examine the allegories of creation latent in glassmakers' practices prompted by Webster's glassmaking references in *The Duchess of Malfi* and other works. According to Johnson and Dubow, for Webster especially, the glasshouse was "an arena in which man wrestled with, and hoped to outrival, the generative powers of nature" (Johnson and Dubow 2017, 117), and they locate in Bosola's glassblowing metaphor the "fantasy of asexual reproduction whereby the male glassmaker is the sole participant in the creation (and inflation) of his glass vessel" (Johnson and Dubow 2017, 115). Indeed, Webster draws on the metaphor of the body as made of glass in various works (Johnson and Dubow 2017, 108; Reiss 2003),[3] which serves additionally to strengthen the connection between specifically female bodies and glass vessels, as in the bawdy reference to the male glassblower's "instrument" which is used to "swell up a glass to the fashion of a woman's belly." I am interested in pushing the literary metaphor further, to consider the ways in which the metaphorical glass belly did not remain in the realm of the symbolic, but was actively used in scientific—and primarily alchemical—endeavour to actualize those symbolic purposes: that is to say, how the metaphorical significance of glass vessels informed their use as literal or physical *replicas* of women's bodies, and how these gendered metaphors became embedded in scientific practices and objects in ways that also made and remade gender (Haraway 2004, 227).

Jennifer M. Park is assistant professor of English at the University of North Carolina, Greensboro.

An interesting precursor to the "birth of the clinic," the voyeuristic possibilities afforded by the glass vessel are in dialogue with the practices of medieval and early modern anatomy which aimed to expose what lay hidden in the body. In a sense, they literalized early on the dissective impulse of Michel Foucault's medical gaze, which penetrates beyond the surface of the skin to read the underlying truth of the body otherwise hidden from view: that "opaque mass in which secrets, invisible lesions, and the very mystery of origins lie hidden" (Foucault 2003, 150). But it is especially this latter secret, the mystery of origins, which informed the medically performative *masculinist* inquiry into opening up the female womb for display (Park 2006). The early modern obsession with the gendered secrets of the woman's womb, in tandem with the specularity of scientific and proto-scientific practices of the early modern period, informs the issues raised by the woman's body imagined as a glass vessel and the voyeuristic and intrusive nature of Bosola's wish. It is thus that the glass vessel, or the glass belly, read as a symbol of the pregnant womb made transparent, stages the gendered dimensions of early modern scientific practices.

As feminist scholars have pointed out, women's bodies were metaphorized throughout the history of science and medicine, particularly in relation to their perceived function toward the goals of human procreation (Haraway 1991; Haraway 2016; Martin 1987; Schiebinger 2004). Emily Martin notes, for example, the development of the metaphor of the uterus-as-machine in seventeenth-century France, according to which the womb and uterus were described as a "mechanical pump" used to "expel the fetus" (Martin 1987, 54). In this model of technologizing the womb, the woman's body was seen as a machine that could be "fixed" by the physician who acts as "the mechanic or technician" (Martin 1987, 54). I would argue that the glass vessel serves as an earlier model of technologizing the womb that extends beyond the metaphor: it not only imagines the womb-as-technology but also manifests a technology to replicate the womb, to be *used* by the male scientist or alchemist to perform, or (re)produce, his goals.[4] If the organic, female body is imagined to be technologized, it is by way of alchemy and its practices, conceptualized through analogies of sexual reproduction, that the reverse impulse to *organify* inorganic technological materials emerges in the form of the glass vessel and the ways in which it allowed male scientists to refigure and to replicate organic processes. It is through the staging of glass "bellies" that alchemical practice demonstrates how "repetition . . . can alter material reality" (Crane 2001, 170).[5] Thus, my interest is not simply in examining the perception of the body as machine, but rather the perception of technologies as capable of life, or capable of performing and reproducing life processes: making glass vessels *breed*.

Insofar as we might define science as a body of knowledge—*scientia*—and a set of practices—*techne*—alchemy was an intellectual endeavour constituted by both (Park and Daston 2008).[6] If, as Mary Thomas Crane suggests, early modern scholars have sometimes held performance to represent the "deceptive, hollow, and illusory nature of the theatrical, even as it conjures the real into being" (Crane 2001, 169),[7] I am interested in how alchemy serves as a particularly pertinent case of what I call *literalizing through performance* in the period—attempting to conjure the real into being even as it combatted its reputation as a fraudulent and deceptive mimicry of "real" science (still a misunderstanding in our current, public understanding of alchemy), as appears in early modern literary and dramatic works like Ben Jonson's satirical comedy *The Alchemist*. As Kirsten Shepherd-Barr notes, science has moved in theatre from "simile and metaphor" to "thorough structural and thematic integration," and I am interested in tracing this in a particular, charged object—the glass vessel—that not only moves "from the margins to center stage" (Shepherd-Barr 2006, 15) in early modern scientific performance, but exemplifies that oscillation between metaphor and structural agent of gendered replication. Considering the myriad permutations of what it meant to *perform,*[8] the glass belly, or glass vessel, serves as an instrument of alchemy and early science, a symbol of their

performativity and of the replicability of the female body—a means of translating into "disembodied scientific objectivity" (Haraway 1988, 576) the "embodied others, who are not allowed *not* to have a body" (Haraway 1988, 575). In other words, these glass bellies materialize the transition whereby the *secrets of women* are made the *theatre of women*, intersecting gender, science, and performance in, and through, early modern alchemical practice. This study thus examines how the theatrical looking in glasshouses and on the stage became gendered modes of looking that were additionally embedded in the material practices and texts of glassmaking. This was made most explicit in the masculinist control of reproduction in glassmaking and fantasies of male birth, particularly in the alchemical laboratory where glass vessels were used to replicate reproductive processes toward reproductive ends. What remains at stake are the ways in which the gendered history of the glass vessel haunts the scientific practices that increasingly intersect with the humanistic study of the past, and how these acts of gendered looking and gendered making/remaking risk being uncritically replicated today.

The Glass-House: Secrecy and Openness in the Performance of Science

When Bosola in Webster's *The Duchess of Malfi* expresses his fantasy that glassmaking, or glassblowing, could make the duchess's secret—her pregnancy—transparent, referring to a young woman's "desire to see the glass-house," the actor playing Bosola also refers knowingly to a working glass-house by the Blackfriars Theatre in which *The Duchess of Malfi* was performed. Spectators of the Blackfriars's theatrical productions may have been spectators of the artisanal practices of glassblowers, just a few steps away (Floyd-Wilson 2013, 117). In early modern England, glassmaking was recognized as "a craft with its own technological secrets" (Floyd-Wilson 2013, 117), but it also, I would argue, became a kind of performance. Early modern artisans and tradesmen dealt with the secrets of their trades, "expert" knowledge of procedures and skills required to craft particular products. But while early modern artisans might have harboured the secrets behind their making practices, sometimes their practices were put on display. The glass-house was thus a spectacle accessible to the larger masses, a "public [place] of experiment, commercial activity, production, magic, and performance" (Floyd-Wilson 2013, 117–18). In this way, prior to the late seventeenth century when the Royal Society would eventually perform science by "stag[ing] experiments," glass-makers, or "glass-blowers," would "stag[e] their techniques for the public" in the glass-houses that housed their activity (Floyd-Wilson 2013, 117). This echoes what occurs in the theatre with *The Duchess of Malfi*, where Bosola prompts the audience to imagine glassblowing on the stage, blurring the distinction between theatre and laboratory and how both stage voyeuristic viewing.

It is worth contextualizing the performativity of the sixteenth- and seventeenth-century artisanal sciences, like glassmaking and alchemy, by juxtaposing them against the scientific performances that came later. In the late seventeenth century, the Royal Society's scientific endeavours took two forms: that of "experimental demonstrations before an audience" and "the transcription of written information" (Golinski 1989, 16). Furthermore, the written knowledge produced through the Royal Society's scientific inquiry needed to be "confirmed by exhibition or replication in meetings" in order to prove its legitimacy. The determination of what Jan Golinski refers to as "fully authenticated 'facts'" of scientific experimentation required firsthand witnesses in the Royal Society's public meeting space (Golinski 1989, 16). In other words, it was the live and public performance and reenactment of these written experiments—and the presence of a "reputable," i.e., male, audience as "witnesses"—that gave them their validity: the spectacle determined proof (Golinski 1989, 16; Mintz 1951).[9] For figures like the Royal Society's Robert Boyle, held to be the father of experimental science, the laboratory was a "place of worship . . . the experiment, a religious rite" (Haraway 2004,

231; Potter 2001, 9). Significantly it was also an arena not only forbidden to women but one where it was perceived that women would not be able to participate even if allowed in. During Royal Society experiments with Boyle's air-pump, which had a glass chamber or globe within which witnesses would see birds perish from suffocation from the vacuum, women were reportedly present at one demonstration—though never recorded as witnesses—interrupting it to demand air for a struggling bird; Boyle's response was to exclude women from further demonstrations (Shapin and Schaffer 2011, 26; Haraway 2004, 232): "women might watch a demonstration; they could not witness it" (Haraway 2004, 231). Experimental history reveals how Donna Haraway's "gender-in-the-making" operated through the scientific looking that determined the "'inside' and the 'outside' of science" along gendered lines (Haraway 1997, 29).

In glassmaking and other earlier artisanal practices, the interest in scientific and theatrical "looking" did not fall quite as explicitly along those same gendered lines, though these practices began to establish what it meant to have permission to observe, and to disclose, that which was historically kept secret. Glassmaking, like most arts, had not always been public. It began as a trade with secrets that were guarded by its guildsmen. As with other artisanal secrets, glassmaking developed as a craft that merged the "awareness of performing an art," in Marco Beretta's words, with "the most hidden mysteries of matter" (Beretta 2009, 148). It was not until the Italian Renaissance that glassmaking went "public" with the publication of the first treatises on glassmaking, like Vannoccio Biringuccio's metallurgical treatise *De la pirotechnia* (1540) which devotes an entire chapter to glass (Beretta 2009, 149). Images began to appear that depict the workings inside the glass-house, open to display on the page, and depicted as open to display to the casual passer-by, allowing, for example, Bosola's "young waiting-woman" to satisfy her "monstrous desire to see the glass-house."

Glass furnace, with workers. Georg Agricola (German, 1494–1555). In *De re metallica* [Berckwerck Buch, Frankfurt-am-Main, 1580, p. cccxc]. Rakow Research Library, The Corning Museum of Glass (66820). Photo: The Corning Museum of Glass. http://renvenetian.cmog.org/chapter/look-inside-renaissance-venetian-glasshouse.

In a period in which the world was increasingly "conceptualized as a theatre" (Vermeir 2012, 181),[10] knowledge, too, began to be understood as performance (182). In particular, the performance of knowledge was enmeshed in the history of secrets; integral to the secrets of the early scientific trades—as well as those of the occult sciences like alchemy, defined by their hidden mysteries—was the inherent *performativity* of secrecy. "To captivate the public," Koen Vermeir writes, "one should not disclose too much at a time. In order to incite the imagination and to give the public a sense of wonder, hidden things should be gradually unveiled, building up the tension and slowly increasing the fascination" (Vermeir 2012, 182–83). This interplay between secrecy and openness often merged with theatre quite literally: in the "public" and "private" spaces designated to distinguish between what is displayed and what remains "behind the scene," or even more specifically with mountebanks who would "[climb] the stage" to sell their secrets, forming the basis for the staged *commedia dell'arte* (Vermeir 2012, 184). Indeed the Italian scholar Giambattista Della Porta, famous for his work publishing the secrets of natural magic, was also a playwright who conducted his own stage plays (Vermeir 2012, 184; Kodera 2014).[11] The stage itself played with its spaces of openness and secrecy in the frontstage and backstage dimensions of theatre, with its working components hidden off stage and its "productions" manifested onstage—a trope that early modern playwrights would use to comment on the metatheatrical aspects of performance.

To return to Bosola's glass-house, Webster in this moment brings attention to the physical juxtaposition of theatre and glass-house, theatrical stagecraft and performed scientific secrets, and uses this moment of wishful imagining to juxtapose in his viewers' minds the spectacle of the secrets of glassmaking next door with that of the duchess's hidden pregnancy through her imagined glass belly. In doing so, Webster guides his audience's attention from the exposed space of formerly secret practice to the desired exposure of the most secretive space of all, the female womb. This moment of theatre makes gender by enticing the audience to push further on this desire to look, to move from what has been to what is not yet exposed, locating the new object of the gaze in the hidden interior of the female body—an unveiling from secrecy to openness along gendered lines.

Thus, Webster intimately connects early modern theatricality to the secrets that defined the period's sciences—"*Secretum* . . . replaced by *theatrum*" (Vermeir 2012, 182)—and does so through the female body. The shift from *secretum* to *theatrum* significantly reveals the gendered ramifications of merging "scientific" and "theatrical" looking. What Tiffany Watt Smith observes about the participation of Victorian scientists in the "passionate and demonstrative looking . . . firmly linked to theatrical audiences" (2014, 7) finds points of uneasy cohesion even earlier, when disciplines like medieval and early modern anatomy made use of actual anatomy theatres for both the educational and spectacular display of their practices of dissection. The desire to reveal or to discover the secrets of women, as in Bosola's wish to know the duchess's (pregnant) state, finds its theatrical drive in early anatomy, in which the impulse manifest as dissecting open the womb, believed to be the site where women's secrets were hidden. Thus, the "*secreta mulierum*, the literature on women's matters," became a "*theatrum mulierum*" (Vermeir 2012, 182). That the secrets of women were made the theatre of women demonstrates the affinity between scientific and theatrical viewing (Tiffany Watt Smith 2014, 7), merged in the material construction of glass vessels through glassmaking and alchemy.

Glass Bellies and Gendered Vessels

Alchemy as a science prescribed to the idea that heterosexual intercourse was, in Jonathan Hughes words, "essential to stabilizing . . . women" as well as the body politic, which was "conceived as

female when unstabilized" (Hughes 2003, 148). Alchemy was thus an especially masculinist endeavour—with the exception of very few apocryphal female figures in alchemy's history, alchemists were portrayed to be male figures—and invested in situating the artificial re-creation or replication of human sexual reproduction under male control. Alchemical processes involved the use of replicated artificial wombs, which were controlled and manipulated by male alchemists who conceptualized their practices using the terms of reproduction. Hughes notes that in alchemy it was the "female principle" that was "appropriated by the male alchemist" because it was valued for its "generative power" (Hughes 2003, 140). Men in medicine already routinely referred to the bodies of women as vessels; in Hippocratic tradition women's reproductive parts—i.e., the womb or "matrix," uterus, and the vagina—were conceptualized as "one organ, like an upturned (weaker) vessel" (Hughes 2003, 147), while both medically and religiously, men referred to the bodies of holy women, especially in relation to dissection, as "holy vessels" (Park 2006, 35). If women's bodies were already conceptualized as vessels, alchemy enabled their actual artificial reconstruction by virtue of glass vessels and instruments.

Glass vessels to be used for science were among the technologies produced during the advancement of science in early modern England, a significant time of development for England's cultural and intellectual history (Godfrey 1974, 244). However, glass had long played a large role in the alchemical literature of antiquity. The chemical procedures involved with ancient and early glassmaking—and, in particular, the process of transmutation—were inspiration for alchemical theory (Beretta 2009, xi). Marco Beretta notes that while scholars have studied ancient alchemists' use of various alchemical instruments, there has been relatively little attention given to the use of materials like glass in the construction of those instruments—the glass vessels and receptacles that enabled alchemical experimentation (Beretta 2009, 109). Instead, as Beretta points out, both chemists and historians of chemistry seem to have taken for granted the use of glass in the manufacture of laboratory equipment, which has continued to the chemical laboratory today in which experimental practice requires "the mass use of instruments made entirely, or partly, of glass" (Beretta 2009, 109–10)—instruments historically constructed to embody gendered dimensions.

Glass vessels were described in gendered terms, drawing from the female body and its parts. Of the wide range of specialized terminology used for an equally wide range of glass vessels, one called the *botarion* was "shaped like a breast (*mastarion*)," as Beretta describes, and "used as the receiver of an alembic"; Beretta's reference to the breast-shaped glass derives from a passage by Synesius of fourth-century Greece (CE), in which is described a "glass instrument having a breast-shaped protuberance" later referenced simply as "the breast":

> With this emission of heat, a glass instrument having a breast-shaped protuberance is slotted into the vessel; put it on the top of the vessel and turn it upside down; catch the water going up through the breast and keep it for the fermentation. This water is the divine water, and this is her extraction. (quoted in Beretta 2009, 114)

Because developments in glassmaking were closely tied to the beginnings of alchemy (Beretta 2009, 122–23), it would not be unreasonable to assume that glass vessels were in part produced for their uses toward the goals of alchemy. The gendering of various glass instruments was thus fitting for the alchemical project of replicating, if symbolically, human reproduction. Leonardo da Vinci even aligns glassmaking with alchemy in his critique of alchemy and other occult sciences, bringing attention to their material imitation of other processes. For example, Leonardo's contemporary Vannoccio Biringuccio compares the famed glassmakers of Murano, Italy, to "ingenious alchemists," able to

reproduce, or counterfeit, gems from glass (Beretta 2009, 150). For Leonardo, the difference between alchemy and darker and more "foolish" arts like necromancy, which give birth to "lies," is that alchemy "works by the simple products of nature" (Beretta 2009, 149). However, alchemy cannot be performed "by nature herself" because, as Leonardo articulates, there are in nature "*no organic instruments* [emphasis mine] with which she might be able to do *the work which man performs with his hands, by the use of which he has made glass* [emphasis Beretta's]" (Beretta 2009, 149). The glass instruments, therefore, aid the active male alchemist to produce that which "nature herself," passive and feminized, cannot. I bring attention here to Leonardo's emphasis on the reproductive goals of alchemy and the use of glass vessels toward that very purpose: lacking "organic instruments," or the natural, living bodies that can reproduce, alchemy requires its male performers to perform manually, and to plunder feminized Nature for her secrets, for which execution they used glass to serve for artificial instruments.

From a literary vantage point, the material practice of alchemical work was entangled with the alchemical allegories that found their model in human reproduction. Allegory, after all, had its own performative slippages between secrecy and openness, obscuring and revealing. Alchemical literature often used "highly allegorical language," which included coded names for various substances and the processes in which they were implicated, one of the "techniques of concealment" used to protect the secrets of alchemy (Nummedal 2011, 333). This highly allegorical language of alchemy, applied to alchemy's physical practices, informs the reproductive symbolism of alchemical performance. The study of alchemical texts was rooted in the actual practices of alchemy and the spaces in which it was practised—the laboratories and kitchens in which alchemists "collected, collated, and organized snippets of text in order to locate recipes and processes, test theories, and make things" (Nummedal 2011, 333). The practices themselves, then, were imbued with alchemical symbolism and implicated in the process of replicating sexual reproduction. The famous *Codicillus*, a supplementary treatise in the Lull tradition, makes explicit the association between human reproduction and alchemical process which "imagined . . . an intimate physical connection (or correspondence) between the world at large (the macrocosm) and the body of man (the microcosm)" (Moran 2005, 19–20). This allegorical concept was integral to alchemical practice, transforming the earth into Nature's womb, the secrets of which had yet to be uncovered.

Thus, the feminized body—and in particular the female womb, a source of mystery and fascination as the hidden site of women's secrets—was conceptualized and replicated in the alchemist's laboratory through his materials. A connection already existed between literature on women's secrets and alchemy, as information on the former was included in and circulated with natural philosophical texts of interest to alchemists (Green 2008, 211). The macro- and microcosmic narratives in medieval alchemy claimed that the "generation of mettals" in the earth imitated the generation of life in the womb, wherein "the imperfect matter . . . must be chosen and made perfect," work that was noted to be similar to the procreation of humans (Bacon 1597, 10). Metals were believed to lie in the womb of the earth, and some, like gold, "reached maturity while others did not," informing the alchemical analogy that the womb of the earth could be replicated artificially in the alchemical laboratory through the model of the female body, which mimicked "the earth that provided the warmth and nutrition necessary for the birth of the stone" (Hughes 2003, 141). Reproductive metaphor and analogy provided the impetus for the physical and material manifestation of the artificial womb by way of glass bellies and artisanal furnaces. To be able to imitate nature, Bacon posits, alchemists must have a source of constant heat and a vessel that can be "close shutte, containing in it the matter of the stone"; moreover, that same vessel had to be "round, with a small necke, made of glasse or some earth, representing the nature or close knitting togither of glass"

(Bacon 1597, 11). The glass vessel or alembic that alchemists would use, placed in furnaces for heat, was thus described as "a matrix or womb" (Hughes 2003, 143). In this way, the alchemist's laboratory was created to be what Hughes calls "a feminine world of vessels and water" (Hughes 2003, 143).

Performing Alchemy, Replicating the Womb

The creation of artificial glass wombs and the metaphorical language in which alchemy is rooted enable the alchemical performance of the possibility, through replication, of generation without women (Schneider 2001, 96).[12] Rebecca Schneider articulates, specifically, the fear of the "copy," that it will "not only tamper with the original, but will *author* the original [emphasis mine]," indeed that the copy "will *come to be acknowledged* as author, father, First [emphasis in original]" (Schneider 2001, 96). Where Schneider subtly notes the fear of the copy in the gendered terms of Genesis's "the rib, the second," here I locate an anxiety in the reversal of that gendered fear: male alchemists' motivation to be acknowledged "as author, father, First" in the deeply gendered conceptualization of human generation. This is a reconfiguration of the dichotomy between copy and original, the replicated and the authentic, which privileges women and their bodies as original and, subsequently, elicits a masculine reaction to reclaim that position of authority and originality. In alchemy, then, cloning is the goal: to reproduce without women, remaking gender inequality through replicating "nature." The performative disclosure of the secrets of the womb is not sufficient; rather, the masculinist alchemical impulse is to *perform*, reenact, and *produce* those secrets themselves—in other words, to be acknowledged, indeed, as author and First.

This drive manifested in the gendered ways in which the glass vessels, now as the alchemists' tools, were evaluated for their ability to produce the alchemical goals. In *The Compound of Alchymy*, reprinted in English in 1591, George Ripley describes the alchemical work that takes place within the alembic, one such glass vessel used in alchemy, in the terms of "the sexual restlessness and fulfilment of the womb" (Hughes 2003, 143). As a warning to the male alchemist working toward producing the Philosopher's Stone, Ripley notes that he will never attain the stone if he handles the alembic "Matrix" (Latin for *womb*) the way "strumpets" treat their wombs; his reasoning emphasizes that strumpets are barren and thus "seldome haue children" born from their wombs (Ripley 1591, E3r). Therefore, according to Ripley, to produce the stone successfully, the alchemist must be sure to close up his glass vessel, again described in terms of the woman's womb: "That after she once haue conceiued of the man, / Her Matrix be shut vp from all other than" (Ripley 1591, E3r). In this explicit connection between (alchemical) science and the social control of the body politic through the woman's body, the woman and her womb are figured as property, with chastity figured as crucial to her reproductive success. If, as Hughes notes, the female was the "elemental principle," her *menstrua* became the model for alchemical solvents that were given the same name; this "menstrue, like lead," was made to be integral to starting the alchemical process, and its status, described as "Elusive in its virgin state," could only be "controlled . . . by making it *breed* [emphasis mine]" (Hughes 2003, 142; see also Martin 1991, 486).[13]

It was thus through alchemical performance that the ever-elusive womb and its corresponding female secrets could be dissected and artificially constructed in the laboratory. Even more explicitly, alchemical practice was predicated on the notion that there were biological wombs, like those of "strumpets," that were being ill-used; the implication was that the birth process was particularly fraught, and that the male alchemist could produce, and thereby control, his own perfect womb.

Thus, not only were female wombs in need of regulation, lest biologically they become unfruitful, but they additionally required *reconstruction* in order to ensure the ideal conditions for reproduction, according to male practitioners. Under male control, the secrets of generation could be realized by means of artificial replacement and staging, divorcing the process of (re)production from the potentially flawed, female body.

The products of alchemical performance took various related forms: the birthing of the matured, perfect metal of gold; the discovery of the regenerative Philosopher's Stone; even the creation of life in the form of the *homunculus*, the man-made man. When in his *De rerum naturae* the Swiss-German alchemist and physician Paracelsus poses the question of "Whether it were possible for Nature, or Art to beget a Man out[side] of the body of a Woman, and naturall matrix?" he finds his answer in "the generation of Artificial men" (Paracelsus 1650, 8). The generation of artificial men, or *homunculi*, was the alchemical goal that most explicitly replicated human reproduction; it was the creation of new life, of a man-made man. Paracelsus's recipe for the alchemical production of the homunculus draws on reproductive materials and the terms of procreation:

> Let the Sperm of a man by itself be putrified in a gourd glasse, sealed up, with the highest degree of putrefaction in Horse dung, for the space of forty days, or so long untill it begin to bee alive, move, and stir, which may easily be seen. After this time it will be something like a Man, yet transparent, and without a body. Now after this, if it bee every day warily, and prudently nourished and fed with the *Arcanum* of Mans blood, and bee for the space of forty weeks kept in a constant, equall heat of Horsedung, it will become a true, and living infant, having all the members of an infant, which is born of a woman, but it will be far lesse. This wee call Homunculus, or Artificiall [Man]. (Paracelsus 1650, 8–9)

Paracelsus refers to the creation of this homunculus, typically gendered male if at all, as "one of the greatest secrets, that God ever made known to mortall, sinfull man," calling it also "a miracle, and one of the great wonders of God, and secret above all secrets until the last times, when nothing shall be hid, but all things be made manifest" (Paracelsus 1650, 9).[14] It was Paracelsus's homunculus that was notorious during the early modern period for providing "instructions on how to create an actual person" (Eggert 2015, 158) without women. This concept of masculine parthenogenesis was particularly compelling to early modern male scholars as it seemed to provide what Katherine Eggert calls "a workaround for the seeming feminine mastery of the reproductive process" (Eggert 2015, 158).

The production of the homunculus referred to three distinct but related alchemical products, described in John French's chapter on "The famous Arcanum, or restorative Medicament of Paracelsus, called his Homunculus" in his *Art of Distillation* (1653). According to French, one definition of the homunculus referred to "a superstitious image made in the place or name of any one," another specified that it referred to an actual "artificiall man, made of *Sperma humanum Masculinum*, digested into the shape of a man, and then nourished and encreased with the essence of mans bloud," and the third defined it as "a most excellent *Arcanum* or Medicament extracted by the spagyricall Art" (French 1653, 115). In other words, the generation of a homunculus took the form of both a literal artificial man and, in a figurative sense, the Philosopher's Stone or Elixir as the great alchemical medicine. Either way, French describes the process as taking place within an alchemical glass which again performs the part of the female womb, within which "the matter will be turned into a spagyricall bloud, and flesh, like an Embryo" (French 1653, 115). Continuing with the

alchemical and reproductive language of generation, French articulates that the "two former sperms, *viz.* of the man and woman, the parents of the *Homunculus*" are "closed up together in a glazen *womb* [emphasis mine] sealed with Hermes seals for the true generation of the Homunculus produced from the spagyricall Embryo" (French 1653, 117). This, he concludes, is "the *Homunculus* or great Arcanum, otherwise called the nutritive Medicament of *Paracelsus*" (French 1653, 117). Even if the homunculus, the man-made man of artificially conceived life, was sometimes used as another name for the medicine alternatively called the Philosopher's Stone, which granted immortality, this continued to signify that, once again, the immortal prospects of reproduction and the secrets of generation formerly relegated to women could be harnessed under the complete control and purview of men in the alchemical context, wherein the glass vessels that replace women's generativity perform the female role necessary to propel "science" forward.

Performing/Replicating the Early Modern Laboratory

I conclude by returning to the performance with which I began—the imagined transparent glass belly of the Duchess of Malfi and the possibility of spectating on the hidden contents of her womb. What begins with Bosola as a desire to unveil women's secrets, by way of imagining the reconstruction of the duchess's womb as transparent glass, finds its manifestation in the practices of alchemy that sought to dis-cover those secrets: by echoing the anatomical impulse to reveal the secrets hidden in the womb, and mimicking the methods of human reproduction to produce those secrets—if analogically—by replicating the womb outside of the female body. It is through the performance of alchemy that Bosola's fantasy is, in a sense, brought to life; in the alchemical laboratory, glass bellies reveal their contents and can be manipulated to realize the secret products that promise to deliver men's hopes for immortality.

It might at first seem a jump to move from the artificial wombs of alchemical glass to practices in the modern science laboratory. Though the translation of scientific "facts," especially in reproduction, continues to be articulated in metaphorical language that both constructs and reinforces cultural narratives about gender (Martin 1991, 491–92), the analogies between the female body and the glass vessels that make laboratory work possible do not appear now in the rhetoric of scientific experimentation. But we might look to the transition from the secret and occult practices of early modern alchemy to the public experiments of the Royal Society as a period that witnesses the origins of the move away from explicit "gender" to the vague concept of "neutrality" in the performance of science—with the caveat that "neutrality" is, becomes, the cloaked signifier for the traditionally male (Haraway 1997). In the time of the Royal Society, the practices that would become "chemistry" were increasingly made distinct from the practices of "alchemy," though the two were very much linked in their origins (Newman and Principe 1998, 38).[15] If, as William R. Newman and Lawrence M. Principe note, the distinction between alchemy and chemistry was "extremely diffuse at best" (33) it is unsurprising that the growth of chemistry as a legitimate scientific discipline involved attempts to distance it from its related predecessor. A number of Royal Society apologists, like Joseph Glanvill, would claim chemistry's place among areas of significant scientific achievement (Golinski 1989, 13), but continued to be troubled by alchemy as a corrupted and corrupting precursor of chemistry, noting that "among . . . the *Paracelsians*, and some other *Moderns*, *Chymistry* was very *phantastick*, *unintelligible*, and *delusive*; and the *boasts*, *vanity*, and *canting* of those *Spagyrists* [alchemists], brought a *scandal* upon the *Art*, and exposed it to *suspicion* and *contempt*" (Glanvill 1668, 12).[16] Perhaps having established a need to remove itself from the "scandal" of alchemy, chemistry, as the laboratory science of and for the future, no longer foregrounds the gendering of scientific

matter and process in the rhetoric of laboratory experimentation. What has resulted, I might argue, is the now-celebrated sterility of laboratory work, wherein the instruments previously so charged with gendered and symbolic meaning—the glass breasts and wombs—have become the "neutral" vehicles for scientific experimentation—the test tubes and beakers with which we are now familiar.

But it is this elevation of neutrality and objectivity in what we now call science that seems to suggest that the scientific laboratory—and the products, or publications, of its performed experiments—might be exemplars of intellectual inquiry. Evidence of priorities in funding in higher education can be seen in the improvement and renovation of the facilities that house scientific experimentation and the equipment and technologies needed to advance scholarship in the sciences. Prioritized support for the sciences has prompted a number of humanities disciplines to pursue the model of the laboratory as a space of inquiry and experimentation—to *perform scientifically* to legitimize the future of humanities study. I wonder, however, in the construction of newer scientific and humanities laboratories for objective academic inquiry, if there is space to address the elimination of the rhetoric of making or re-making gender which serves, if inadvertently, to erase the gendered history of laboratory technologies and processes, as in the glassware used for (al)chemical endeavour.

A fruitful site might be the performative reconstruction of the early modern laboratory, and of laboratory methods, today—now used not so much to verify scientific discoveries, but to verify the *history* of scientific discoveries, and historical discoveries more broadly. *The Making and Knowing Project* is one such initiative, founded by historian Pamela Smith at Columbia University, which aims "to study the nexus of historical craft making and scientific knowing," realms "regarded as separate" today but which were integrated "in the earliest phases of the Scientific Revolution" when "nature was investigated primarily by skilled artisans by means of continuous and methodical experimentation in the making of objects—the time when 'making' was 'knowing'" (The Making and Knowing Project 2014; see also Pamela Smith 2004, 2008). Indeed the project resonates with surging contemporary public interest in maker culture and DIY and the expansion of "maker spaces" both on higher education campuses and in broader public spaces that enable participants to learn artisanal skills and technologies to "make" various products and projects. *The Making and Knowing Project* has received glowing praise and publicity, featured in a 2016 *New Yorker* article titled, appropriately, "Twenty-First-Century *Alchemists* [emphasis mine]" which reports on the laboratory and its "team of science historians who are attempting to re-create recipes from a sixteenth-century text" (Kean 2016), opening up the "secrets" of early modern making and knowing to scholarly research today. Emphasizing what she calls "Reconstruction as Method," Smith provides a rationale for replicating laboratory work, drawing on Francis Bacon's seventeenth-century call for a "New Philosophy; or Active Science" and the early modern discontent with the "inadequacy of words" for experimental endeavour: "writing was inadequate to convey [the] skills [of craftspeople], and . . . book learning was inferior to bodily experience" (Pamela Smith 2016, 210).

Historical reconstruction, according to Smith, "involves both subjective action, self-reporting, and the manufacture of evidence by the historian in the present" (Pamela Smith 2016, 220); I would argue that it is also an act of performance, complicit in the history of making and remaking of gender. *The Making and Knowing Project* conducts its research through workshops, working groups, and laboratory seminars, performing "hands-on work in the laboratory carrying out historical reconstruction research" (The Making and Knowing Project 2014). It is a fascinating phenomenon to see this project invested in explicitly replicating early modern methods—indeed, of replicating the early modern laboratory—integrating the performance of science into humanistic inquiry. It

foregrounds experiential research, precisely the kind of knowledge-construction that early modern craftspeople argued could only be gained from experience. It aims to "[cross] the science/humanities divide"—a divide that did not exist in early modern intellectual inquiry but which has been constructed to define aspects of modern disciplinary thinking today—as well as the divide between the early modern past and our present, "between today's labs and the craft workshops of the past, and between early modern conceptions of natural knowledge and our own understanding of science, art, and historical scholarship" (The Making and Knowing Project 2014). Feminist scholars have argued, rightly, that early humanistic concerns never receded from modern laboratory science, and I think what is unique about this instance, with *The Making and Knowing Project*, is not so much the reverberations of early science in modern science, but the explicit turn to *replicating* the early modern laboratory and its practices, which itself signified as a performance of remaking gender in the early modern period.

I thus wonder if new projects like Smith's, of replicating laboratories in humanistic inquiry, can be used as a vehicle not only in tandem with but *responsive to* early modern and performative scholarship. In using "reconstruction as method" in the study of the past, how can we remain attuned to the ways in which scholarship unveils and replicates the charged history of the materials we [*use* to] reconstruct? To what extent might participants think critically about what it means to hold a glass vessel shaped like a pregnant woman's belly, and how does it shape their perception of the scientific processes that these vessels enclose? How might participants understand the layers of performance embedded not only in their current practices but the early modern precursors to those practices? What remains to be a future area of dialogue is the way in which these projects might be aware of their performativity, of their intersection with the discourses of literary and performance studies that examine the nuances of just what the performance of early modern science, and of alchemical transformation, meant. As we move forward with pursuing humanistic inquiry in laboratory spaces, and as we shape future spaces and methods of knowledge construction and (re)production, attending to the early literary and symbolic registers of science and performance—the glass bellies and artificial wombs that haunt the gendered, performative history of modern scientific inquiry—may indeed be what connects historical reconstruction, and historical performance, to the overlooked gendered valances of the history it aims to bring to life.

Notes

1. Hereafter cited parenthetically by act, scene, and line number.

2. Though the term "laboratory" would not yet embody the laboratories we think of now, I draw on Owen Hannaway's discussion of the origins of laboratory design and the ways in which the term was associated primarily with alchemy and chemistry in the early modern period (Hannaway 1986).

3. Johnson and Dubow identify Webster's idea of the glassmaker, for example, as "a potent creator (and breaker) of his lifelike forms" (2017, 108).

4. Karen Barad (2003) articulates the notion of "performative alternatives" to discursive representation, which shifts representational power from words to actions. What Barad presents as the performative possibility that places questions of "ontology, materiality, and agency" foremost beyond linguistic representation, I find useful as a framework for understanding the ways in which the language of allegory intersected with the performatics of alchemical practice.

5. Crane notes, for example, that for performance theorists like Victor Turner and Richard Schechner, performance was defined "not by its representational or deceptive nature, but by repetition and liminality;

they emphasize, in Turner's words, 'process and processual qualities: performance, move, staging, plot, redressive action, crisis, schism, reintegration, and the like'" (2001, 170).

6. Here I follow on the discussion by Katharine Park and Lorraine Daston on the term "science" during the early modern period, what they qualify as an anachronistic "portmanteau term" taken from the later nineteenth century and beyond, meaning a "disciplined inquiry into the phenomena and order of the natural world" (2008, 2–3). Our modern-day idea of "science" had "no single, coherent counterpart" during the sixteenth and seventeenth centuries, and instead what can be traced during the early modern period is "the gradual emergence of a new domain of inquiry" which "embraced both intellectual and technical approaches and was composed of what had previously been disparate disciplines and pursuits" (3). The Latin *scientia* taken from the Middle Ages, then, referred to "any rigorous and certain body of knowledge that could be organized (in precept though not always in practice)" (3).

7. Crane explores the nature of performance, expanding beyond critics like Stephen Greenblatt who have dismissed theatrical performance on the basis that it is "'fraudulent,' and that it 'evacuates everything it represents'" (2001, 169).

8. "perform, v.". *OED Online*. March 2017. Oxford University Press. http://www.oed.com/view/Entry/140780?redirectedFrom=perform (accessed April 04, 2017). To perform in its primary definition dating back to the fourteenth century meant "To carry out in action, execute, or fulfill (a command, request, undertaking . . .); to carry into effect." But additionally, in the sixteenth and seventeenth centuries, it was defined as an action "Opposed to *promise*," or in other words "to *do*, pay, provide, etc. (something which has been promised) [emphasis mine]." To perform also meant to "carry out, or execute formally or solemnly (a public function, ceremony . . .)," or "To make, construct, or build . . . to create . . . to complete," both stemming from the late fourteenth century, and "to present . . . on stage or to an audience" starting in the sixteenth century.

9. It must be stated that such a reputable audience did not include women, who were excluded from participation, with the notable exception of Margaret Cavendish, Duchess of Newcastle, who was involved in her own literary intervention into performative, scientific, and experimental inquiry and was granted permission, once, to attend a meeting of the Royal Society.

10. In particular, the Baroque period was a "theatrical time" that witnessed the development of what Vermeir calls "techniques of the self," which "allow[ed] one to hide one's secrets and to read the secrets of others" (2012, 181).

11. Kodera situates Porta's scientific laboratory work and his literary work for the stage in the context of what he calls a "peculiar form of theatricality" (2014, 15).

12. Rebecca Schneider speaks of the concerns about "cloning and anxiety" throughout Western history of mimesis and its links to theatrical repetition (2001, 96).

13. Indeed, scientific textbooks throughout history continued to represent menstruation as a "failure" by speaking of it in terms of detritus—the "'debris' of uterine lining" (Martin 1991, 486)—which found its found its analogy in the early modern period in the discardable nature of the alchemical solvent after its use.

14. For another recipe for the creation of a homunculus, see also Simon Forman's description in Ashmole MS 1494, 579, Bodleian Library, Oxford. Forman's enigmatic "recipe" describes a homunculus that while different in constitution from Paracelsus's, also physically conforms to a little man.

15. Newman and Principe note the etymological similarity between the two terms: "The Greek term chēmeia or chymeia, probably derived from the word for smelting metals (cheein), had encompassed a variety of metallurgical and chemical techniques by the time it was appropriated by the Arabs in the early Middle Ages. Arabic-speaking authors . . . added the definite article al to the transliterated noun kīmiyā', to arrive at al-kīmiyā', the linguistic progenitor of the Latin alchymia and its orthographic variants such as alchemia and alchimia" (1998, 38). By the early to mid-eighteenth century, distinctions between alchemy and chemistry were more explicit, with alchemy "being applied almost exclusively to topics related to metallic

transmutation" and with chemistry "increasingly being defined as the art of analysis and synthesis": "thus, by that time, 'alchemy' and 'chemistry' had acquired nearly their modern meanings" (39).

16. Glanvill includes "the AEgyptians and Arabians" in his attack, as they were also associated with the ancient origins of alchemical knowledge and practice.

References

Bacon, Roger. 1597. *The Mirror of Alchimy*.

Barad, Karen. 2003. "Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter." *Signs: Journal of Women in Culture and Society* 28 (3): 801–31.

Beretta, Marco. 2009. *The Alchemy of Glass: Counterfeit, Imitation, and Transmutation in Ancient Glassmaking*. Sagamore Beach, MA: Science History Publications.

Crane, Mary Thomas. 2001. "What Was Performance?" *Criticism* 43 (2): 169–87.

Eggert, Katherine. 2015. *Disknowledge: Literature, Alchemy, and the End of Humanism in Renaissance England*. Philadelphia: University of Pennsylvania Press.

Floyd-Wilson, Mary. 2013. *Occult Knowledge, Science, and Gender on the Shakespearean Stage*. Cambridge: Cambridge University Press.

Foucault, Michel. (1976) 2003. *The Birth of the Clinic: An Archaeology of Medical Perception*. Translated by A. M. Sheridan. London: Routledge.

French, John. 1653. *The Art of Distillation*. London.

Glanvill, Joseph. 1668. *Plus ultra: or, The Progress and Advancement of Knowledge since the Days of Aristotle*. London.

Godfrey, Eleanor S. 1975. *The Development of English Glassmaking 1560–1640*. Chapel Hill: University of North Carolina Press.

Golinski, Jan V. 1989. "A Noble Spectacle: Phosphorus and the Public Cultures of Science in the Early Royal Society." *Isis* 80 (1): 11–39.

Green, Monica. 2008. *Making Women's Medicine Masculine: The Rise of Male Authority in Pre-Modern Gynaecology*. Oxford: Oxford University Press.

Hannaway, Owen. 1986. "Laboratory Design and the Aim of Science: Andreas Libavius versus Tycho Brahe." *Isis* 77 (4): 585–610.

Haraway, Donna. 2016. *A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century*. In *Manifestly Haraway*, 3–90. Minneapolis: University of Minnesota Press.

———. 2004. *Modest_Witness@Second_Millenium*. In *The Haraway Reader*, 223–50. New York: Routledge.

———. 1991. *Simians, Cyborgs, and Women: The Reinvention of Nature*. New York: Routledge.

———. 1988. "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective." *Feminist Studies* 14 (3): 575–599.

Hilgartner, Stephen. 2000. *Science on Stage: Expert Advice as Public Drama*. Stanford: Stanford University Press.

Hughes, Jonathan. 2003. "Alchemy and the Exploration of Late Medieval Sexuality." In *Medieval Virginities*, edited by Anke Bernau, Ruth Evans, and Sarah Salih, 140–65. Toronto: University of Toronto Press.

Johnson, Bonnie Lander, and Bethany Dubow. 2017. "Allegories of Creation: Glassmaking, Forests, and Fertility in Webster's *The Duchess of Malfi*." *Renaissance Drama* 45 (1): 107–37.

Kean, Sam. 2016. "Twenty-First-Century Alchemists." *New Yorker*, September 26, 2016. http://www.newyorker.com/magazine/2016/09/26/twenty-first-century-alchemists.

Kodera, Sergius. 2014. "The Laboratory as Stage: Giovan Battista della Porta's Experiments." *Journal of Early Modern Studies* 3 (1): 15–38.

The Making and Knowing Project. 2014. "About." http://www.makingandknowing.org/?page_id=25. http://www.makingandknowing.org/?page_id=18.

Martin, Emily. 1991. "The Egg and the Sperm: How Science Has Constructed a Romance Based on Stereotypical Male-Female Roles." *Signs* 16 (3): 485–501.

———. 1987. *The Woman in the Body: A Cultural Analysis of Reproduction*. Boston: Beacon Press.

Mintz, Samuel I. 1951. "The Duchess of Newcastle's Visit to the Royal Society." *Journal of English and Germanic Philology* 51 (2): 168–76.

Moran, Bruce. 2005. *Distilling Knowledge: Alchemy, Chemistry, and the Scientific Revolution*. Cambridge, MA: Harvard University Press.

Newman, William R., and Lawrence M. Principe. 1998. "Alchemy vs. Chemistry: The Etymological Origins of a Historiographic Mistake." *Early Science and Medicine* 3 (1): 32–65.

Nummedal, Tara E. 2011. "Words and Works in the History of Alchemy." *Isis* 102 (2): 330–37.

Paracelsus [Philipp Theophrastus of Hohenheim]. 1650. *Of the Nature of Things: Nine Books*. London.

Park, Katharine. 2006. *Secrets of Women: Gender, Generation, and the Origins of Human Dissection*. New York: Zone Books; Cambridge, MA: MIT Press.

Park, Katharine, and Lorraine Daston. 2008. "Introduction: The Age of the New." In *The Cambridge History of Science, Vol. 3: Early Modern Science*, 1–18. Cambridge: Cambridge University Press.

Potter, Elizabeth. 2001. *Gender and Boyle's Law of Gases*. Bloomington: Indiana University Press.

Reiss, Timothy J. 2003. *Mirages of the Selfe: Patterns of Personhood in Ancient and Early Modern Europe*. Stanford: Stanford University Press.

Ripley, George. 1591. *The Compovnd of Alchymy. or The ancient hidden Art of Archemie: Conteining the right & perfectest meanes to make the Philosophers Stone, Aurum potabile, with other excellent Experiments*. London: Imprinted by Thomas Orwin.

Schiebinger, Londa. (1993) 2004. *Nature's Body: Gender in the Making of Modern Science*. New Brunswick, NJ: Rutgers University Press.

Schneider, Rebecca. 2001. "Hello Dolly Well Hello Dolly: The Double and Its Theatre." In *Psychoanalysis and Performance*, edited by Patrick Campbell and Adrian Near, 94–114. London: Routledge.

———. 2006. "Intermediality, Infelicity, and Scholarship on the Slip." *Theatre Survey* 47 (2): 254–60.

Schramm, Helmar, Ludger Schwarte, and Jan Lazardzig. 2005. *Collection, Laboratory, Theater: Volume 1: Scenes of Knowledge in the 17th Century*. Berlin: Walter de Gruyter.

Shapin, Steven, and Simon Schaffer. (1985) 2011. *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life*. Princeton: Princeton University Press.

Shepherd-Barr, Kirsten. 2006. *Science on Stage: From Doctor Faustus to Copenhagen*. Princeton: Princeton University Press.

Smith, Pamela. 2004. *The Body of the Artisan: Art and Experience in the Scientific Revolution*. Chicago: University of Chicago Press.

———. 2008. "Laboratories." In *The Cambridge History of Science, Vol. 3: Early Modern Science*, edited by Katharine Park and Lorraine Daston, 290–305. Cambridge: Cambridge University Press.

Smith, Pamela H. 2016. "Historians in the Laboratory: Reconstruction of Renaissance Art and Technology in the Making and Knowing Project." *Art History* 39 (2): 210–33.

Smith, Tiffany Watt. 2014. *On Flinching: Theatricality and Scientific Looking from Darwin to Shell-Shock*. Oxford: Oxford University Press.

Vermeir, Koen. 2012. "Openness versus Secrecy? Historical and Historiographical Remarks." *British Journal for the History of Science* 45 (2): 165–88.

Webster, John. 1990. *The Duchess of Malfi*. Edited by Elizabeth M. Brennan. London: A & C Black; New York: W. W. Norton.

Only the Envelope: Opening Up Participation, Surveillance, and Consent in Performance

Vahri McKenzie

Like many Australians, I was distressed with the passing of the Data Retention Act in 2015, and like many Australians, I did nothing actively to object. The Australian Government's Telecommunications (Interception and Access) Amendment (Data Retention) Act 2015 requires telecommunications companies to retain and secure certain records for a period of two years. Then-Prime Minister Tony Abbott memorably defended this new depth of data gathering by using the analogue-era metaphor of the personal letter; the material to be gathered is the metadata, akin to the material on the front of the envelope, while the contents of the letter remain private ("Interview with Michael Brissenden, *ABC AM*" 2014). We need not worry about invasions of privacy, the metaphor implies, because it is only the envelope that is gathered. In the Channel Nine interview in which the proposed legislation was first explained, Abbott made an error, later clarified, by referring to web-browsing history as metadata when it is in fact content. "It is not what you're doing on the internet, it's the sites you're visiting. . . . It's not the content, it's just where you have been, so to speak" (cited in Griffiths 2014). Abbott's confusion is indicative of the limited understanding the public has about large-scale data gathering, so-called big data, with which most of us are now involved, more or less unwittingly.

As an artist and scholar, I did continue to reflect upon the agenda that sees us all included in the social contract as long as we comply with the ubiquitous surveillance interventions in our lives, regardless of whether we understand their implications. The social contract builds on the Enlightenment ideal in which members of a community give up some individual freedoms in exchange for the common good—up to a point. It might be argued that digital surveillance and big data, as fundamental components of the twenty-first-century social contract, push this point in troubling new ways because digital surveillance mechanisms produce conditions that suggest transparency while, in fact, actively obscuring full access to information. A sense of collective complicity was the main impetus for the research project *Only the Envelope: An Artistic Exercise in Data Retention*, which combines research methodologies to investigate the ways in which we share personal information in the public sphere. The performance stage of the project was a work of live art (McKenzie 2016) that offered visitors the intimate experience of viewing an original video while being monitored by a "scientist"—both performer and research assistant—who invited viewers to be involved in an "experiment": viewing a video while wearing Tobii Pro Glasses 2, a wireless eye-tracking device. The performer, as laboratory technician, explicitly gathered demographic information and captured data about where the participants looked, who they looked at, and how long they looked. These processes are analogous to those typically required for website membership forms that gather demographic details and log users' navigation on the site. In addition, the research assistant performed close observation and note-taking during the period of participation, enacting a version of the twenty-first-century social contract in which participants are offered a free experience if they consent to surveillance.

Vahri McKenzie is a senior lecturer in the School of Arts and Humanities at Edith Cowan University in Western Australia. Her articles have appeared in *PARtake: The Journal of Performance as Research*, *Journal of Dance and Somatic Practice*, and *Brolga: An Australian Journal about Dance*.

Publicity image for Vahri McKenzie, *Only the Envelope*, live art installation shown in the Archive Room, Bunbury Regional Art Galleries, Western Australia, March–April 2016. Photograph by Vahri McKenzie.

Taking *Only the Envelope* (*OTE*) as the key example, in this paper I will describe and discuss three performance works (*OTE*; McKenzie, *Sleep Disorders* 2010; McKenzie and Russo, *Fool Asleep* 2012) in the context of applied and participatory contemporary performance paradigms. I will contextualize my practice that performs a version of neoliberal faith in "science," which might be described as scientism, a belief that empirical science constitutes the most authoritative worldview, to the exclusion of other approaches. In *OTE* this tendency is apparently enhanced by powerful technologies: Tobii Pro Glasses 2 and its interpretive software. My recursively playful performance troubles a distinction between the apparently private experience of viewing art with the apparently public experience of being surveilled by rendering visible the surveillance occurring within an artistic space while viewers are engaged in a solo viewing of a video. In this live and participatory work I hoped to invite resistance, or reflective decision making on a personal level, where participants could try out different ethical positions—be more or less compliant—as a way of discovering their own feelings on the matter of data retention in the "low stakes" context of viewing art. There was little evidence of resistance among those who gave their consent to participate in the work, though a greater freedom of response was observed among those who implicitly participated by observing the work or refusing to be involved.

OTE's participatory element offered a provocation that challenged and potentially informed viewers of the work; at the same time, the structured process of gaining consent is not dissimilar to online surveillance in its inauthentic presentation of choice that obscures a competitive corporate agenda. Kirsty Best's 2010 study "Living in the Control Society" uses qualitative data to investigate public understanding of surveillance in the online world, revealing a scenario characterized more by pragmatism than understanding. Democratic citizenship is increasingly constrained by authority and discipline, and by power imbalances between corporate and state bodies and "data subjects":

> Information is ritually and relentlessly extracted from those who wish to participate in almost any form of citizenship or consumption. The market for this data is an extremely lucrative one, and although information can be said to undergird the participatory, collaborative democracy of Web 2.0, its generation is also often private and often obligatory. (Best 2010, 8)

OTE may serve as a timely reminder that refusing to comply by opting out of digital surveillance is extremely difficult to accomplish; raising awareness around the illusion of choice and the facts of surveillance is a more realistic goal. Within this complex picture, where power is held in the combined forces of structured participation, institutional authority, and technoscience, an artistic exercise in data retention can make a valid contribution to understanding participation, surveillance, and consent in performance.

Applying Science and Participation: Contexts of *OTE*

Only the Envelope: An Artistic Exercise in Data Retention was funded by Edith Cowan University (ECU) via its eResearch Technology Funding Scheme (ETFS), which funds pilot research projects that employ information technologies held by the University. According to the ETFS webpage, "The overall aim of this program is to stimulate and facilitate the uptake of eResearch technologies by ECU researchers" ("eResearch Technology Funding Scheme (ETFS)" n.d.). This aim provokes me to suggest that the Scheme encourages and supports technology-*led* research, which in turn reflects the power accorded technoscience and research that employs sophisticated technologies. I was sufficiently provoked to create a work in response, building on previous works that took sleep science as a subject; these will be glossed in the next section. *OTE* adds to this body of work and includes a collaborative encounter between participants, performers, and technology that takes place in a gallery setting.

Rachelle Rechichi as "Svetlana" in *Only the Envelope*, 2016. Photograph by Vahri McKenzie.

OTE can be described as delegated performance. I hired a research assistant, Rachelle Rechichi, to attend the gallery in my stead, playing the role of a laboratory technician and collecting data. Rechichi is a writer and musician who received training in the use of Tobii Pro Glasses 2. Together we developed a character, Svetlana, who engaged with the viewers of the work. She wears a white lab coat and allows participants to see her donning surgical gloves. As a character, Svetlana represents a playful personification of institutional control that compromises individual liberty as a trade-off for greater collective security. She developed stark contrasts between verbal directives that offered information and clear choices, with body language and tone that implied invasions of privacy, such as standing to the side of the participant, very close but not touching,

and using the participant's name more often than is customary. The performance deliberately plays up the invasive inauthenticity that is suggested by transactional engagements with medical professionals and the managerial state.

According to Claire Bishop, delegated performance is "the act of hiring nonprofessionals or specialists in other fields to undertake the job of being present and performing at a particular time and at a particular place on behalf of the artist, and following his or her instructions" (Bishop 2012, 91). Bishop's paper is situated in the discourse of the so-called "social turn" in contemporary art and focuses on the potentially ethically questionable practices of delegation. I am more interested in her taxonomy of delegated performance, where *OTE* falls into the second type, the use of professionals from other fields of expertise, which is far less controversial than the use of nonprofessionals hired for their representations of particular identities (Bishop 2012, 95). In keeping with the commodification of culture, Bishop observes that the delegated performance tendency coincides with managerial changes in the economy such as outsourcing (Bishop 2012, 103-4), such that "Presence today is arguably less a matter of anti-spectacular immediacy (as was the case during the 1960s) than evidence of precarious labor, but artists are more likely to sustain this economy than to challenge it" (Bishop 2012, 105).

Delegation is consistent with broader social trends that foreground participation; furthermore, delegated performance is an apt way of framing big data, which requires delegated performances of labour through private individuals inputting personal data online that is surveilled and monetized by commercial entities. *OTE* is fundamentally participatory, but it troubles where delegation is happening because Svetlana delegates the labour of data acquisition to the participant, while Svetlana is herself a delegate for the artist. Bishop provides some useful markers within the social dimension of participation in contemporary art, where there are two tendencies: "an authored tradition that seeks to provoke participants, and a de-authored lineage that aims to embrace collective creativity; one is disruptive and interventionist, the other constructive and ameliorative" (Bishop 2006, 11). *OTE* can be seen to fit the former category, albeit in a playful way, where the delegated aspect of the work undermines any authorial heavy-handedness. Moreover, Svetlana's performance on behalf of the artist draws attention to scientific norms that distinguish labour from authorship.

OTE can additionally be described as applied performance that, according to Nicola Shaughnessy, includes works that are collaborative, participatory and socially engaged (Shaughnessy 2012, xiv), where such performances are to be found across a variety of practices including devising, performance art, durational, site/place responsive, intermedial and live art (Shaughnessy 2012, xv). This range gives a sense of the breadth of contemporary art practices that can be viewed as applied performance, such that "the dualisms of the aesthetic and non-aesthetic" (Shaughnessy 2012, xvi) are increasingly redundant. Other important contributions in this area have been provided by Jen Harvie in *Fair Play: Art, Performance and Neoliberalism*, who questions whether the turn to social engagement in art and performance may in fact be "complicit with the agendas of neoliberal capitalist culture" (2013, 3), while maintaining critical space for participatory works that offer "constructive engagement" through "pleasurable fun" (10). Contributors to *Performance and Participation: Practices, Audiences, Politics* continue to investigate the paradox of participation, recognizing that "Participation is politically pliable, and it can no longer be taken for granted that its dramaturgical strategies carry specific political meanings or social imperatives" (Harpin and Nicholson 2017, 3).

It is not uncommon in this participatory neoliberal context to find science-themed artworks. Art-science collaborations can be traced to cultural shifts of the 1960s; the best examples illustrate both the creativity of scientific research and the rigour of artistic practice (see for example De

Oliveira, Oxley, and Petry 2003 on installation). More recently, Shaughnessy (2012) illustrates the extent to which cognitive science has infused performance studies, challenging the doxa in both fields:

> Cognitive neuroscience has reconceptualised our understanding of how we learn, the way we think and how we engage with our environment. Perception, memory, identity and subjectivity, agency, relations and interactions with others, emotions, empathy, embodiment, affect are prevalent themes of both applied theatre scholarship and cognitive studies. (2012, xvii)

New findings arising out of these collaborations theorize mind and body, and self and other, as "dynamic, iterative and integrated" (Shaughnessy 2012, xviii). But there is also room for concern in the artistic adoption of observation, measurement, and data accumulation. In a review essay on contemporary approaches to curation, Hal Foster sounds a note of caution, observing that while 1960s conceptualism permitted anything to be art, which opened the field to interdisciplinary collaborations—"the Gestamtkunstwerk, the library, the archive, the collection, the laboratory" (2015, 14)—he questions whether this opening up offers new agency or merely heightened administration: "As 'cognitive labourers' we manipulate information, which is to say we curate the given, and this compiling often presumes a good amount of compliance" (13). Perhaps the seeds of this caution were seen by Foster as early as 2004; in a note accompanying the influential essay "An Archival Impulse," Foster speculates that archive art may be bound up with "archive reason"; implicated

> with a "society of control" in which our past actions are archived . . . so that our present activities can be surveilled and our future behaviours predicted. This networked world does appear both disconnected and connected—a paradoxical appearance that archival art sometimes seems to mimic. (2004, 22)

This "society of control" is a Deleuzean notion whose characteristics are tested by Kirsty Best's study that uses qualitative data to investigate public understanding of digital surveillance, which I will explore below. But first, I will turn to the findings of *OTE* in order to examine the operations of participation and consent in this artwork that engages with technoscience at several levels.

Participation and Consent: Data and Meaning in *OTE*

I have long been drawn to a performance practice that engages with technoscience through a playful subversion of its norms. *Sleep Disorders* (McKenzie 2010) enacted invented sleep pathologies, using performance art to explore scientific incursions that problematize a "natural" state and to interrogate tensions between sleep science and art. I made the work for Lisa Carrie Goldberg's installation *Perth Institute of Sleep Behaviour* (2010), which recreated a sleep laboratory; Goldberg invited me to become a "subject" in her lab and to respond with an original work after immersion in her process. The installation created a laboratory space within an artistic space, where the authenticity of the installation was supported by Goldberg's MA in Biological Arts with world-leading research centre SymbioticA at the University of Western Australia (UWA), which gave her access to UWA's sleep lab. I spent long periods of time within the installation, read medical literature, and viewed authentic surveillance footage; surveillance of sleeping subjects is fundamental to sleep science. My performance within the installation was videoed in low resolution and posted on the Internet, suggesting a troubling equivalence between surveillance footage of sleep science subjects and work that "passes" as such.

Publicity image for Vahri McKenzie and Hellen Russo, *Fool Asleep*, in *Fringe World Festival 2012*. Perth, Australia: The Treasury, 2012. Photograph by Lisa Carrie Goldberg.

Fool Asleep (McKenzie and Russo 2012) was the culminating work of two years' research in performing sleep pathologization, a one-act play that used spoken text, original video and dance (choreographed by co-creator Hellen Russo) to present the complex relationship between a subject of a sleeping disorder and an examining sleep scientist, within a narrative frame. I wrote and performed the original script based on lay and scientific sleep science texts, which reframed scientific discourse and so questioned the assumptions that have rapidly created a new medical specialty. Surveillance footage featuring Russo and me was acquired to contribute to mise-en-scène, which was itself part of an original site-specific work that juxtaposed the pervasiveness of surveillance technologies with the vulnerability of the state of sleep (McKenzie & Russo 2011). The ubiquity of CCTV in public spaces demands a compliance of individuals that reflects the relationship between subject and scientist.

Sleep Disorders and *Fool Asleep* reflect my ongoing interest in the performance of technoscience, beginning with the aesthetic choice to recreate laboratories complete with white-coated technicians and powerful technologies. Moreover, these works' interest in "gazes" finds fruitful material in scientific scenarios and discourses. The scientific method that employs close observation in order to generate a hypothesis is deeply entangled with the power of looking that is fundamental to drama. I have included brief descriptions of these works to contextualize my response to the provocation of ECU's eResearch Technology Funding Scheme. Initially, I

approached *OTE* as an explorer, seeking to gather data for a purpose unspecified, to better reflect the Australian Government's Data Retention Act, which gathers metadata indiscriminately. But institutional feedback indicated that gathering data for purposes unspecified would not meet the requirements of ECU's Human Research Ethics Committee (HREC), so I ensured my application made some clear claims about the "hard data" to come. Namely, when viewing a video and wearing eye-tracking glasses, who do the participants focus on? Where do they look? How long is their attention span? These data were duly gathered, within the context of an arts-based research inquiry in which the use of the eye-tracking technology was exploratory; key findings show that participants tend to focus on the eye, nose and mouth areas of faces depicted, in accordance with expectations.

However, the insights regarding participant behaviour produced by the eye-tracking technology are incomplete for (at least) two reasons. Firstly, the interpretations were made from a small sample. The second, and more interesting, reason that this data picture is incomplete is that the richest information came from the studio notes made by Svetlana while observing participants engaging with the work, which leads to two further points. Uncontroversially, we are reminded of the importance of context and qualitative research in understanding data, which undermines a model that imagines that technologies can provide accurate or complete pictures and impartial data.

The other point is vital for my argument about responses to participation and consent in *OTE*'s performance of science and suggests that the process of gaining consent is associated with a loss of power and knowledge. There was nothing deceptive about Svetlana noting her observations: "informed consent" was gained via a script that had the approval of ECU's HREC, where the first line stated: "This project, *Only the Envelope*, contrasts the private experience of viewing art with the public experience of being surveilled, to contribute to a public dialogue about data retention and sharing private information." But how well understood was this process? How seriously was it taken? Svetlana's notes suggest that the consent process was taken with the same seriousness with which we routinely give our consent to online "agreements." For example:

> English was a problem for my next participant. . . . The verbal consent was read and the participant agreed by saying "yes" at the conclusion. Following the consent script recording, I asked the participant for his full name. At this point he got out his translator, which suggested that the verbal consent script would have been mostly not understood.

As Hal Foster reminds us, "Who among us considers what is signed over when we click 'I agree'?" (2015, 13).

For the purposes of ECU's HREC, "participants" in *OTE* were defined by wearing eye-tracking glasses, but as the project progressed the value of "non-participants" became evident. Although consent was collected from sixty-five participants, almost as many can be said to have participated without consent, by either declining to participate when approached or participating as a companion to the one who gave consent, and observing the whole process, including viewing the video, if they chose. As the project unfolded, it became clear that interesting observations could be made about these viewers, who, in effect, participated in an unanticipated way and expanded my understanding of "participants" and "participation," so Svetlana began gathering notes on a number of these companion-observers. Svetlana's studio notes distinguish between "participants," those who formally gave consent, and "observers," who are companions to "participants." It is an ironic and telling fact in a paper about participation, surveillance and consent in performance that I cannot report further on these findings in detail, as the

requirements of the University's HREC prohibit it. I cannot quote from Svetlana's studio notes, nor can I state the number of these non-consenting participants. It can be seen here that the HREC process provides protections to participants in *OTE* that are not extended in other modes of surveillance and data acquisition, and yet the perfunctory nature of the HREC becomes absurd in its consequences when it limits discussion of low-risk activities and de-identified data.

I can note general tendencies: the key finding is that different behaviours are observed between those watching the performance as observer and those taking part in the performance as participant, where the least compliance in behaviour is observed among those who did not give their consent. For example, reactions to Svetlana from those who declined to participate when approached varied widely, from emphatic resistance to playful engagement. Svetlana's studio notes reveal a wide range of responses to the work among companion-observers, some of whom exhibited freedom of movement in the installation space that enabled them to observe—and disrupt—Svetlana's surveillance activities. The range of responses among observers suggests something of the reflective decision making on personal levels I had anticipated with the staging of scientific space in an artistic space.

Installation view of *Only the Envelope*, 2016. Photograph courtesy of Bunbury Regional Art Galleries.

In *OTE* a contrast is evident between the variety of responses observed among those who did not formally give their consent and the general compliance of those who did. Two observations can be made here. It is remarkable that, of the sixty-five participants who had their viewing behaviour recorded, none refused to give consent after indicating interest in participating in the "experiment," although one refused to give her name, and in general, Svetlana was unable to tell whether participants gave false information. The second remarkable finding is the length of time for which participants who formally consented submitted to surveillance. Forty-four eye-tracking recordings, that is, over 70% of total recordings, ran the length of the entire video (ten and a half minutes). Watching the whole video was not required, nor was it anticipated; in fact, participants were explicitly informed they could watch as much or as little as they wished. Viewers were explicitly reminded of their freedoms, yet most chose to stay and appeared to engage deeply, or apparently *wished to appear* to engage deeply. Svetlana reports:

> Some participants take the "test" very seriously and focus intently on the screen, because that's what they've been asked to do. They ignore Svetlana's invasive observation techniques, becoming more intent at those times.

This may be interpreted as an example of the operation of self-surveillance identified in Foucault's metaphor of the Panopticon. Applying Foucault's familiar adaptation of Bentham's architectural prison model to *OTE*, Svetlana stands in for the guard in the central tower; she is sometimes visible and sometimes not. The participants, like the prisoners, are always visible to her and so internalize the norms of behaviour established by her apparent power over them. Foucault shows that the major effect of the Panopticon is "to induce in the inmate a state of conscious and permanent visibility that assures the automatic functioning of power. So to arrange things that the surveillance is permanent in its effects, even if it is discontinuous in its action" (1991, 201). Analysis of the recordings offers ambiguous support for Svetlana's observation above: on the one hand, it is notable how little people seem to be distracted by Svetlana when she appears in the viewers' line of sight, which may suggest they are studiously *avoiding* looking at her. However, of the two scenes selected for analysis, there are only a few points where she appears in front of the participant.

What is it that participants are submitting to when they consent? Is it the power of instructions, no matter how silly? Of institutions, that of the art gallery, or the university, whose HREC gives its experts' mark of authority to the consent script? Is it "science" and its manifestation in the unfamiliar-looking Tobii Pro Glasses 2? When viewed from the perspective of the companion-observers, Svetlana's performance of the process of gaining consent is read as a performance, and these participants, for the most part, do not limit their freedom to engage with the work as they wish. The different behaviours seen when watching this performance as a companion-observer or taking part in this performance as a "participant" suggest that being inducted into the work leads to a compliance not seen when not formally inducted into the work, despite both roles being played out within the same delimited space.

In staging a "laboratory" in an art gallery, *OTE* fits within the twenty-first-century trend toward the dramatization of science described in the context section above (for further examples, see Shaughnessy 2013; Kirby 2010; Bleeker 2008). Svetlana's observations suggest that viewers have become accustomed to the interpenetration of science and art. On the one hand, one participant critiqued the work for its lack of scientific rigour, discounting the aesthetic dimension:

> Svetlana got grilled. A research scientist asked way too many questions and offered advice on how to improve the quality of the data capture. . . . The scientific image presented confuses people. Many don't know how to respond, or

> respond by fitting the scenario into something that they are familiar with, an existing schema.

On the other hand, there are those who take their duties as citizen scientists very seriously and wish to make a valid contribution:

> My last participant, an older woman, appeared to see this project as a scientific rather than artistic project, believing, in her innocence, that Svetlana was a real scientist. . . . Following her session, the participant was apologetic and concerned about the accuracy and usefulness of her data as she "zoned out a bit, so it might not be that good."

This participant exhibits the implicit trust in science and technology as neutral and beneficial and beyond social and financial influence that *OTE* aims to critique. Although my older works *Sleep Disorders* (2010) and *Fool Asleep* (2012) did not explicitly gather data on audience responses, all three works seek to generate a response to the surveillance gaze of technoscience. *OTE* takes this interest further by foregrounding the participatory element but paradoxically finds that this may in fact work against resistance, reflective decision making, or even playful engagement. Participants are encouraged to actively engage in an entangled science-art context, but it would seem that the process of gaining consent positions participants as needing protection, after which they assume the position of passive subject of the scientific gaze.

Interpretations from the Control Society Thesis

This paper's final section employs findings from studies in cultural understandings of digital surveillance and big data to illuminate the findings of *OTE*'s qualitative and interpretative insights regarding participation, surveillance, and consent in participatory performance. Useful interpretive clues for the participant responses to *OTE*, that is, compliance on the part of those who have given consent to participation and surveillance, can be found in Kirsty Best's "Living in the Control Society: Surveillance, Users and Digital Screen Technologies," which looks at the three theses of Deleuze's "control society" and compares these theoretical constructions with evidence from a qualitative study of digital screen users' perceptions of the relative harms of surveillance. Best (2010) finds that, despite growing academic and political concern with data surveillance, users appear unconcerned, accepting greater usability for decreased control. The first of the three characteristics of the control society model interrogated in Best's research is the dispersion of surveillance that leads to convoluted and inaccurate circulation of personal information. Despite this, most people believe information gathering is transparent and accurate, and that only wrong deeds are punished. In Best's study, this belief persists in spite of a significant proportion of respondents acknowledging that they give false information as a way of gaining a sense of control (2010, 13). The second claim of the control society thesis is its lack of limits; "Surveillance is thus freed from spaces, and found instead at mobile, ever-present sites" (14). However, users express belief in place-specific surveillance, such as the workplace, and context-specific surveillance, especially pertaining to financial matters; Best notes that fraud is often misunderstood as a surveillance concern (16). She concludes, "Apart from these two context-specific belief patterns about surveillance, which localised anxiety within a confinable space or information domain, respondents were generally nonchalant about surveillance" (16).

The third area investigated reflects a commonality between the control society thesis and users' perceptions, where the control society concept describes surveillance as "participatory," in that "contemporary discipline is in fact self-discipline . . . part of what motivates such participation is that information transactions involve a seemingly worthwhile trade-off for consumers and

citizens" (Best 2010, 17). The "trade-off" is rationalized as a system of rewards and punishments, or as a process over which users have no control; fewer respondents identify a need to balance care and control, "most often voiced as a belief that surveillance will result in heightened security" (17). Overwhelmingly, the "idea of *being able to use* the technology is a key idea in respondent attitudes" (18, emphasis in original). The study's findings support other research which shows that "personalization and privacy are independent constructs. Users value each of these separately, and the former higher than the latter" (20). This is borne out in *OTE*: while some gallery-goers declined to participate in the work, none of those who expressed interest subsequently declined to participate, even though they were made aware that they would be subject to surveillance as a condition of viewing the work.

Best's findings run against the control society model, which does not necessarily suggest the model is wrong, she argues, but that publics have difficulties conceptualizing the abstractions of surveillance:

> If the control society thesis is a good representation of contemporary surveillance practices and their repercussions for the distribution of resources and power, then the fact that people do not internalise such maps, but instead understand surveillance in terms of localized spaces, realism and truth, means that there is a gap that hasn't been closed through public initiatives such as fair information principles. It seems, in fact, that abstract concepts of the flows of power in a complex networked, information dense and globalised society are not salient for users. (2010, 21)

Furthermore, Best's study suggests a degree of wilful ignorance regarding users' awareness of surveillance, and when inconsistencies are pointed out, respondents immediately refer to the trade-off. "Their attitude toward surveillance thus becomes a pragmatic one, where if participation in surveillance is a precondition to participation with technology, then as the latter is either desired or mandatory, it only makes sense to comply" (Best 2010, 20). However, Best forms a final conclusion, in the form of a question, suggesting that the complexities and lack of public understanding of digital screen users' perceptions of surveillance cast doubt upon the *existence* of consent: "If the majority of users are faced with a trade-off that can be described as expedient at best and as inevitable at worst, can consent truly be said to exist?" (21). Best's study offers support for my observations in *OTE* that, despite my intentions to invite resistance to the conditions of the "experiment," participants who consented to involvement were largely compliant.

A distinction is revealed at the heart of my artistic exercise in data retention, in which consenting to the work leads to a compliance not seen when the issue of consent is not addressed. *OTE*, however, was clearly delimited by the space of the Archive Room in which it was installed, while it is difficult to be beyond the reach of digital screen technologies if one wishes to participate in society. The very ubiquity of surveillance in our lives demands individual compliance such that the choice to consent or not to consent, to participate or not to participate, is always already marked by systems of power and control. Under such circumstances, it is tempting to claim that consent disempowers, and that informed consent is a kind of ignorance; even that consent does not exist. While participation in the research was defined, for the purposes of ECU's HREC, by the wearing of eye-tracking glasses, looking back at this distinction through the research project *OTE* shows its limits and, potentially, its dangers. The distinction is analogous to different kinds of digital screen users, where some are content to "create an account" in order to access online content, and some are not. We might consider the many businesses and community groups who use Facebook as their public face; to access their content, visitors must "sign up" or "log in."

Like the companion-observers, those who do not use Facebook choose to do without, or find alternative routes to information, rather than comply with the limited options made available. However, as Wendy Chun has shown, the very act of going online creates digital traces that can be followed by others with ever-increasing sophistication; software is inextricably interconnected with "transformations in modes of 'governing' that make governing both more personal and impersonal, that enable both empowerment and surveillance, and indeed make it difficult to distinguish between the two" (Chun 2011, 58).

It is a complex picture, made more so when digital on-screen surveillance is conceptualized as "big data," the term "used to describe the massive and continually generated digital datasets that are produced via interactions with online technologies" (Michael and Lupton 2016, 104), such as those the Australian Government's Data Retention Act requires telecommunications companies to retain. Big data is "involuted," write Michael and Lupton, in that publics are "both the subjects and objects of knowledge, both authors and texts, simultaneously informants, information and informed" (2016, 105). Moreover, such involution necessarily muddies the waters of knowledge such that critical data studies challenge the supposed neutrality and objectivity of big data. The instabilities compound: Michael and Lupton note that "public" is a shifting concept with various meanings and constituents (109), but the fact remains that data subjects are excluded from any benefits extracted from the collection and commodification of their data and have very few ownership rights to it. With data constantly in flux, knowledge is unstable, and this "raises issues around the relations of knowledge to 'ownership' (which may often take opaque forms)" (109); thus, privacy and ownership, too, are unstable. In an interpretation that might make sense of the inconsistencies of belief attested to in Best's study, Michael and Lupton

> imagine a sort of "oscillatory awareness" of big data as aspects of its prosumption come into and out of focus, individually and collectively. Thus, issues about privacy, ownership and data exploitation can shift between, or co-exist as—matters of overt concern and matters of routinized utility. (2016, 111)[1]

It may well be that the "low stakes" context of viewing art, which I anticipated might playfully encourage consideration of data retention among viewers of *OTE*, was in fact discounted as a context of concern and so worked against consideration of data retention. Michael and Lupton's proposed framework for empirical research in public understandings of big data requires conceptual shifts that might respond to Best's identification of the difficulties users have in conceptualizing the abstractions of surveillance, such that notions like "affect" and "imagination" are important to research design (Michael and Lupton 2016, 112). Furthermore, Michael and Lupton suggest that the research methodology will be performative, shaping the sort of social data that are produced, and recursive, where a study can become part of its own object of study, such that "the empirical task also becomes one of creatively enabling lay people's imaginative and affective relations to big data to *unfold*" (113, emphasis in original). On the other hand, then, it may be that *OTE did* encourage consideration of data retention; participation was anonymous, and no follow-up was done to measure impacts after the event.

It is important that cultural critiques encourage reflective decision making on personal and policy levels when it comes to our involvement with various surveillance interventions that encourage us to share personal information without fully understanding their implications. *OTE* reflects participatory contexts in contemporary art, showing that "participants" tend not to be concerned with data surveillance and generally consent to donating their personal data. While the work generated hard data that offers information about where we look, who we look at and how long we look at a particular work of art, the live art installation staged encounters that dramatize the

act of looking and being looked at, generating empirical evidence that offers another way of investigating the act of sharing personal data. The qualitative data generated by *OTE* show that those who formally consented to participation through ECU's Human Research Ethics Committee process display higher levels of compliance than those who "participated" by refusing to be involved or by participating as a companion-observer, where these viewers of the work display a much greater range of behaviours in response to the work. At the same time, while these non-consenting participants displayed a greater freedom of response because they were not wearing the glasses, they were nevertheless compliant objects of the institutional gaze.

OTE deliberately deploys tropes that suggest an oppressive presence of "science," "state," and "managerialism," raising questions about what it is that participants are submitting to when they consent: the power of instructions, institutions, technoscience? Literature addressing cultural understandings of digital surveillance and big data shed light on *OTE*'s qualitative and interpretative insights regarding participation, surveillance, and consent in participatory performance. In particular, the Deleuzian notion of a "control society" that posits twenty-first-century surveillance as opaque and dispersed is not reflected in public understandings and engagement with digital technologies.

Furthermore, "participatory" surveillance encourages self-surveillance and pragmatic decision making where compliance is rewarded with access; in *OTE* the reward was viewing the video, a work in its own right.[2] These factors come together in *OTE* such that I might suggest an answer to the question posed above: when participants consent to being involved in the work they are submitting to the *combined powers* of instructions, institutions, and technoscience represented in the HREC's contractual consent relationship that purports to both inform and empower, yet does neither. Rather, it is evidence of the managerialism with which we are so familiar that it is treated as merely a minor obstacle to overcome rather than a process of consequence. It must be acknowledged that the HREC offers modest protection to participants in a scholarly artistic context, while state and commercial enterprises offer no such protection; the state's lack of privacy protection is supposed to protect us from a larger threat, while commercial entities are permitted to exploit private individuals. However, the HREC transacts its "protection" via a managerial veneer covering a corporate agenda. In *Only the Envelope*, the Human Research Ethics Committee stands in for various supposedly neutral and objective state apparatuses that quantify and commodify, substituting for the complex processes of negotiating and understanding quality and value.

Acknowledgements

My acknowledgements are due to research assistant and performer Rachelle Rechichi; technology consultant Neil Ferguson; to all participants, consenting and otherwise; to Sally Knowles and David Hodgson for careful readings of drafts of this paper; to eResearch Coordinator Heather Boyd, who reached out to me as a creative arts researcher; to Edith Cowan University's eResearch Technology Funding Scheme; and to the School of Arts and Humanities, for their financial support.

Notes

1. To the figure of the "prosumer" Michael and Lupton add "produsage," a neologism reflecting data assemblages that "both draw on individuals' personal data and contribute to large digital datasets and, in turn, may be used to feedback to individuals" (2016, 107). Similarly, "prosumption" implies the intermixing of producing and consuming content.

2. McKenzie, Ben-Ary, Lehrer, and McKee, 2014. Involution and recursion characterize this digital video work, which is extended in *OTE* and explored in McKenzie 2017.

References

Best, Kirsty. 2010. "Living in the Control Society: Surveillance, Users and Digital Screen Technologies." *International Journal of Cultural Studies* 13 (1): 5–25. doi:10.1177/1367877909348536.

Bishop, Claire, ed. 2006. "Introduction." In *Participation*, edited by Claire Bishop, 10–17. London, UK: MIT Press.

Bishop, Claire. 2012. "Delegated Performance: Outsourcing Authenticity." *October* 140, 91–112. doi:10.1162/OCTO_a_00091.

Bleeker, Maaike, ed. 2008. *Anatomy Live: Performance and the Operating Theatre*. Amsterdam**:** Amsterdam University Press.

Chun, Wendy. 2011. *Programmed Visions: Software and Memory*. Cambridge, MA: MIT Press.

De Oliveira, Nicolas, Nicola Oxley, and Michael Petry. 2003. *Installation Art in the New Millennium: The Empire of the Senses*. London, UK: Thames and Hudson.

eResearch Technology Funding Scheme (ETFS). n.d. http://intranet.ecu.edu.au/research/for-research-staff/research-support/eresearch/eresearch-technology-funding-scheme.

Foucault, Michel. 1991. *Discipline and Punish: The Birth of the Prison*. Translated by Alan Sheridan. London, UK: Penguin Books.

Foster, Hal. 2004. "An Archival Impulse." *October* 110, 3–22. http://www.jstor.org/stable/3397555.

Foster, Hal. 2015. "Exhibitionists." Review of *Ways of Curating*, by Hans Ulrich Obrist, and *Curationism: How Curating Took Over the Art World—and Everything Else*, by David Balzer. *London Review of Books* 37 (11): 13–14.

Goldberg, Lisa Carrie. 2010. *Perth Institute of Sleep Behaviour* [Installation artwork]. Perth, Australia: Perth Institute of Contemporary Art.

Griffiths, Emma. 2014. "Data Retention Laws: Tony Abbott Says Government 'Seeking Metadata', Not Targeting People's Browsing History." *ABC News,* August 7, 2014. http://www.abc.net.au/news/2014-08-06/security-laws-abbott-browsing-history-not-collected/5652364.

Harpin, Anna, and Helen Nicholson, eds. 2017. *Performance and Participation: Practices, Audiences, Politics*. London, UK: Palgrave.

Harvie, Jen. 2013. *Fair Play: Art, Performance and Neoliberalism*. Houndmills: Palgrave Macmillan.

"Interview with Michael Brissenden, ABC AM." 2014, August 6. *Australian Government Department of the Prime Minister and Cabinet*. http://pmtranscripts.pmc.gov.au/release/transcript-23710.

Kirby, David A. 2010. *Lab Coats in Hollywood: Science, Scientists, and Cinema*. Cambridge, MA: MIT Press.

Michael, Mike, and Deborah Lupton. 2016. "Toward a Manifesto for the 'Public Understanding of Big Data.'" *Public Understanding of Science* 25 (1): 104–16. doi:10.1177/0963662515609005.

McKenzie, Vahri. 2010. Sleep Disorders [Live artwork]. Lisa Carrie Goldberg's *Perth Institute of Sleep Behaviour*. Perth, Australia: Perth Institute of Contemporary Art.

———. 2016. *Only the Envelope* [Installation artwork]. Bunbury, Australia: Bunbury Regional Art Galleries.

———. 2017. "Only the Envelope: An Artistic Exercise in Data Retention." *PARtake: The Journal of Performance as Research* 1 (2): Article 5. http://scholar.colorado.edu/partake/vol1/iss2/5.

McKenzie Vahri, and Hellen Russo. 2011. "Design, Form, Light, Movement." *Helen Herbertson & Ben Cobham Co/Lab*. Perth, Australia: King Street Arts Centre.

———. 2012. Fool Asleep. *Fringe World Festival 2012*. Perth, Australia: The Treasury.

McKenzie, Vahri, Gemma Ben-Ary, Jacob Lehrer, and Alex McKee. 2014. *Telephone* [digital video]. Perth, Western Australia: Spectrum Project Space. http://ro.ecu.edu.au/ecubooks/1/.

Shaughnessy, Nicola. 2012. *Applying Performance: Live Art, Socially Engaged Theatre and Affective Practice*. Houndmills: Palgrave Macmillan.

Shaughnessy, Nicola, ed. 2013. *Affective Performance and Cognitive Science: Body, Brain and Being*. London, UK: Bloomsbury Methuen Drama.

Welsh, Ian, and Brian Wynne. 2013. Science, Scientism and Imaginaries of Publics in the UK: Passive Objects, Incipient Threats. *Science as Culture* 22 (4): 540–66. doi:10.1080/14636778.2013.764072.

ARTICLES

Organismal Futurisms in Brown Sound and Queer Luminosity: Getting into Gressman's Cyborgian Skin

Sandra Ruiz

My skin glows in the dark shines in the light
It's the color that holds me tight
My brown me is the shade that's just for me
I'm never not missing anything but me
Cause I love you
And I can't miss anything but you
You're stuck on me
And all this time I'm inside you
Our time together we grow
We stretch and show
It's tough as it goes and it won't rub off of you
—Helado Negro

For contemporary, indie, electronic singer-songwriter, and son of Ecuadorian immigrants, Helado Negro, or Roberto Carlos Lange, the above lyrics are an homage, a love poem even, to that Brown skin that "won't rub off." "It's My Brown Skin" lays bare the intricate contours of our biggest organ: it is "stuck" on us, and we are always already inside of it. This interarticulation between the interiority and exteriority of the subject, as Helado Negro explains, intently coheres human affection to such an extent that one can't "miss anything but" it. But what happens when the human skin we live in isn't thick enough to mediate ideologies of race, sexuality, and gender? What happens when we must turn profoundly inward because the meanings that accrue to "the color that holds [us] tight" constrict, contain, and contort our Brown existence? How thick is our Brown skin, then?[1]

Pulling from the metaphoricity of skin, too, is Miami-born queer and Colombian avant-garde performance artist, Erica Gressman.[2] In *Wall of Skin* (2016), Gressman pulls back the layers of her Brown skin that both "shines in the light" and "holds one tight" by cloaking herself in five layers of white Lycra spandex zentai, or a face-covering full body suit, in order to eventually unearth her insides. Fusing noise music, analogue technology, including circuit-bent electronics, handmade synthesizers, cybernetics, and a process she calls "bio-feedback" (an intersection of aesthetics and science), Gressman plays sound and light through and across her layered skins, giving new meaning to phrases like "skin deep" and "jumping into one's skin."[3] Her cybernetic skin is composed of a handcrafted light-sensitive audio synthesizer, made in the tradition of composer and pioneer of "home-made" electronic music, Nicolas Collins.[4] As the image of the instrument below shows, an integrated circuit chip on a protoboard produces three separate, yet rapid, clicking signals that are controlled by three photoresistors.[5] In this original instrument, light is the input; sound is the output, making the latter responsive to movement. The more light is engendered, the higher the pitch of sound.

Sandra Ruiz is assistant professor of Latina/Latino Studies and English at the University of Illinois at Urbana-Champaign. Her articles have appeared in *Women & Performance* and *Small Axe*. Her book *On Rican Death and Endurance: Performances of the Unwanted* is under contract with New York University Press and examines how acts of bodily and sensorial endurance by Puerto Rican artists and revolutionaries serve as aesthetic and political interventions under colonial temporality.

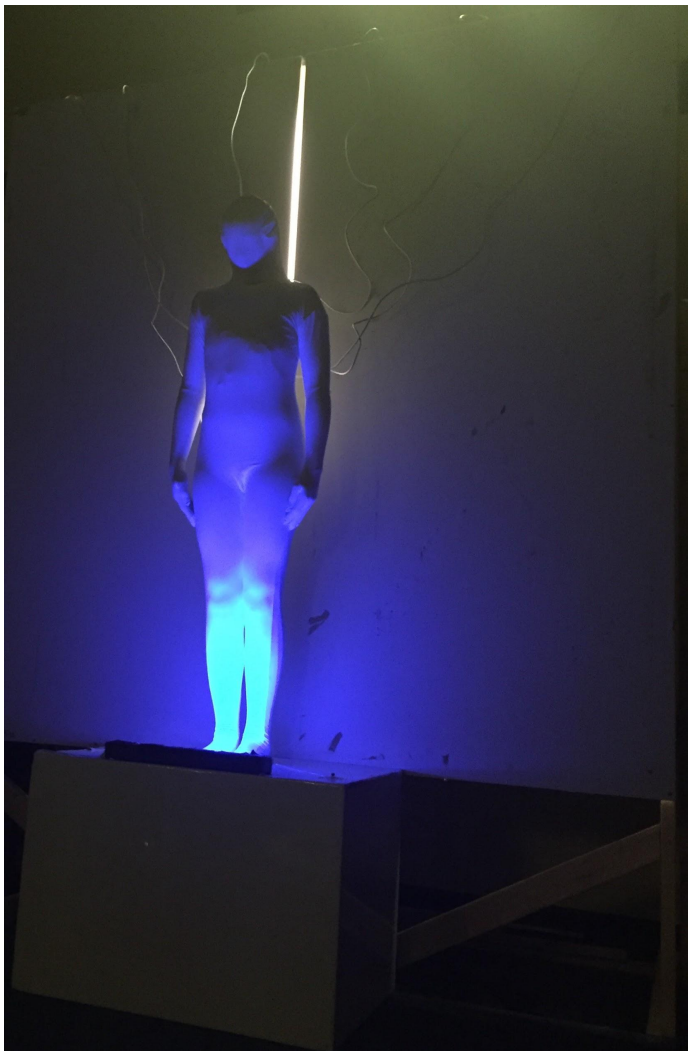
Exterior shot of instrument. Image courtesy of the artist.

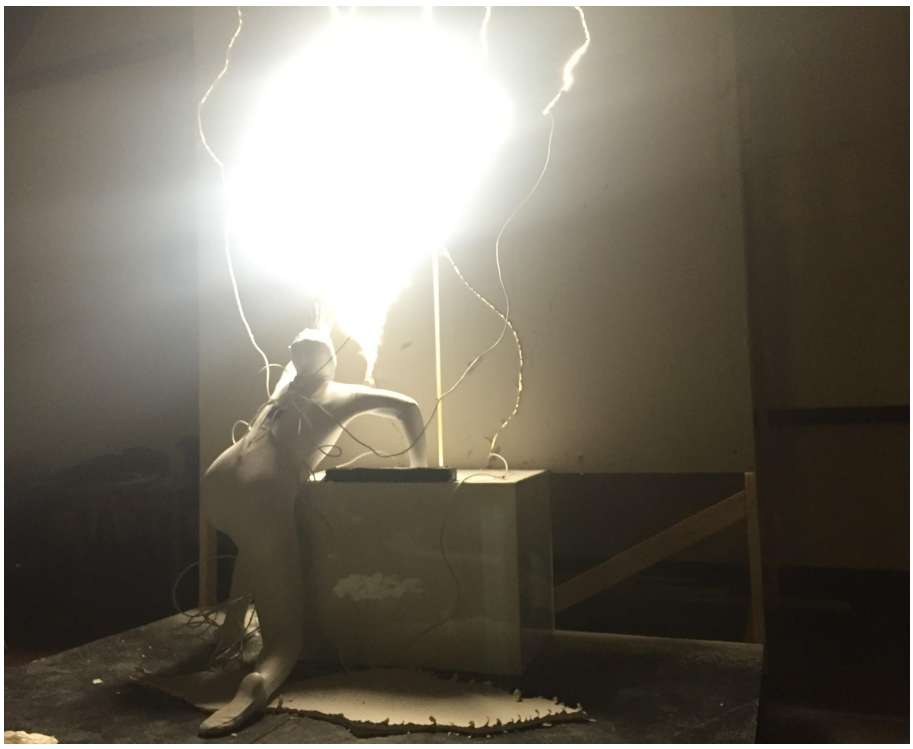

Interior shot of the instrument. Image courtesy of the artist.

Gressman begins her performance in the dark, on a raised platform in front of a piece of drywall with cables attached to it. She is dressed from head to toe in her snug white cybernetic skin, her breasts taped tightly against her chest and her face obscured to erase any conventional markers of sex, gender, and race. Erect and still, with her arms tightly by her side, the faceless artist bows to the floor. As the performance progresses, Gressman begins to move—deliberately. Immediately, one notices that these same cables are also tied to her back, exacerbating the sense of anxiety, difficulty, thrill, and extreme spectacle that already motivates the piece; forcing one to think: how will Gressman release herself from this wall, breathe against her own skin? Moving back and forth across the stage, while vigorously pulling cables from this breakable wall she too has made, Gressman slowly liberates light from the wall and creates sound. For almost twenty-five minutes, three sensors, set to different resistances, produce three distinct sounds in *Wall of Skin*. Her oscillating instrument is guided by three signals, each with a photoresistor enduring degrees of light, and a potentiometer filtering the resistance levels of individual signals. While no specific symmetrical harmonic structure is pre-planned, Gressman adjusts the potentiometers prior to each performance to create a "non-technical harmonization." That is to say that the artist arranges a sense of harmony between the three signals by tailoring them to distinct ranges based on what motivates her ear. There is no actual pitch tuning or mathematical symmetry that motivates Gressman's sounds, varying between consonance and dissonance. In this symbiotic relationship, Gressman's ear is triggered by her own bodily movements; however, her moving body alters the direction of sound, creating a vigorous

ensemble between embodiment, sound, and light throughout the entire piece. With a fierce political impulse for the synesthetic, here, one sees how Gressman becomes an organism, prompting the proliferation of sound through the simultaneous interaction of bodily movement and light.[6]

The spectator experiences shimmers of luminosity as the artist becomes the visual and live embodiment of sound. As she strips herself of four *zentai* within twenty-five minutes—one by one—light beams resembling the structure of pipe organs are revealed. This interconnection between the illuminated wall and her choreography becomes a necessary element in Gressman's musical composition of controlled chaos. Through the aesthetic and political figure of the cyborg, the artist places pressure on white, heteronormative practices of sound performance and the ontic infelicities of Brownness and sexuality. "I have always wanted to find ways to artistically and scientifically capture and embody sound as a queer woman of color," Gressman explains. "*Wall of Skin* is the closest way that I could visually embody sound, what it could look like. It is also a way for me to break down walls, our joined layers that block our inner core." Brownness and queerness, here, become elaborated visual extensions of her anatomical self—life-lines that are soon cut through this white drywall that she herself pulsates through Brown sound, queer luminosity, and bodily movement.





Stills from *Wall of Skin.* Images by author.

In this article, I read Gressman's piece against the sensory stimulus of her unseen skin. I turn to philosophies of science by Donna Haraway, Chela Sandoval, and Michel Serres to argue that Gressman's sonic and kinetic enactments transition her into a new organism in which light changes sound, being Brown, racialized, and queer in performatively hybridized ways. Gressman provides a new way of doing politics by decentring the human form and reformulating the Brown, queer

subject through the interface of technology, science, and aesthetics. By controlling how sound determines light, and consequently spectatorial experience, she asks her audience to tap into the patience of the ear, and to experience race, gender, and sexuality carefully, sonically, uncomfortably. Such an act, importantly, allows listening itself to extend the senses and point out how the ear, too, can listen for, to, and beneath the skin.

It is in this practice that Gressman proposes an antidote for thicker skin: listen for it, be illuminated with it, turn inwards, and embody experiences that run counter to those sounds that deafen difference to one kind of "skin glow." She concedes that "my brown me is the shade that's just for me"—invigorated by the interplay of her queer luminosity and anatomical insight. Or, as she discloses throughout her work: when we stop peeling off our layers, we remain complacent in our human sameness, excluding, unconsciously even, our differences. It is in sites of controlled chaos, sometimes beside, around, a little outside of the human, that the most compelling identificatory markers reveal themselves, often testing one in order to free one of such entrapment.

Gressman's Transcendental Layers: Rubbing the Skin Raw

The above description of *Wall of Skin* only touches the surface of its many layers. Like Gressman herself, the more denuded, the less one can see and listen singularly. This is precisely Gressman's political intention: to keep us transfixed by the multiplicity in meaning and experience within the space of first darkness, to the effervescent lights and experimental sound, all in cyborgian ways. In doing so, Gressman travels new citational pathways to undress race, gender, sexuality, and sex, propelling the spectator to join in. *Wall of Skin* is open-ended and often coincides with the constitution of the audience, she confesses in my 2016 interview with the artist.[7] "I'm post-human, I mix genres, the senses," and they become analogies for "my own mixed background as a queer Latina with a white father, [who was] born and raised in a conservative Colombian family fuelled by Catholicism, in which my mother was both my mom and dad." These details help frame the major tenets of the performance, even if she invites the spectators to project their own stories and selves onto her own. Her polemical relationship with religion, race, gender, sex, and sexuality and her love for experimental art and the philosophy of science all contribute to her aesthetic intentions, revealing just how closely tied art and politics remain for the artist. For Gressman, her history carries dissonant and disturbing sounds. She invites us to lend an ear, a listen-with.

Gressman's tour with sound began at a very young age, participating in art camps and guitar and drum lessons in Miami.[8] Later, in high school, she played in various bands, spending copious amounts of time at punk shows. These punk shows were transformative and liberating, and they inform much of her aesthetic style today, or as she explains: it was the most "striking image for me to see queer Latinos as punks, in their 'costumes,' as a Catholic school kid. I wasn't out yet at this time, but heard queerness expressed through the music, the clothing."[9] The punk aesthetic has had a longstanding relationship with queers and people of colour, often serving as a refuge for many minoritarian subjects. For Tavia Nyong'o, this aesthetic provides an avenue for expanding constructions of sexuality, sound, and politics, that is, past binaries such as straight versus gay, conservative versus obscene (Nyong'o 2008). Punk enables the creation of new social spaces and innovative contrasts to dichotomous thinking by operating as a type of "running through and out of the shit the world throws at its most vulnerable" (Nyong'o 2010, 75). This "running through" is relevant to how José Esteban Muñoz rethinks the space of the negative in punk culture. While it appears that "punk aesthetics tells us the story of the negative" (one side of a binary), as Muñoz

asserts, for being anti-establishment and advocating for the destruction of institutions, it actually allows for a kind of being-with that stems from a reordering of the dialectic between the "positive and negative" (Muñoz 2013, 97).[10] If punk stems from a space of the negative, then it also produces a place for potentiality beyond it. Or as Elizabeth Stinson says of the movement, "punk sound, as a radical force, has the potential to open a vital and alternative space of sexuality and performance" (Stinson 2012, 279).

At punk shows Gressman became captivated by the theatricality of underground music, remembering how "a human body completely letting go in front of a group of people was the most radical thing" she had ever witnessed. But being a Catholic school girl was equally metamorphic: Gressman recalls that her daily life was saturated with religious iconography from sounds like Gregorian chants and playing pipe organs, to images of the "bleeding body of Jesus" beautifully suffering and "exposing the human as both very weak and powerful." The confluence of punk culture and Catholicism remain central components of her body of work. One sees the artist negotiating between the radical and resistant impulses of punk culture and the guilty and guilt-ridden pleasures of Christianity.[11] This interplay, tension, site of personal and political disidentification informs the intricate details of her cultural labour: Gressman is always at odds with both her desires and her distastes—a mixture that remains as hybridized as her humanoid, and as erotic as her emotional pain.

But this hybridization of aesthetics, spirituality, and politics would evolve as Gressman encountered new experimental art practices. While at New College of Florida, one of the most liberal colleges in the state, Gressman became involved in the noise music community, which altered her overall conception of sound. During this time, in which the free trade protests dominated the daily scene, musicians were encouraged to rage against the state and form alternative affective states of belonging and music/world making. While she found "her kin" in queer and experimental communities at New College, she missed connecting with students of colour. This would become, as Gressman explains, a critical realization in her work: the overabundance of whiteness in the institutionalization of aesthetics, something she visually plays with in *Wall of Skin* via the preponderance of the colour white—in noise, lights, costuming, props, set design.

At New College, Gressman studied philosophy, psychology, and music, eventually being led to experimental sound. But, the first two fields of study remain influential in her work, particularly in *Wall of Skin* where she builds from the unconscious renderings of human fantasy to exploit social life. Or how the philosophical pursuit of the human—from her facticity to ontology—beautifully mirrors the anatomy of the subject. All of these fields of thought eventually led Gressman to performance art where she could combine her love of theatre, film, music, and movement and continue to investigate opposing modes of her identity.[12]

Since 2009, Gressman has produced work that expounds on ideas of embodiment, sound, science, and technology. From *Hair Composition,* in which she amplifies the sound of her hair being brushed, to the sound of a hacked corset being pulled out in *Female Distortion*, to *Wall of Skin,* Gressman plays with the spectator's experience of bodily noise and generates new sensorial politics of bodily materiality, where one's innards are as apparent as the outer film of skin, and where inside and outside are anything but distinct. This is exemplified in one particularly notable piece, *Full Frontal Biopsy*, in which Gressman performs what she calls a "self-surgery" on her abdomen, using a Dremel drill to stand in for a scalpel. Gressman transforms herself into the character of Boogita, a "hyper-feminine Miami consumer" turned monster. Boogita is an uncanny monster covered in "frightening

makeup, fishnet stockings, corsets, a lab-coat," and an untamed wig. It's a Brown monster we've all seen someplace in urban Latina life; its excessive raunchiness calls us forward in a familiar and disturbing way. Placing a plastic plate on her stomach, attached to a contact microphone, Gressman uses the "drill to operate on herself," amplifying vocal noises from a different contact microphone in her mouth. Her vocal noises and the sounds of the drill on the plastic plate are looped with effect pedals, creating deep drum-like vibrations and layers of sound. As the drill is in direct contact with the plastic, the contact microphone transduces the actual sound, and the contact microphone in her mouth amplifies biological noises. This performance produces what the artist describes loosely as a bio-feedback composition: she constantly responds to the sounds she creates with both her body and the "scalpel," generating new layers of sound to create a "desired output response." For the artist, sound and image exact memory, feeling, a sense of belonging/non-belonging through a figure both manufactured and consuming. Gressman pushes noise music into the space of theatre and science in this work, stating, "I am the input and the output, the patient and the surgeon, the artist and the audience."

Boogita, Gressman states, exposes "her innards in a manner both abject and narcissistic. The performance is erotic and horrific, as she tears herself to pieces with the drill. Its masturbatory appearance transforms into a violence that once again becomes uncomfortably erotic." The tension between abjection and the want to cleanse the body of such distaste, a Kristevian admission to say the least, leaves Gressman always under her skin but safeguarded by the fantasies that protect it. Gressman never gives us all of herself; it would be, as she notes, a pleasure we must work toward together, in constriction, tightness, the small spaces of the self.

Gressman's Bio-feedback: Posthuman Desires

Wall of Skin commences with Gressman as human-like organism recently, and neatly, dropped on planet earth, silent and still in the darkness: only the play of light on cybernetic skin awakens its other/worldly voice. Gressman is an avatar, a cyborg, an alien, a familiar, yet strange posthuman, not-quite-human, or more than human fantasy. Gressman notes: "I think it's incredibly seductive to enter a fantasy, even if it ends in a somewhat dystopic way, where there is something familiar to human form, and no face." For the artist, the seduction of this lies in the detail between the human and non-human, science and science fiction, the senses and aesthetics.

In her groundbreaking 1984 posthuman manifesto, philosopher of science Donna Haraway turns to the cyborg to examine the feminist modes of embodiment and politics at play in emergent forms of bio-communication. For Haraway, "communications technologies and biotechnologies are the crucial tools recrafting our bodies" (Haraway 2000, 302). The manifesto suggests that we, too, forge ahead with the times by learning to communicate in our feminist practices differently. Haraway proposes new feminist "affinities," not identities, fostered and mediated by different relations of power between and across material formations: the organic/inorganic, technology/human, human/animal, animal/automaton, and their subsequent hybrid intersections. The cyborg, here, is both a cultural figure encrusted with political histories and an analytic by which to read "the name of one's feminism" outside a "single adjective" (295). The cyborg is a site of resistance and foresight, a transgressive mechanism destabilizing the human's role as the centre of subjectivity and existence. The cyborg "is a matter of fiction and lived experience," a "cybernetic organism," a blend of "technology and biology" (291). Haraway adds that the border between

> science fiction and social reality is an optical illusion . . . we are all chimeras; theorized and fabricated hybrids of machine and organism . . . the cyborg is our ontology; it gives us our politics. The cyborg is the condensed image of both imagination and material reality, the two joined centres structuring any possibility of historical transformation. (292)

In further elaborating this tension, Haraway assembles a theoretical hybrid, built from the space of intersectional thought. In her assemblage of a postmodern feminism, there's a deliberate interexchange between women of colour feminist thought, feminist science studies, science fiction, and all those relevant "techno-monsters" in fiction and film. Thinkers such as Cherrie Moraga, Audre Lorde, Octavia Butler, and Chela Sandoval help articulate Haraway's cyborg feminist agenda.

In particular, Sandoval's decolonial feminist position runs deep throughout Haraway's piece, helping Haraway move toward a politics of "affinity and coalition," and beyond figurations of identity as a definitive and stable signifier of the subject (Haraway 2000, 296). In theorizing the details of intersectionality, Sandoval propels us to account for the "science of oppositional ideology"—a consequence of US Third World feminist thought and women of colour revolutionary labour (Sandoval 1991, 2). Third World feminist thought, for Sandoval, is a corrective to second-wave feminism in which the white female human remains at the apex of inquiry. Sandoval's theory calls for an "oppositional consciousness" against "hegemonic feminism" (3). In this, she establishes her own technologies (i.e., equality and social reformation across modes of difference) for reordering structures of power and ideology, which often reinforce the dichotomy of gender and exclude people of colour from dominant dialogic encounters, from feminist theorizing itself. In a direct address to Haraway, more than a decade later, Sandoval proposes her own manifesto of a cyborg feminism through the methodology of the oppressed. In her positioning, however, "the colonized peoples of the Americas have already developed the cyborg skills required for survival under techno-human conditions as a requisite for survival under domination over the last three hundred years" (375). For Sandoval, the racialized, sexualized, colonized human has always already been "cyborged," forcing one to rethink traditional constructions of cyborg consciousness, in which the colonized other is front and centre. Sandoval underscores the colonial legacies of and resistances to the rendering of human beings into technologies in the service of other humans and systems of power. Her cyborg feminism is not only a theoretical proposition, but a practice she hopes will inform feminism's newest trajectory, whereby women of colour are no longer marginalized from the category of the human itself.

The cyborg, then, is most viable as a site of resistance and transgression when its wires are crossed in intersectionality. Gressman claims that the multi-dimensional figure of the cyborg allows her "to be free of being completely human, since the human can be too limiting." The cyborg is a site of political potential that the human form, as figured in hegemonic social and biological discourses of "man" cannot offer her. The cyborg, she adds "is the best way to embody sound because sound can help move with and beyond politics, race, sexuality" without erasing them, of course. One can easily say that this is a piece about metaphorically shedding one's identity, but as Gressman poignantly notes: "I don't get out of the last layer of skin because there's no way to actually escape ourselves"—our markers of difference remain central to our essence and pursuit of eternal freedom. For Gressman, the nearest way to a futurity in which she can breathe in her own skin is through the ephemerality of sound and "keeping her fantasies alive through this cyborg creature." Her oppositional cyborg is both trapped and empowered by tearing down walls.

Gressman's hybrid-human is fuelled by this mediated tension: her cyborg is the site that frees her from the limiting constraints of the human, but that also binds her to her own skin and laboured breath. This skin is not one she hopes to "rub off," but instead to mask, in order to unsheathe, showing just how painful, exhausting, and all-consuming easy constructions of difference can be, precisely when the subject is supplanted by an illusory identity politic. Here, Gressman expounds on the brilliant residue left over from Haraway's feminist cyborg and Sandoval's methodology of the oppressed. Gressman is Sandoval's Brown cyborg, labouring against the sonic and kinetic impulses of racial capitalism. We witness this act of labour in her moving body as well as in the residue of her trapped breath—air she must sustain under layers of *zentai* over and as her own skin. Her cyborgian flesh against our own, all of us covered by the thematic impulses of the cycles of life, or perhaps a desire to return to warmest of wombs, where breath, too, is measured, contained, and evidence of existence.

Gressman's piece is meant to elicit fantasy and play, and although her cyborg is visually and sonically stunning, it is equally asphyxiating. One is required to sit with Gressman's difficulty in order to exit the performance. In deliberately imagining what being Colombian and queer might sound, feel, move, and look like in everyday life, she reorders our normative schemas of deep listening, sight, and viscerality; and by extension, sensorily breaks the spell of difference, while never revealing her flesh. Gressman does this by reorganizing her breath and movement in the space of extreme difficulty—both for herself and the spectator. Jennifer Doyle reminds us to use the term carefully and to be with difficult objects in all their ambivalent overtures (Doyle 2013, xvii). For Doyle, "difficulty" is a mode of thinking, an analytic by which to read and experience art and spaces generally considered controversial, immoral, deviant, and too problematic to endure. She cautions us to do the hard labour of being with objects that might elicit pain and tap into other negative affective registers, and that might be dismissed for requiring too much work. If the viewer is willing to put in the work, even at the expense of a (be)laboured breathing, art can enable a transformational moment between the artist, viewer, and even the object itself. Gressman presents us with this call in *Wall of Skin,* as she, too, fights against her own histories and materialities.

Wall of Skin materializes the everyday sentiments of a Brown, queer subject; it stages the minoritarian labour of learning to respire, move, remain in/visible under difficult systems of oppression and subjugation. Perhaps Gressman shows us a way to make it in a world that is inherently refusing: learn to inhale and exhale against the tempo of the world's dominant sound and light system. For the first five minutes of *Wall of Skin*, which inevitably feels more like fifty minutes, Gressman remains completely cloaked, steadying her breathing with slow patterns for the first half of the performance. As the piece evolves and the *zentai* come off, Gressman starts to liberate her breath; however, she is still unable to see, hear freely. This contributes to the continual difficulty of the performance: overheated, exhausted, drained, she performs within the claustrophobic walls of her own skin, trying to escape her invisibility through and against her fabricated visibility. Here, too, as she records in an email correspondence, she is trying to break out from but confront her debilitating history with sexual abuse and violence. Gressman's perpetrator, here, becomes *that very* skin she can't rub off, even in her desire to scratch the surface of her violent contusions. Desiring to peel off her skin to erase this historical violence, Gressman attempts to take leave of her body. But alas, her cyborg, after approximately twenty-five minutes of struggle, ends lying on a platform, practically in a fetal position, with the white bodysuit still on. Gressman is a body without a face, face without inherent organs, on the brink of humanness and machine, at the edge of breath. The latter gives her just enough sentiment to pull through and hold on to her own skin.

The Skin She's In: Gressman's Mingled Body

Gressman's entire performance is a deliberate play on the term skin, showing us just how many ways there are to skin one's skin. If our skin's central function, as our largest organ, is to protect our internal organs from harm and infection and to manage how we receive information through our other senses, such as touch, Gressman takes this idea to the extreme by using layers of synthetic cloth to protect her flesh; this artificial texture binding her entire synesthetic and somatic experience, and ours, too. But if the skin enables us to touch something and be equally touched in return, Gressman both limits and expands this sensory symmetry. While she is sensorily restricted by the multiple layers of *zentai*, her instrument, via the photoresistors running to audio-oscillators, incites heightened material abilities, as it allows her body, through the control of light, to both manipulate and respond to sound.

In *The Five Senses: A Philosophy of Mingled Bodies,* philosopher and history of science professor Michel Serres sets out to recuperate the senses from a capitalist world system inundated with information and discourse (Serres 2008). For Serres, the language has overdetermined our engagement with the senses, telling us how to sense, instead of actually sensing through the body. In an attempt to rethink and reorder our inter- and intrasubjective experiences, Serres privileges human perception, the body, and sensory stimulation and considers how our senses contain a reservoir of knowledge outside the mandates of *cogito* and language. To elaborate, he first attempts to disentangle our senses but inevitably fails at this already impossible feat—our senses are more conjoined than they are separated. Like all of his work, Serres's book on the senses "is a hybrid; and its connectivity and cohesion" are conjoined by the interarticulation of categories and schools of thought (Sankey and Crowley 2008, vii). He moves from literature, philosophy, art history, aesthetic theory, and science, crossing genres, to bridge his contemplation with the sensory stimulus. Throughout his book, however, the reader is left without signposts; our hands are held by something other than footnotes, marginalia, or elaborate context between objects of analysis. Here, the reader's hand is held by the sensory input they also experience in their mingled bodies. For Serres, like for Gressman, the senses are always already intimately conjoined.

But still Serres attempts to create a categorical imperative for all senses: each of his chapters is separated and shaped by a sense. Serres even advocates for a sixth sense ("Joy") that forms the full composite of our sensorial body and the affective responses it conjures.[13] For example, in "Veils" he meditates on skin and touch, and by extension draping, or veiling, texture upon skin, or how symbolically every "epidermis would require a different tattoo" and "each face an original tactile mask" (Serres 2008, 24). He argues an important point in this chapter that is also fundamental to Gressman's work: the skin is the prime locus for sensory input and output. The skin "can in one sense be regarded as the ground or synopsis of all the senses, since all the organs of sense are localized convolutions of it" (3). He adds that "in the skin, through the skin, the world and the body touch, defining their common border . . . the skin intervenes in the things of the world and brings about their mingling" (97). In other words, at the apex of our "mingled bodies" lies the contingency of the skin; the skin is what informs our central and most important encounters with the self and others. It is the skin we live in that tightly drapes our other senses: our very ears are covered by flesh, the tip of our noses a reminder of texture. The skin, then, precisely adheres our senses, adheres us.

Gressman challenges the science of the skin through an alternative position of flesh, race, sex, and the ecstasy of the subject. First, Gressman covers her already white skin in multilayers of white, clingy fabric, preventing herself the privilege of her full senses. Second, she eventually unveils these layers one by one, although remaining cloaked in one last layer. We are never granted the pleasure of her body-body. Third, the internal chaos she sustains, inflicted by sexual abuse, racism, sexism, queerphobia, essentially becomes visual and electrical life-lines; eight fluorescent lights eventually resemble the structure of an organ pipe, or the circulatory system Gressman pulls out from her insides. Here, she illuminates the electrical interiority of the human, or just how fundamental light is to the "vision" of the subject. "Our bodies are full of electricity; we are electric," she reminds me in our interview, and "light and sound share similar scientific properties."

When asked why she turns to light (and not other sensors activated by temperature, or water, for example) and the overabundance of white objects, space (why not appear in all black?) alongside the figure of the cyborg as a larger commentary on being Brown and queer, Gressman explains that there are several reasons, some technical, some personal, and some political:

> I need to be in a white suit, costumes, surrounded by a white wall because they all reflect light to create more sound; white reflects light and works like a mirror. The sound is responsive to my movement; and I am working to make the sound as active as possible. I'm trying to offer the audience a type of light ecstasy. My cyborg is empowered by light, not blinded.

Sound amplifies this sentiment, as Gressman notes: "it's like queer ecstasy, reaching full movement, and cadence in both movement, light, and sound." In his last chapter called "Joy"—an attempt at that sixth sense—Serres turns to bodily joy, or ecstasy as a sense. Of this bodily ecstasy, covered in skin, Serres says that the body is not a mere object in space and time or a "simple passive receptor.… It loves movement, goes looking for it, rejoices on becoming active, jumps, runs, or dances, only knows itself, immediately and without language, in and through its passionate energy" (Serres 2008, 316). But this movement and energy are tethered to the body's potential collapse: "it discovers its existence when its muscles are on fire, when it is out of breath—at the limit of exhaustion" (316). Gressman labours in this type of visceral ecstasy throughout her piece: a queer joy meets the painful pleasure of being Brown differently. The artist moves into the light—an existential act in longing for that body that will "stretch and show" into the future, as Helado Negro conjectures in his love poem above.

But in her call against the exhaustion of the Brown subject and its continual link to the enduring Brown body of the future, Gressman explains:

> *Wall of Skin* is not traditional endurance or body art. I don't want this piece to be read as about human form, meat, flesh. It's about how to harmonize and hybridize sound, the body, and light. I have never been attracted to time-based, or endurance-based work either. I don't think it is realistic to life. A piece loses its value because the audience, too, will become exhausted and come to see the artwork, as opposed to the experience.

Yet, watching this piece is an act of endurance in its most literal sense. Even the artist herself credits the work of Stelarc, Orlan, Butoh, and Ron Athey as major influences throughout her oeuvre. Still, there is deliberate political pause and intent for Gressman in her move past endurance art: "I think a lot of art forces the brown body to be the art piece." Not wanting to carry the burden of

representation, to always be live, or on, and Brown, Gressman refuses us her own flesh in any of her work. She instead covers up her body to witness it shed into another organism. When asked, "What does Brown sound like?" Does it sound like light?" she playfully but poetically responds "What does queerness sound like? It's an exploration, and Brownness is a rebellious act in itself." Being Brown and queer are acts of inquiry and experimentation, Gressman shows, rather than states of stability that have already happened. Her art is of the future, of fantasy, a Brown futurism that calls for the "joy" of the body, as much as the Brownness in one's skin, the accumulation of the senses as much as the technologies that enliven them.

Still from *Wall of Skin.* Image by author.

The Skin's Archival Sounds: The Production of Noise

Even within this temporal joy of the body, one must contend with the political tenacity of Gressman's noise. In *Noise,* philosopher Jacques Attali argues that music is an "organization of noise" that should be used as an analytic to read social spaces (Attali 1985, 4). Since the sixteenth

century, music has been culturally commodified, a "tool of power" forcing subjects to believe in, forget with, and be silenced by the state (19). On the flipside, Attali points out that music has been a novel mode of production that both reflects and distorts the world, similar to a collection, a series of mirrors (5). How do we listen to ourselves in the images we reflect, reflect back upon us? He writes that music is "a mode of social expression, and duration itself. It is therapeutic, purifying, enveloping, liberating: it is rooted in a comprehensive conception of knowledge about the body, in a pursuit of exorcism through noise and dance. But it is also past time to be produced, heard, and exchanged" (9). Music is prophetic, as the "noises of a society are in advance of its images and material conflicts." Attali remarks that music is simultaneously "science, message, and time," allowing for the futural to be awakened and the musician to become a site of potential disruption and subversive (11). Gressman bodies forth from the very scene Attali enlivens above. Her noise is a mixture of genres, the senses, modes of difference, and a commitment to the political affinities found in experimental art and music.

Gressman's work is influenced by artists such as John Cage, Pauline Oliveros, Nam June Paik, Pamela Z, Clara Rockmore, and La Monte Young—artists who have placed pressure on traditional constructions of space, time, and aesthetics by advancing sound through technology. Cage, whose piece *4'33"* was composed of silence and ambient sounds (audience coughing, for example), is considered the forerunner of experimental music (Cage n.d.). Gressman notes: "Cage's work showed me that sound is constant, even in silence: a concept that I have used in all my artistic endeavors." Cage's use of unplanned actions and incorporation of texts such as the *I-Ching* served as an inspiration and challenge for her in producing her own avant-garde music. She further describes this tension in our interview to express how her sound methodologies are distinct from Cage: "I'm not directly responding to Cage in my work; he was my gateway into experimental music." Her performances carry the transgressive spirit of Cage and other experimental artists, although Gressman further expands the relationship to sound and image via embodiment, incorporating breath, choreography, and identificatory concerns marked by difference.

Gressman was also influenced by more contemporary methods of experimental artists, including those of Pauline Oliveros, a performance artist known for her technique of deep listening. Paik, who is most famously known for his television and video installations, also created several musical works, such as *Hommage à John Cage* (1959), in which he spliced sound and music, and performance pieces like *Simple*, *Zen for Head*, and *Étude Platonique No. 3* (1961), where aggressive movement was an integral component of the piece ("Nam June Paik" 2017). He also collaborated with the cellist Charlotte Moorman on several performance pieces, such as *Opera Sextronique* (1967) and *TV Bra for Living Sculpture* (1969). Though Paik has influenced many young artists with his video work, Gressman personally and artistically connected with his musical works, noting that Paik believed that sound has deeper meaning than both image and sound together. Another of her major influences, La Monte Young, experimented with the possibilities of sound through drone compositions, expanding upon notions of what musical performance should inherently be. In his piece, *The Well-Tuned Piano*, which plays for over six hours, Young produces a tuning system broken into various themes and sections (Service 2013). Pamela Z, a contemporary artist who uses her voice to create layered compositions digitally ("Bio" 2017), and Clara Rockmore, who was involved in enhancing and popularizing the Theremin, an electronic instrument heard in songs such as the Beach Boy's *Good Vibrations,* are at the centre of Gressman's musical archive (McGoogan 2016). For Gressman, Cage and the multitude of artists under the umbrella of experimental music and performance have given her the aesthetic stimulus to "try different languages and methods of reaching 'inside sound'" through the use of the body and light.

Noise music enables Gressman to explore the embodiment of sound, to queer her instrument by taking an object such as a hairbrush or a drill and "mak[e] it do things it is not naturally supposed to do." Gressman is intimately and politically invested in repurposing and recycling dominant objects. For example, she takes instruments or everyday household objects and creates new apparatuses that make noise on their own or contain sensors that produce sound, as in *Wall of Sound*. She is actively involved in building her instruments, hacking radios, wigs, brushes, shoes, and helmets, among other things, always turning to analogue electronic sound. In all of her pieces, the artist controls the function and manipulation of her handmade instruments, even if she plays and waits with chance. Not to mention that noise's socially transgressive character makes it conducive for Gressman to explore embodiment further. That is to say, in *Wall Of Skin*, the main point of dialogue between the body and noise is the essential choreography influencing and expanding sound. This, coupled with the body as already marked in difference, engenders a new type of listening/seeing/feeling practice in which intersectional concerns match aesthetic fortitude.

For author Stephen Graham, the noise genre is at the very core of underground music (Graham 2016). The genre, which Graham claims developed over the late 1970s and 1980s, typically has been marked by the use of electronic instruments, guitars with distortion pedals, digital audio workstations, and what Gressman uses in her performance, contact microphones (Graham 2016, 169–70). Graham posits that noise, whether through words, images, physicality, or aural means, is political and a resistant force. Pulling from philosophers Hegarty, Brassier, Serres, and Attali, he asserts that

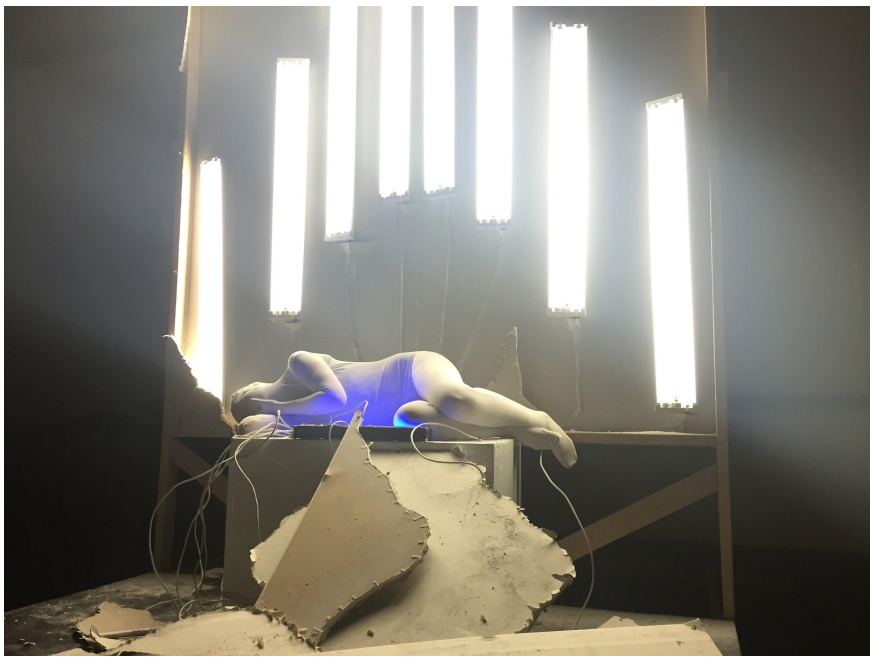
> noise qua abstract concept *and* qua specific sonic event, *reveals*, whether that revealing is of the limits or frailties of a system; of the "redundancy" or lack in the perceiving systems of its receiver; of the artificiality of seemingly "natural" boundaries between, for example, tonality and atonality in music; or, in a more positive sense, of new possibilities and alternative, even emancipatory, principles and procedures. (174)

Artists such as Throbbing Gristle, SPK, Merzbow, and This Heat tested the limits of noise through electronic instruments, varied sound effects, and transgressive performances (Graham 2016, 183–84). In the last twenty-five years, the genre has grown to consist of what Graham calls a spectrum of current noise music, going from harsh noise to cross-genre noise to post-noise (187). Gressman cites noise artists who create or adapt musical instruments and push the limits of the genre, such as Lightning Bolt, Russian Tsarlag, Unicorn Hard-On, Naomi Elizabeth, Yip-Yip, This Is My Condition, and Japanoise band Boredums, to name a few as influences. She also attended and performed at the annual International Noise Music Conference in Miami, where devotees of the local and global noise community have met for fourteen years (Bennet 2017). At this conference, Gressman was exposed to an eclectic range of experimental and performative artists who were "the best most obscene and radical acts." However, she notes that her work particularly responds to artists such as 90s Miami noise rock group Harry Pussy ("Harry Pussy" 2017); solo artist Kites, who records with oscillation batteries, circuit boards, and stringed instruments ("Kites" 2017); underground duo Pedestrian Deposit, who use feedback, recordings of objects such as dry ice against metal, and a cello (Holslin 2015); and Justice Yeldham, who performs using various vocal styles through sheets of amplified glass ("Granpa (Previously Justice Yeldham)" 2017).

Ultimately, Gressman departs from the traditional works made by white male noise artists, precisely because they are unable to evolve their instruments. While they place pressure on the genre, as an anti-music aesthetic, they are often unwilling to address identity and the contours of a racialized and

queered body. She notes, "so much of identity is lost by these men in noise music." Her instrument, in particular, has similar properties to the body; she comments that by incorporating sound and light, "there is something organic" about her instrument that will always pulsate existence. Analogue electronic noise offers Gressman "a very physical force" that she can undertake and manipulate to charge her body in performance. *Wall of Skin,* then, brings the body (from within) to noise music.

Working from within the tradition of the aforementioned noise and experimental artists, the music from *Wall of Skin* derives from a light-sensitive audio-oscillator, a small circuit that Gressman places inside of a sunglass case, along with three photoresistors. A return to the mechanics of the instrument is warranted to demonstrate the precision and disorder of noise in this piece. Photoresistors sense the light and ignite the resistance of clicks coming from the integrated circuit. Her bodily movements simply block light as the light affects the photoresistors and consequently the sound (pitch) output. The sound output, on the other hand, changes based on how she tempers her body. As such, her moving body controls the degree of illumination as she tears down the wall to alter the light-sensitive audio-oscillator. Gressman's instrument is similar to the Theremin, the electronic instrument used in 1950s horror movies that changes pitch and volume through hand movement. The instrument allows her to actively produce and manage "variations in sound that happen fluidly with light," demonstrating to the audience how light and the body control sound. The resultant sounds form a musical composition precisely because Gressman scores the theatricality of the event, pre-routing the lit grooves that are seen as she pulls the embedded cables down the wall, creating a "highway" that draws "life/light lines." As she pulls on the cables and pieces of wall during the performance, the increasing amount of light causes the music to change distinctively in pitch. When *Wall of Skin* begins, the audience hears a droning, vibrating sound in a low pitch: Gressman's cyborg is embodying its first moves about the stage. The sound is hypnotic, created by "clicks going faster and faster to create a familiar pitch." Gressman wants her audience to be lulled by the hypnotic feel of the music, "to be under" the influence of sound, as she sustains those very acts against her own skin.



Stills from *Wall of Skin*. Images by author.

In *Wall of Skin,* the lulling, hypnotic sound is reminiscent of Gregorian chants; Gressman notes the influence of the rhyme and metre of religious incantation in her work, and the three pitches heard in the piece create a sense of spirituality, a religious experience. The influences of film scores are also evident in the piece, for as the amount of light increases over time, the sound increases as well. When Gressman pulls apart the drywall, the overall tone increases and the audience hears the frequency and pitch of the pulsating sounds becoming higher, bringing about a feeling of human urgency.

In this piece, there is a type of "controlled chaos," to use Gressman's term. As she moves closer to the light, sound harmonizes; if she pulls too far from the light, the sound becomes unbearable to the human ear, and the pitch emitted by the light-sensitive synthesizer maxes out. Gressman is keenly aware of this as she's vigorously moving and making sound across the stage; however, there is a window built into the score for unpredictable elements, creating moments of tension, improvisation. Her work technically relates visual and sonic material while also exposing the complexity and intersectionality of identification. Over and above, Gressman's aesthetic and political intention is to highlight the temporal relationship between movement, light, and sound, to demonstrate how they can join us in our differences.

Notes for the Future, Or Build the Wall: Gressman's Cyborg as Aesthetic Transmission

On April 7, 2016, during the US presidential campaign season, I saw Erica Gressman perform this version of *Wall of Skin*[14] to a both stunned and energized room full of minoritarian audience members during the University of Illinois's 2016 inaugural "Being Brown, Being Down: Performances of Spic and Span" symposium. The symposium, led by the Department of Latina/Latino Studies, was a two-day event that turned to different forms of performance, such as drag, experimental performance art, sound poetry, the documentary film genre, and visual art as sites of Brown resistance and existence. It was a hybridization of genres and artistic media that helped the

department address the recent queer and ethnic-racial backlash under Donald Trump's new campaign to "Make America Great Again." While this backlash was a national epidemic sweeping across the country, for the department, it was a bit closer to home. The night before Gressman's tantalizing and spirited performance, an anonymous party chalked "build the wall" and "deport them" in front of the department building's steps. In response to this threatening message, the department contacted campus security and asked them to circle the Channing Murray Foundation during the performances by Gressman and other artists such as Lola Van Miramar, Tracie D. Morris, and Kenneth Pietrobono. Filmmakers Dan Sickles and Antonio Santini, who screened their award-winning documentary, *Mala Mala* the night before, sat in the audience, waiting to be moved by a different type of wall.[15]

The symposium began by asking how we could jointly, through performance, redirect the illegalities of Brownness and queerness. In my opening remarks, I suggested that the historical reality of Brownness is perpetually tied to the persistence of the always in-waiting and waiting-on Brown subject. Even when quiet, this subject is still excessive, and when responsive, runs the high risk of being silenced. In light of the recent attacks against faculty and students of colour at the University of Illinois at Urbana-Champaign, acts of aggression against subjects just trying to keep breathing in the world, being Brown and being down—acts not exclusive to Brown folk—became perpetual exercises of endurance, resistance, and reimagined civility. By co-opting the pejorative of spic and span (that cleaning product that could never sublimate our cultural stains anyhow), the symposium was an homage to all those who've cleaned before and for us. By reimagining that spic, that span that pushes against walls and refuses to build new ones, the symposium hoped to reframe how both race and queerness are exercises of everyday labour. Such a claim allowed for a reading of Brownness that is about a *waiting-with* but also a *waiting-on*. The audience was given the task of thinking about being dirty and excessive together, and to locate those sublime shimmers of light near that no exit sign, against those all-consuming walls.

In direct response to the linguistic wall staged across the building's steps, I suggested that when the state says, "deport them, keep them out, send them all back, build that wall and make them pay for it," we must believe that aesthetics can talk back, redirect that chalking hail that doesn't mark out our chalk outlines. From drag performance to sound and image in the avant-garde, to fearless bodily gestures and social activism as art, I called for *new walls of skin*, against such violence. Or, how do we aesthetically learn to keep on living, pulling from the full capacity of our senses, in a world that doesn't want us, in a world that can't love us, but easily mourns us, even before we disappear? How can performance redirect the silence and inner noise embedded in Brownness and queerness?

These were the questions guiding Gressman on April 7. Of the event itself, she claims: "I did something right in this version of *Wall of Skin;* the seats were not filled with white male experimental noise artists, and I was moved. I had the deepest sleep that night; I felt open for the first time." And she did do something right: as the audience sat in anxious anticipation of her every move—some in tears, others feeling vindicated politically by her rendition of a wall—Gressman found the right note or harmony between/in difference, the human/automaton through the embodiment of sound in a space filled with allegories of both the wall and skin. In Gressman's Brown futurism, like my own, experimental aesthetics sound luminously, blurring the already hybrid lines between race, gender, sexuality, and the human. And this sound is not so much a replacement of more popular ones, but an experimentation that in its own right intervenes in new organismal futurisms. For Gressman, the world is a scientific experiment in which constant variables change at the line between the human/humanoid. And Gressman frees us from the overdetermination of the human, finding a new

and emergent way to stage a political scene through the interplay of technology, science, and aesthetics, at the very limit of animated existence.

Notes

1. I turn to Helado Negro, not to privilege, conflate, or naively juxtapose versions of Brownness. His lyrics offer me the mileage I need to read for Gressman's type of skin. I have also been trying to find a way to theorize Lange's theorization of race and embodiment. Gressman's work, yes, offers a different tempo in electronic sound than Lange's, but both offer sonic reverberations of existence, neither closing off a call to advance the future of Brown politics and aesthetics. For me, they both make up a Brown Futurism where the call to life is resolutely tied to those resistant and radical aspects found in abstract and experimental aesthetics.

2. For more about Erica Gressman's work, see www.ericagressman.com.

3. *Wall of Skin*, by Erica Gressman, Channing Murray Foundation, Urbana, IL, April 7, 2016. The performance was part of the "Being Brown, Being Down: Performances of Spic and Span" Inaugural Symposium initiated and led by the Department of Latina/Latino Studies at the University of Illinois at Urbana-Champaign.

4. Nicolas Collins is a musician, author of *Handmade Electronic Music: The Art of Hardware Hacking*, and the chair of the Department of Sound at the School of the Art Institute of Chicago (see Sheridan 2006).

5. According to Gressman, the chip is a CMOS Hex Schmitt Trigger Integrated Circuit 74C14. The output of the instrument creates a square wave oscillation (see Collins 2009, 118).

6. Previous iterations of *Wall of Skin* involved photosensors placed on the artist's arms and head, which were activated by light and the movement produced by Gressman drumming.

7. Erica Gressman in discussion with the author, October 1, 2016. In addition to the in-person interview, Gressman and the author conducted a series of e-mail correspondence from November 2016–May 2017, which also inform this article.

8. Gressman recalls that at age ten, she snuck into the garage to play her brother's drum set when he wasn't home—it was a rebellious act for a young Latina to be playing the drums.

9. It is Sun Ra himself, "a brother from another planet," combining identity, outer space, and aesthetic vision who said that "costumes are music" (see Corbett 1994, 11). I mention this here because in our interview Gressman gestures to a similar tradition, remarking how noise musicians and punk musicians tapped into the spectacle components of costuming to interact with sound.

10. Though the punk movement has provided space for resistance, scholar Fiona I. B. Ngô, through her analysis of the punk scene in L.A.'s Chinatown, points to how punks also rehashed state and imperialist narratives of pathology towards people of colour in their establishment of an outsider status (see Ngô 2012). Scholar Mimi Thi Nguyen, in her analysis of the Riot Grrrl Movement, warns us against the perpetual erasure of women of colour in punk. For Nguyen, women of colour have been at the forefront of the Riot Grrrl Movement but have not been positioned as such (see Nguyen 2012).

11. Gressman's movement between punk and Catholicism in her work can be viewed through the lens of disidentification. Muñoz describes disidentification as a "survival strategy" in which the minoritarian subject learns to negotiate and repurpose dominant ways of being in the world (see Muñoz 1999, 9–11).

12. Following college, she travelled Europe, creating a solo act she called BOOGA, where she used her "little electronic instrument" and a borrowed drum set from a Danish band. Following this short stint in Europe as a musician, Gressman returned to the US to attend the School of the Art Institute of Chicago, where she received her MFA in performance in 2012.

13. The chapter entitled "Boxes" focuses on sound and hearing, setting up categories for how to entertain different kinds of hearing, and the sensory receptor of the ear. In "Tables," Serres focuses on smell and taste, the least aesthetic of the senses. "Visit" entertains the properties of vision.

14. Gressman has performed *Wall of Skin* seven times since first performing it in 2011 at the School of the Art Institute of Chicago. She also performed it in 2013 at the New College of Florida and at the 2016 performance at the University of Illinois at Urbana-Champaign symposium discussed in this article.

15. During the panel with filmmakers Dan Sickles and Antonio Santini, and moderated by scholar Larry La Fountain-Stokes, La Fountain-Stokes argued that *mala mala* is more than a film title. To be *mala mala* is a way of being-in-the-world, a way of accessing subjectivity and boldly exhaling in those spaces often reserved for the amenable, consenting subject of the world (see La Fountain-Stokes 2016; La Fountain-Stokes, forthcoming).

References

Cage, John. "4'33"." n.d. *John Cage Complete Works*. Accessed June 3, 2017. http://johncage.org/pp/John-Cage-Work-Detail.cfm?work_ID=17.

Attali, Jacques. 1985. *Noise: The Political Economy of Music*. Translated by Brian Massumi. Manchester: Manchester University Press.

"Bio." 2017. *Pamela Z*. http://www.pamelaz.com/pzbios.html.

Bennet, David. 2017. "Inside International Noise Conference's Alien, Intimate, Ear-Busting Scene," *Miami New Times,* February 2, 2017. http://www.miaminewtimes.com/music/inside-international-noise-conferences-alien-intimate-ear-busting-scene-9104394.

Collins, Nicolas. 2009. *Handmade Electronic Music: The Art of Hardware Hacking*. New York: Routledge.

Corbett, John. 1994. *Extended Play: Sounding Off from John Cage to Dr. Funkenstein*. Durham, NC: Duke University Press.

Doyle, Jennifer. 2013. *Hold It Against Me: Difficulty and Emotion in Contemporary Art*. Durham, NC: Duke University Press.

Graham, Stephen. 2016. *Sounds of the Underground: A Cultural, Political, and Aesthetic Mapping of Underground and Fringe Music*. Ann Arbor: University of Michigan Press.

"Granpa (Previously Justice Yeldham)." n.d. *Dual Plover*. Accessed June 3, 2017. http://dualplover.com/yeldham/.

Haraway, Donna. 2000. "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century." In *The Cybercultures Reader,* edited by David Bell and Barbara M. Kennedy, 291–324. New York: Routledge.

"Harry Pussy." 2017. *Discogs*. https://www.discogs.com/artist/200854-Harry-Pussy.

Helado Negro (Roberto Carlos Lange). 2016. *Private Energy*. Digital Download. Asthmatic Kitty Records, AKR131.

Holslin, Peter. 2015. "Experimental Noise Duo Pedestrian Deposit Bleed for Their Art." *LA Weekly*. April 14, 2015. http://www.laweekly.com/music/experimental-noise-duo-pedestrian-deposit-bleed-for-their-art-5495779.

"Kites." *Load Records*. http://loadrecords.com/bands/kites/.

La Fountain-Stokes, Lawrence. 2016. "Mala Mala y la representación transgénero y transformista en el cine puertorriqueño." In *Nuestro Caribe: Poder, raza y postnacionalismos desde los límites del mapa LGBTQ*, edited by Mabel Cuesta, 185–200. San Juan: Editorial Isla Negra.

———. Forthcoming. "Being Mala Mala: Documentary Film and the Cultural Politics of Puerto Rican Drag and Trans Identities." *Caribbean Studies*.

McGoogan, Cara. 2016. "Clara Rockmore: Story of the Theremin Virtuoso Who Inspired Led

Zeppelin and The Rolling Stones." *The Telegraph*. March 9, 2016. http://www.telegraph.co.uk/technology/2016/03/08/clara-rockmore-the-story-of-the-theremin-virtuoso-who-inspired-l/.

Muñoz, José Esteban. 1999. *Disidentifications: Queers of Color and the Performance of Politics*. Minneapolis: University of Minnesota Press, 1999.

———. 2013. "'Gimme Gimme This . . . Gimme Gimme That': Annihilation and Innovation in the Punk Rock Commons." *Social Text 116* 31 (3): 95–110. https://doi.org/10.1215/01642472-2152855.

"Nam June Paik." *Guggenheim Museum*. Accessed June 3, 2017. https://www.guggenheim.org/artwork/artist/nam-june-paik.

Ngô. Fiona I. B. 2012. "Punk in the Shadow of War." *Women & Performance: A Journal of Feminist Theory* 22 (2–3): 202–32.

Nguyen, Mimi Thi. 2012. "Riot Grrrl, Race, and Revival." *Women & Performance: A Journal of Feminist Theory* 22 (2–3): 173–96.

Nyong'o, Tavia. 2008. "Do You Want Queer Theory (Or Do You Want the Truth)? Intersections of Punk and Queer in the 1970s." *Radical History Review* 100:103–19. https://dio.org/0.1215/01636545-2007-024.

———. 2010. "Brown Punk: Kalup Linzy's Musical Anticipations." *TDR* 54 (3): 71–86.

Sandoval, Chela. 1991. "U.S. Third World Feminism: The Theory and Method of Oppositional Consciousness in the Postmodern World." *Genders* 10:1–24.

———. 2000. "New Sciences: Cyborg Feminism and the Methodology of the Oppressed." In *The Cybercultures Reader,* edited by David Bell and Barbara M. Kennedy, 374–87. New York: Routledge.

Sankey, Margaret, and Peter Crowley. 2008. "Sense and Sensibility: Translating the Bodily Experience." In Michel Serres, *The Five Senses: A Philosophy of Mingled Bodies*, vii–xii. Translated by Margaret Sankey and Peter Crowley. New York: Bloomsbury.

Serres, Michel. 2008. *The Five Senses: A Philosophy of Mingled Bodies*. Translated by Margaret Sankey and Peter Crowley. New York: Bloomsbury.

Service, Tom. 2013. "A Guide to La Monte Young's Music." *Guardian*. March 25, 2013. https://www.theguardian.com/music/musicblog/2013/mar/25/contemporary-music-guide-la-monte-young.

Sheridan, Molly. 2006. "Nicolas Collins: Bending All the Rules." *New Music Box*. July 1, 2006. http://www.newmusicbox.org/articles/nicolas-collins-bending-all-the-rules/2/.

Stinson, Elizabeth. 2012. "Means of Detection: A Critical Archiving of Black Feminism and Punk Performance." *Women & Performance: A Journal of Feminist Theory* 22 (2–3): 275–311.

National® Bra

COMPUTATION NO

Department

Subject

Name

Address

43-648

75 Sheets Quad., 11 3/4" x 9 1/4"

333 43648 8

norm Inc. • Coppell, TX 750

Made in Mexico

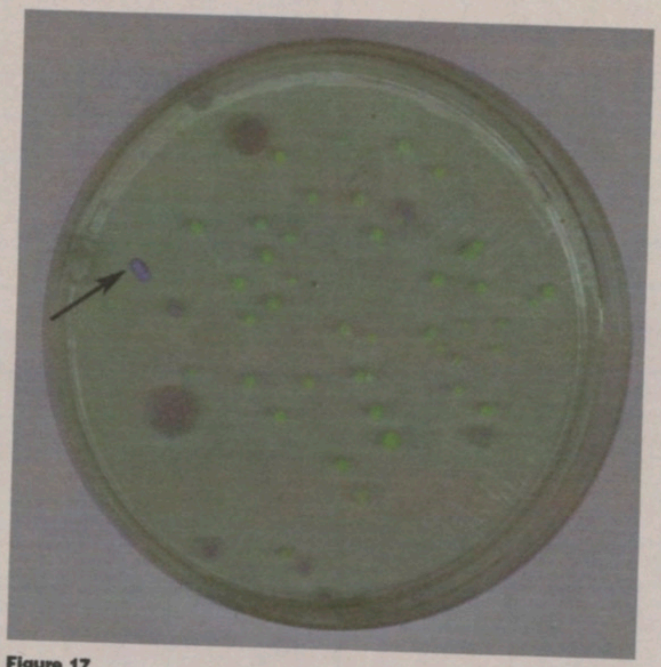
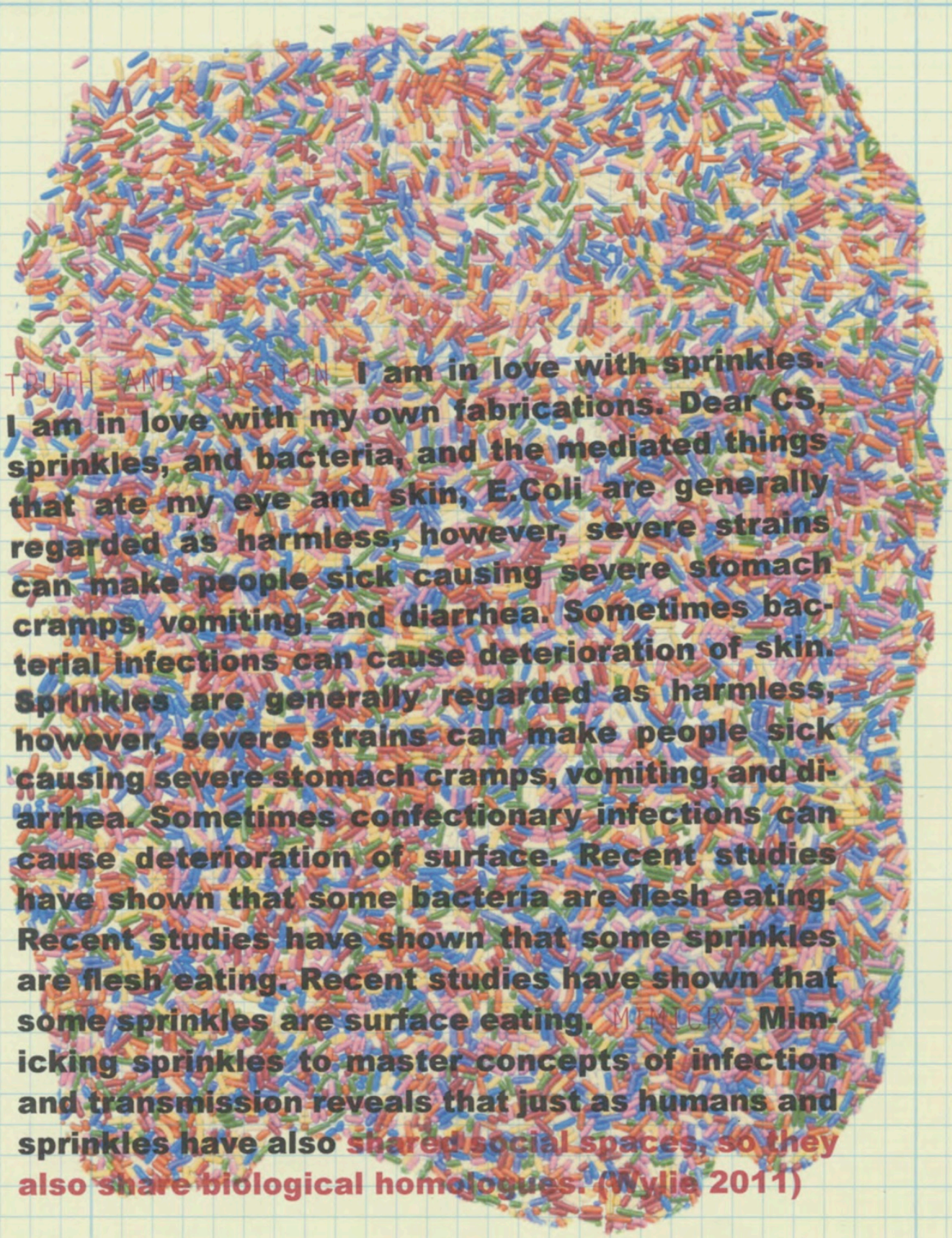
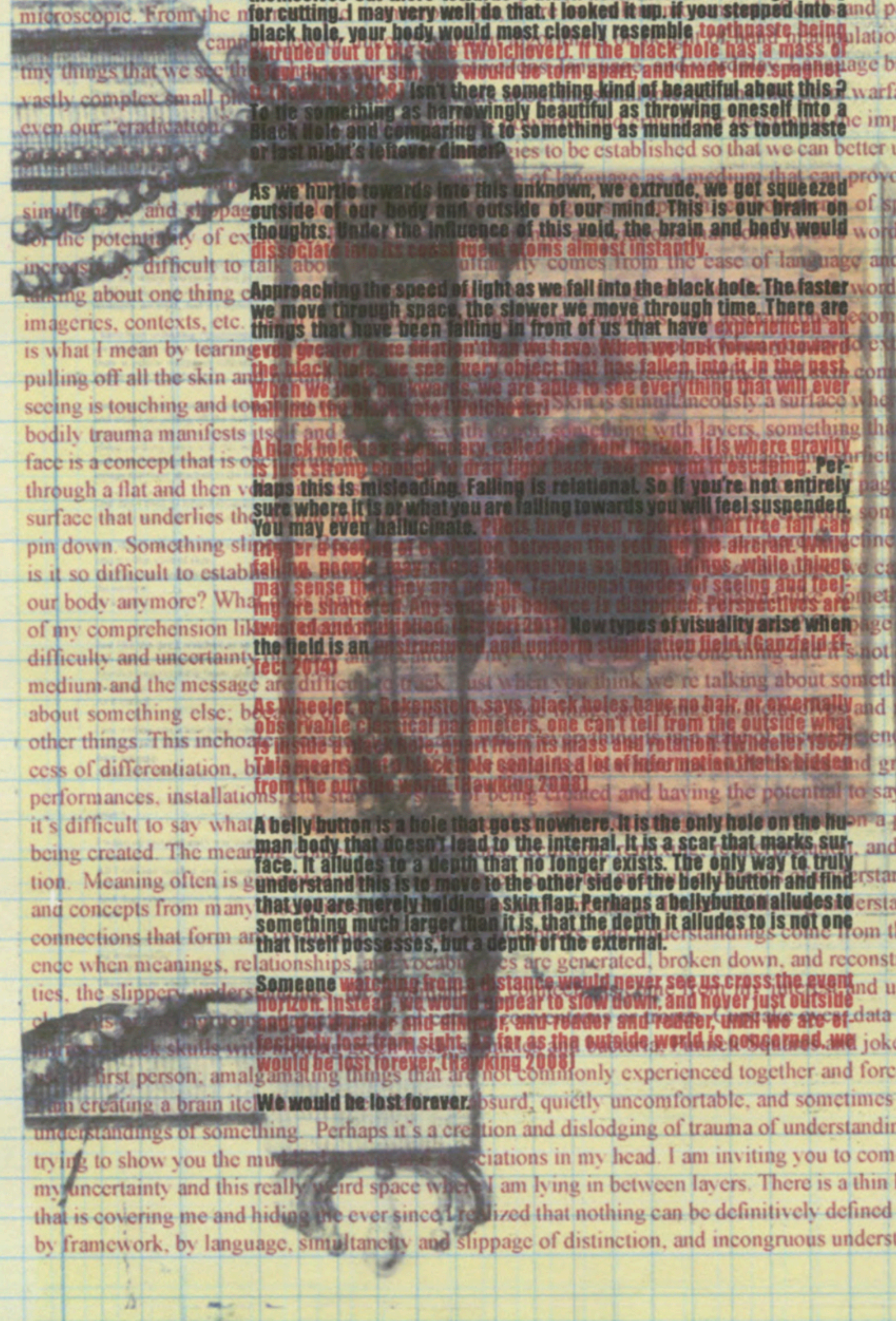


Figure 17
LOOKING LIKE OTHER THINGS: EVERYTHING IS EVERYTHING Privileging sight (and knowing). It's how you can pinpoint the crazy. It's how you figured that you could tell me that I'm in a transitory phase. It's how they used to measure and qualify that I'm not malleable anymore because there is a visual comparison to the adult brain. That the cancer is in my brain, the infection is in my lungs, and not something that is a part of me. Rather that it is all of me. The inside only made from the outside closing in.



TRUTH AND FICTION I am in love with sprinkles. I am in love with my own fabrications. Dear CS, sprinkles, and bacteria, and the mediated things that ate my eye and skin, E.Coli are generally regarded as harmless, however, severe strains can make people sick causing severe stomach cramps, vomiting, and diarrhea. Sometimes bacterial infections can cause deterioration of skin. Sprinkles are generally regarded as harmless, however, severe strains can make people sick causing severe stomach cramps, vomiting, and diarrhea. Sometimes confectionary infections can cause deterioration of surface. Recent studies have shown that some bacteria are flesh eating. Recent studies have shown that some sprinkles are flesh eating. Recent studies have shown that some sprinkles are surface eating. MIMICRY Mimicking sprinkles to master concepts of infection and transmission reveals that just as humans and sprinkles have also shared social spaces, so they also share biological homologues. (Wylie 2011)



A (W)HOLE

When I was eight, I read this book on space that talked about what would happen if you threw someone into a black hole. In the illustration the man gets stretched out like a piece of fruit roll up. I always wondered why no one who wanted to donate their body to science didn't ask to strap a camera or something to their body and just hurl themselves out there towards a black hole. Instead of being a body for cutting. I may very well do that. I looked it up. If you stepped into a black hole, your body would most closely resemble toothpaste being extruded out of the tube (Wolchover). If the black hole has a mass of a few times our sun, you would be torn apart, and made into spaghetti. (Hawking 2008) Isn't there something kind of beautiful about this? To tie something as harrowingly beautiful as throwing oneself into a Black Hole and comparing it to something as mundane as toothpaste or last night's leftover dinner?

As we hurtle towards into this unknown, we extrude, we get squeezed outside of our body and outside of our mind. This is our brain on thoughts. Under the influence of this void, the brain and body would dissociate into its constituent atoms almost instantly.

Approaching the speed of light as we fall into the black hole. The faster we move through space, the slower we move through time. There are things that have been falling in front of us that have experienced an even greater time dilation than we have. When we look forward toward the black hole, we see every object that has fallen into it in the past. When we look backwards, we are able to see everything that will ever fall into the black hole (Wolchover)

A black hole has a boundary, called the event horizon. It is where gravity is just strong enough to drag light back, and prevent it escaping. Perhaps this is misleading. Falling is relational. So if you're not entirely sure where it is or what you are falling towards you will feel suspended. You may even hallucinate. Pilots have even reported that free fall can trigger a feeling of confusion between the self and the aircraft. While falling, people may sense themselves as being things, while things may sense that they are people. Traditional modes of seeing and feeling are shattered. Any sense of balance is disrupted. Perspectives are twisted and multiplied. (Steyerl 2011) New types of visuality arise when the field is an unstructured and uniform stimulation field. (Ganzfeld Effect 2014)

As Wheeler, or Bekenstein, says, black holes have no hair, or externally observable classical parameters, one can't tell from the outside what is inside a black hole, apart from its mass and rotation. (Wheeler 1967) This means that a black hole contains a lot of information that is hidden from the outside world. (Hawking 2008)

A belly button is a hole that goes nowhere. It is the only hole on the human body that doesn't lead to the internal. It is a scar that marks surface. It alludes to a depth that no longer exists. The only way to truly understand this is to move to the other side of the belly button and find that you are merely holding a skin flap. Perhaps a bellybutton alludes to something much larger than it is, that the depth it alludes to is not one that itself possesses, but a depth of the external.

Someone watching from a distance would never see us cross the event horizon. Instead, we would appear to slow down, and hover just outside and get dimmer and dimmer, and redder and redder, until we are effectively lost from sight. As far as the outside world is concerned, we would be lost forever. (Hawking 2008)

We would be lost forever.

There is a story that I must tell and it's circular. And though concision and exposition are preferred for clarity, sometimes the best way to talk about something is to talk about something else. To circle around an origin point and to flow from one thin[illegible] I suppose that is where the term "circular ideas" [illegible]. The work came from consideration of the worl[illegible]ral, fatty, thick, corporeal, mucous lubricated, [illegible] the same time abstract microscopic. From the m[illegible]nd pathways, and the [illegible] cann[illegible]ulations. These are the tiny things that we see th[illegible]age brings to life these vastly complex small p[illegible] warfare, infections, or even our "eradication" [illegible]e imperceivable. Lan[illegible]ies to be established so that we can better understand things [illegible] of language as a medium that can provoke the trauma of simultaneity and slippage [illegible] of speech, that allow for the potentiality of ex[illegible] word, that it becomes increasingly difficult to talk abo[illegible]ultaneity comes from the ease of language and wordplay. How talking about one thing c[illegible] word can have infinite imageries, contexts, etc. [illegible]come entangled. This is what I mean by tearing [illegible]o extract meaning and pulling off all the skin an[illegible] comes from. Because seeing is touching and to[illegible] Skin is simultaneously a surface where pathologies and bodily trauma manifests itself and [illegible] something with layers, something that is dynamic. Surface is a concept that is o[illegible]rficial understandings, through a flat and then v[illegible] page, wading through surface that underlies the[illegible] something difficult to pin down. Something sl[illegible]efine boundaries. Why is it so difficult to establ[illegible]e cannot feel or tie to our body anymore? Wha[illegible]omething that darts out of my comprehension lik[illegible]page best describes the difficulty and uncertainty [illegible] it's not quite another. The medium and the message are difficult to track. Just when you think we're talking about something, we're talking about something else; b[illegible] and representations of other things. This inchoa[illegible]eness and in the process of differentiation, b[illegible]nd grows. The objects, performances, installations, etc. sta[illegible] of being created and having the potential to say other things that it's difficult to say what[illegible]n a perpetual cycle of being created. The mean[illegible], and re-contextualization. Meaning often is g[illegible]erstanding, vocabulary, and concepts from many [illegible]erstandings and varied connections that form a[illegible] understandings come from the volatile experience when meanings, relationships, and vocabularies are generated, broken down, and reconstructed. These new ties, the slippery unders[illegible]nd use of incongruous el[illegible] data skin grafts, tumor [illegible] skulls wit[illegible] jokes, and impersonal [illegible] first person, amalgamating things that are not commonly experienced together and forcing them together, [illegible] creating a brain itc[illegible]bsurd, quietly uncomfortable, and sometimes reveal our surface understandings of something. Perhaps it's a creation and dislodging of trauma of understanding. Perhaps it's me trying to show you the mu[illegible]ciations in my head. I am inviting you to come wade with me in my uncertainty and this really weird space where I am lying in between layers. There is a thin layer of something that is covering me and hiding me ever since I realized that nothing can be definitively defined and it's all defined by framework, by language, simultaneity and slippage of distinction, and incongruous understandings.

2

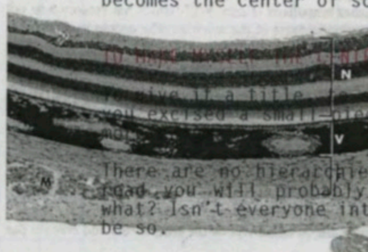
NAVEL GAZING

I lie on the scanner, my belly pressed to the glass
Bellybutton to glass to screen to windows to the soul

An origin point. A proof of living, of humanity Take the case of object 1. Model. Objectified. Problematic Now without belly button. Without the point of origin no matter how facsimile the body is Breasts vagina legs, arms, firm abs, she is not like us This button a seal of authenticity and humanity

What happens when surface reading meets the origin with out destination?

Does something infinitesimally grand happen when the universe emanates from a point? When this tiny point becomes the center of something more profound



LAYERS OF THE EYEBALL The three layers of the eyeball, from outside in, are the fibrous tunic (F), vascular tunic (V), and neural tunic (N). An ocular muscle (M) is also visible

TO MAKE MYSELF THE CENTER OF MY OWN UNIVERSE

To give it a title, to say it is a piece is to say that you excised a small piece of something even larger and more

There are no hierarchies when everything goes As you read you will probably think at various points "so what? Isn't everyone interested in this?" Yes No May-be so.

When you ask me what this piece is about
I can only make myself a point of it all

Just as Wigglesworth himself became the very thing he was studying in the laboratory, we are finding that we share so much more with the things we are tangled with

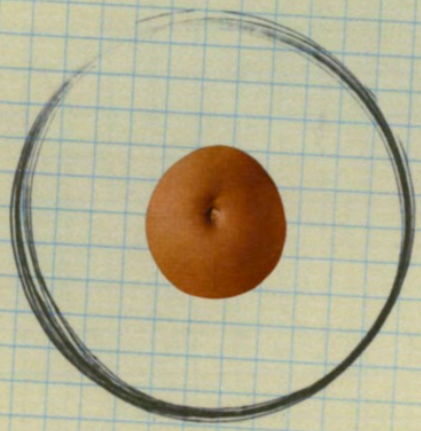
I cannot simply stop at the surface of this I will not just tell you about "themes" and forms I am interested in. I am going to cut because knowledge is not made for understanding; it is made for cutting (Foucault 1984) I cut crawl in rest in, seal, become, and repeat not necessarily in that order. The compulsions that come with knowing the rules but not giving a fuck I want you to know I know your rules and I am choosing not to play by them.

I hes tate to put into writing the basic motivations that reveal the bare bones question, not hidden in am-biguities of an active human consciousness of trying to figure out how he or she has solved or not solved being alive

What is the point of picking a point of fixation and devoting oneself to incomplete understandings of life, objects and things? To pick at the bellybutton

To choose a point of departure only to find that every-thing is vastly incomplete and then having to add more and more limited perceptions to get closer to never touching it but always closer. To fixate on everything to find yourself confronting the immensity of infinites and certain flavors of infinite that are not unlike that of the irrational

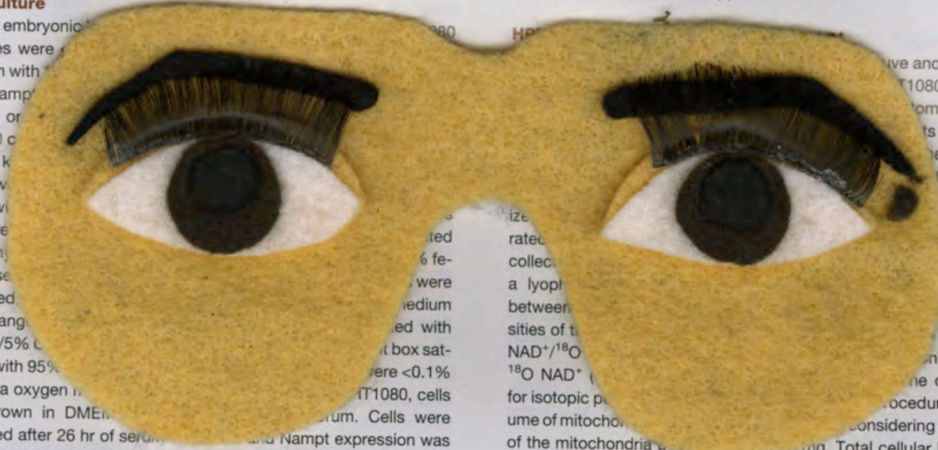
91



Cell

EXPERIMENTAL PROCEDURES

Cell Culture



Human embryonic ... cell lines were ... medium with ... erate Namp... pcDNA or ... HT1080 c... Nampt k... vector w... lected wi... were pre... cardiom... tal calf se... subjected ... was chang... 95% N_2/5% ... urated with 95% ... (Ohmeda oxygen ... were grown in DME... harvested after 26 hr of seru... ted ... % fe- ... were ... edium ... ed with ... box sat- ... ere <0.1% ... T1080, cells ... um. Cells were ... Nampt expression was analyzed by western blotting.

Drug Treatments and Cell Death Assays

HEK293 and HT1080 cells at less than 85% confluency were treated with MMS (1.2 mM) for 6–8.5 hr and 8–17 hr, respectively. Transiently transfected cells were washed three times with PBS to remove residual transfection reagents before treating with MMS. HEK293 cells and HT1080 cells were exposed to etoposide for 72 hr or 46 hr at 120 or 40 µM, respectively. HT1080 cells were exposed to camptothecin at 14 µM for 23 hr. After drug treatments, cells were harvested by trypsinization, pelleted by centrifugation, and resuspended in PBS containing 3% FBS. Cell death was analyzed by FACS using propidium iodide (PI) staining. In cells transiently transfected with mNAMPT/MSCV, SIRT... siRNA, Nmnat-3, or ... siRNA oligos and cotransfected with FAM-labeled scrambled siRNA oligos, percent cell death was determined as the proportion of PI/GFP- or PI/FAM-positive cells versus the total number of cells with green fluorescence.

OK FIRST THINGS FIRST: WHICH CAME FIRST THE CHICKEN OR THE EGG?

Constantly telescoping back and forth, adjusting the focus knob.
I am 10-100 meters away and now too close for comfort.

Under the microscope, a cell looks a lot like a fried egg: It has a white (the cytoplasm) that's full of water and proteins to keep it fed, and a yolk (the nucleus) that holds all the genetic information that makes you you.

Under the influence, your brain looks like a fried egg.

Under formal scrutiny, a sprinkle looks a lot like a rod-shaped bacterium.

And a brain cell looks a lot like the universe it contains.

Under hermetic artistic conditions, an eye looks a lot like an apple, looks a lot like an egg, looks a lot like a hole, looks a lot like a black hole.

Under purely conceptual conditions, your mediated eye looks a lot like a sprinkle decorated cupcake.

Assay for Aceylated AceCS2

Control and Nampt overexpressing HEK293 cells were transfected with ... transfections, cells were washed and lysed in IP lysis buffer (50 mM Tris-HCl, pH 7.5, 150 mM NaCl, 0.5 mM EDTA, 0.5% NP-50, 400 nM TSA, 5 mM Nicotinamide, and protease inhibitors [Compelete, Roche]) for 30 min at 4°C. Lysates were cleared and subjected to immunoprecipitation ... itations were washed three times for 15 min each in lysis buffer and resuspended in 1× SDS-PAGE buffer and analyzed by western blotting.

Cell Fractionation and Drug Treatment of Mitochondria

Unless otherwise ... using a differential centrifugation and sucrose gradient procedure with slight modifications (Schwer et al., 2002). For drug treatment of mitochondria, fresh mitochondria were obtained from livers excised from fed young male rats. Half of the liver homogenate was used for mitochondrial isolation using a commercially available kit as described by manufacturer's instructions, designated Protocol 1 (Pierce Mitochondrial Isolation kit, Rockford, IL). The other half of the original homogenate was subjected to a differential centrifugation protocol to isolate mitochondria (Protocol 2). Mitochondria (500 µl) were added to a 48-well plate and treated with methylmethane sulfonate (MMS) at 1:1000 dilution and/or FK866 (10 nM) for 30 min at 37°C. Suspensions were spun down for 1 min at 14,000 rpm at 4°C and pellets were stored at −80°C prior to NAD+ analysis by HPLC/MALDI/MS. Detailed protocols are described in the Supplemental Data.

HP...

... ve and Schramm, ... T1080 cells were ... ometer. NAD+ ... ts by adding ... e reference ... to the sam- ... en neutral- ... ize... was sepa- ... rate... eaks were ... collec... dried with ... a lyop... eak ratio ... between ... the inten- ... sities of t... obtain ^{16}O ... $NAD^+/^{18}O$ ... nly ^{16}O and ^{18}O NAD^+ ... e corrections ... for isotopic p... ocedure. The volume of mitocho... onsidering the density of the mitochondria ... ing. Total cellular NAD^+ concentrations were calculated by dividing the quantity of NAD^+ per cell by the mean cell volume (MCV) as measured by a Coulter counter, which for HT1080 was 2183.95 fl and for HEK293 was 1691.04 fl.

Animal Experiments

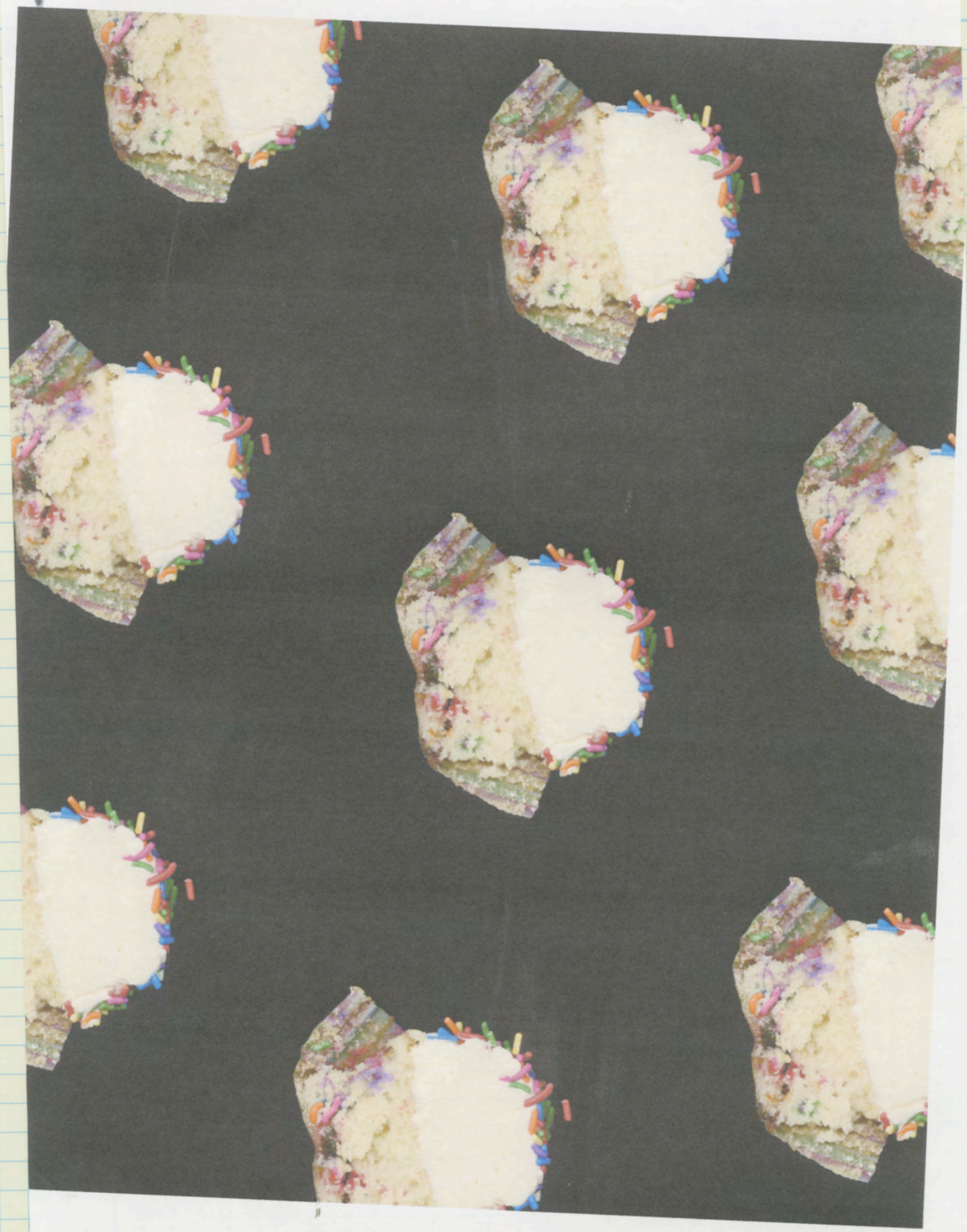
To assess Nampt expression in vivo, Sprague-Dawley rats (120–150 g) were obtained from Charles River Laboratories and randomly assigned to control and experimental groups of four animals. The control group was fed ad libitum (AL) with a 78% sucrose diet prepared by Research Diets Inc. and the experimental group was fasted for 48 hr before being sacrificed. Liver tissue for RNA extraction was stored in RNAlater reagent (QIAGEN). All other samples were frozen in liquid nitrogen and stored at −80°C until use. To assess mitochondrial Nampt and NAD+ ... (F344) rats were bred and reared in a vivarium at the Gerontology Research Center (GRC, Baltimore, MD). From weaning (2 weeks), the rats were housed individually in standard plastic cages with beta chip wood bedding. Control animals were fed a NIH-31 standard diet AL. The procedures for preparation of mitochondria from liver are described in the Supplemental Data.

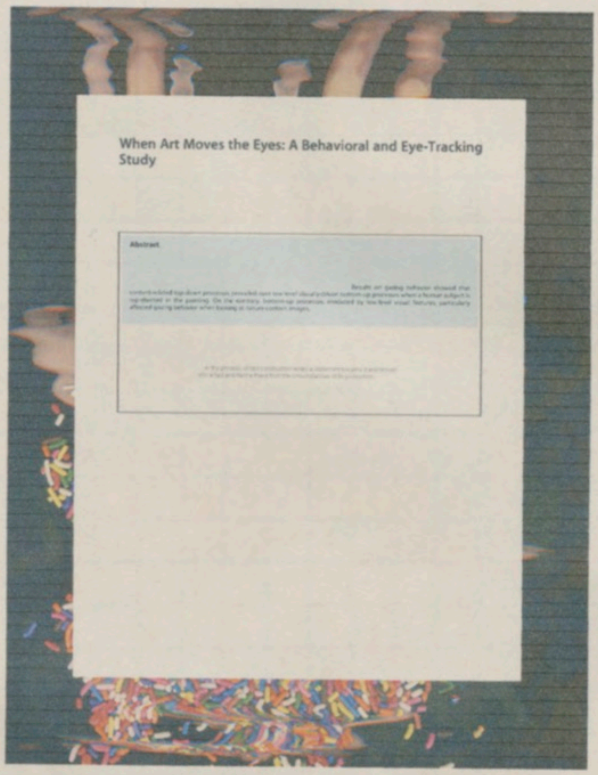
Supplemental Data

Supplemental Data include Supplemental Experimental Procedures, eight figures, and Supplemental References and can be found with this article online at ... full/130/6/1095/DC1/.

ACKNOWLEDGMENTS

... anti-Nampt monoclonal antibody and mNAMPT/MSCV plasmids. Thanks to Carolina Smith for assisting with animals and surgery, Jill Milne for providing EX-527 and Sean Armour for technical advice. H.Y. was supported by ... American Heart Association Award, D.L. by a National Eye Institute training grant, and J.J.C. by a Howard Hughes Medical Institute Predoctoral Fellowship. This study was supported in part by the intramural program of the National Institutes on Aging. D.A.S. was an Ellison Medical Foundation New Scholar. A.R. and T.M. are supported by grants from the NIH and the Leducq Foundation. The Sauve lab is supported by NIH grant R01 DK 073466, the Sinclair lab by NIH grants RO1GM068072, RO1AG028730, PO1 AG027916 and the Paul F. Glenn Laboratories for the Biological Mechanisms of Aging. D.A.S. and A.A.S. are consultants to Sirtris Pharmaceuticals, a company aiming to treat diseases by modulating sirtuins. D.A.S. is a cofounder of Sirtris Pharmaceuticals and sits on their advisory board and board of





When Art Moves the Eyes: A Behavioral and Eye-Tracking Study

Abstract

A LABNOTEBOOK AND A TRUTH

A lab notebook's observations are always competing for a place in some unfinished truth. (Shields 2010)

The breeding of vagueness of the Romantics is different from the ad hoc protectionism in which one modifies a challenged hypothesis without increasing its content. For there is a difference between bringing a scene into soft focus and leaving it out of focus (Sorensen 1997) What I look at out of focus and then in focus, the edges, the crevice, the background, it's all parts of the same source. In the end it's all the same, and then again it isn't the same

CONFUSED BY THE (WORD) GAME?

Consider that pizzeria is not a greasy spoon, and yet… that pizzeria is a greasy spoon. Your car isn't a lemon, and yet… your car is a lemon. This knowledge doesn't weigh a ton, and yet… it weighs a ton. (Hofstadter and Sander 2013)

FOCUS AND ATTENTION

Depending on where you shifted your attention to abstraction, simultaneity of existence and abstractions allowed themselves to become visible If we focus on different things, is it a different thing entirely? Or is it ultimately the same?

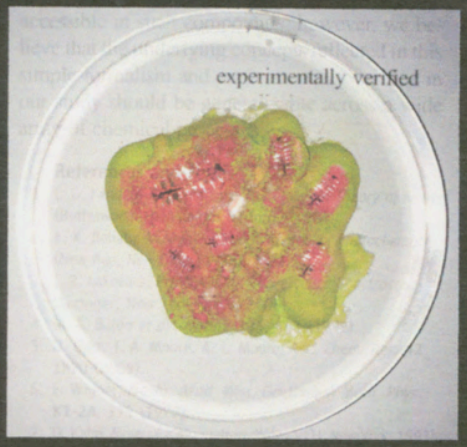
If we only focus on a part of the SINE wave it can appear to be a linear plot If we only focus on the black boy's organs that weren't hit by the bullet in the pathology report, then the black body appears healthy and fine. If we're only looking at shiny celebrities and perfectly curated flowers and products and makeup then we aren't looking at the bullshit in the world. But it's all part of the same whole.

That's the problem isn't it? When you're only looking for the red objects, you're only going to see the red objects. How the fuck are you going to see the blue objects? Red pill or blue pill. When you're looking at the things that work, things will appear to work

(W)hole. I saw this on Andre's wall once. He made a typo But that's what it is. The immensity of the whole, implodes, becomes a black (w)hole of sorts It becomes the ultimate void

a surprisingly simple explanation

issues raised herein will manifest more readily in inorganic rather than organic systems



experimentally verified

a logical placement

replacements

a prosthetic

an attractive implant

sliding

play

a solid lubricant,

morbidity, disability,

wear

8.6 million people

afflicted

American adults

Analyzing the Analyst: An Experimental Data Video for Thinking Theatre and Cognitive Neuroscience Together

Yelena Gluzman

Before I say much else about *Analyzing the Analyst*, the video to which this text is an accompaniment, I should say that, if you are like me, this might be the sort of video you'd prefer to watch without too much framing beforehand. And though I wouldn't want to prescribe how to engage with this material, I would like to assure you that, yes, it's ok to stop reading now, watch the video, and come back whenever you're ready.

While you were gone and I was struggling to write the next paragraph, I realized that my opening gesture above, to privilege the video over the text, is itself indicative of my project in making this video. Rather than using the video as "supplementary material"[1] to illustrate an argument that has already been worked out through its writing, here the video—both in terms of the process of me making it and that of you watching it—is meant to be, itself, *an empirical opportunity for analysis and interpretation*. I will say more about this below, but given its dense convolutions, let me start with some questions you might have asked yourself as you watched the video.

What Is This?

Analyzing the Analyst presents video material from three different but interrelated situations: (1) an interaction between strangers in a participatory audio piece ("*your position*") installed in an art gallery, (2) an interaction between myself and a cognitive neuroscientist as we attempt to analyze video recordings of the interactions in the art gallery, and (3) a rehearsal in which I describe the two previous scenes to a group of three performers, with whom I then work to re-perform my interaction with the cognitive neuroscientist. The video does not constitute the entire project dealing with this material; rather, it is meant to present the *materials and methods* of the larger project, in advance of identifying and discussing its findings.

The larger project is an attempt to consider claims about embodiment from theatre and performance studies with those made in cognitive neuroscience and seeks to develop an experimental paradigm to examine these notions in practice. *Embodiment theory* suggests that social, political, emotional, and cognitive processes cannot be separated from the ways that they form through, and are maintained by, bodily action. For cognitive neuroscience, embodiment theory was proposed in the early 1990s as a challenge to older "brain-in-a-vat" cognitivist paradigms that considered cognition to be located in the brain, separable, in principle, from the body and environment in which that brain was embedded (Varela et al. 1992). For theatre, the ways in which social and cognitive phenomena are inscribed on bodies and propagated through bodily interaction have long been central to scholarly work and artistic practice. Parallel to the turn to embodiment by some cognitive scientists was an uptake of the term in theatre studies (Spatz 2015), and an attempt, by some theatre and performance scholars, to relate these two concerns (Blair and Cook 2016; Falletti et al. 2016).

Yelena Gluzman is a theatre director and researcher. She is a PhD candidate in Communication, Science Studies and Interdisciplinary Cognitive Science at the University of California, San Diego.

Previous research applying cognitive neuroscientific views on embodiment to theatre practices has been able to make important claims; for example, that a seemingly passive spectator is, through what some scientists have called the "action understanding" function of mirror neurons, in fact actively (though not consciously) incorporating observed movement onto their own seemingly non-moving bodies (Cook 2007, 590). However, this work can be problematic when applying such concepts without engaging sufficiently with the complexity of scientific findings and ways those concepts have been produced (Cook 2007, 591n5). One way to address this omission would be through an ethnographic laboratory study looking at daily practices in a cognitive neuroscience lab that engaged with the embodiment problem, a method typical to laboratory studies in Science and Technology Studies (Latour and Woolgar [1979] 1985; Knorr Cetina 1981; Lynch 1985). This sort of ethnography, however, for me, is problematic in respect to the rigid—and at times oppositional[2]—relation between the ethnographer and her field site. It is also problematic in its imperative to lay bare the performativity of scientists' practice while struggling to account for the performativity of one's own ethnographic practices (Gluzman 2017).

My approach here explores an alternate configuration for multidisciplinarity between theatre and cognitive neuroscientific practice, in which experimental situations create a shared space of inquiry without necessarily seeking consensus. Experiments are performative in a particular and orchestrated way; they are sites of interaction whose staging shapes the sorts of phenomena that become visible. While experiments are central to the way that cognitive neuroscientists approach the empirical, they are also central to a range of artistic and theatrical practices that interrogate the embodied, empirical conditions of their production and reception. In the project presented here, theatre-based experimental interventions in the cognitive science lab function as sites where divergent investigative approaches can become visible, actionable, manipulable, and theoretically viable to each other.

Why a Video?

Within this larger project, the video *Analyzing the Analyst* takes up the problem of how to make available the empirical phenomena that arose in these experiments and is thus meant to function as an *experimental data video*. It is a *data video* in the sense that all the material in the video—even the authorial voice-overs—come from empirical interactions that arose in one of the video's three contexts, each of which was recorded to allow analysis and interpretation after the fact. Though all the interactions occurred within my heavily choreographed conditions (or experiments), none of them were scripted for the camera. Not only do I consider and treat these interactions as data, available for analysis, but also consider that their medium as *video* data could allow a viewer to encounter these rich empirical interactions without relying primarily on textual descriptions. While I do not wish to reinscribe simplistic divisions between video and text, my hope is that the video itself (as well as this accompanying text) offers an opportunity to engage more nuanced aspects of the data.

The video is considered to be *experimental* in two senses. First, the project of making the video (selecting particular video clips, combining, splicing, and editing them together to make a coherent work) was treated as a medium-dependent experimental process, in which my first attempt to think all three layers of this material together was done by manipulating and juxtaposing the video itself, not through linguistic reflection on watching the video data. This required reflexively attending to and dealing with the complex ways in which the three layers of material speak to each other, and how such juxtapositions could speak to a viewer. The long process of editing, thus, was itself a

reflexive process of analysis that attended to the particular concerns and difficulties that arose specifically *in video* when trying to jump from one level to another while preserving important contextual framing that gives sense to any of the layers. Therefore, the experimental orientation of this process necessitates thinking, through *doing*, about the affordances and demands of video as data.[3] This process of thinking through video did not resolve but rather made available the tension between an irreducible situated event and a generalizable grammar of meaning-making in interaction.

The video is *experimental*, also, in the sense that it is made to orient viewers not only to the interpretive acts being done by all the "analysts" shown on video, but also to their own interpretive practices as they watch the video. In this sense, the "Analyst" in the title is meant to be a floating signifier, and to include, potentially, the video's viewer. By foregrounding not just the *fact* but also the *experience* of interpretation, the video opens up an interrogative[4] dynamic in which a viewer can ask questions of their own flow of attention and interpretation, even while the video asks viewers to attend to others' interpretive action.

The three different situations shown in *Analyzing the Analyst*—the interaction in the gallery, the interaction in the lab, and the interactions in the rehearsal room—are each meant to provide empirical materials to think about the others, and to focus our attention on the resources and strategies taken up in each interpretive process. Though I am interested in how these sites differ, I do not consider their juxtaposition to be a comparative project which, as I understand it, would necessitate an external position for the analyst. Rather than defining or explaining the differences between layers, I am more interested in their porousness: how does each reflect and refract the others?[5] If this project is using logics of comparison, they are rather in the mode of a "practicing comparison"[6] that doesn't rely on fixed, pre-defined differences between each situation (i.e., "controls"), but rather sets up a dynamic field of interrelations that must be navigated from *within* the moving field.

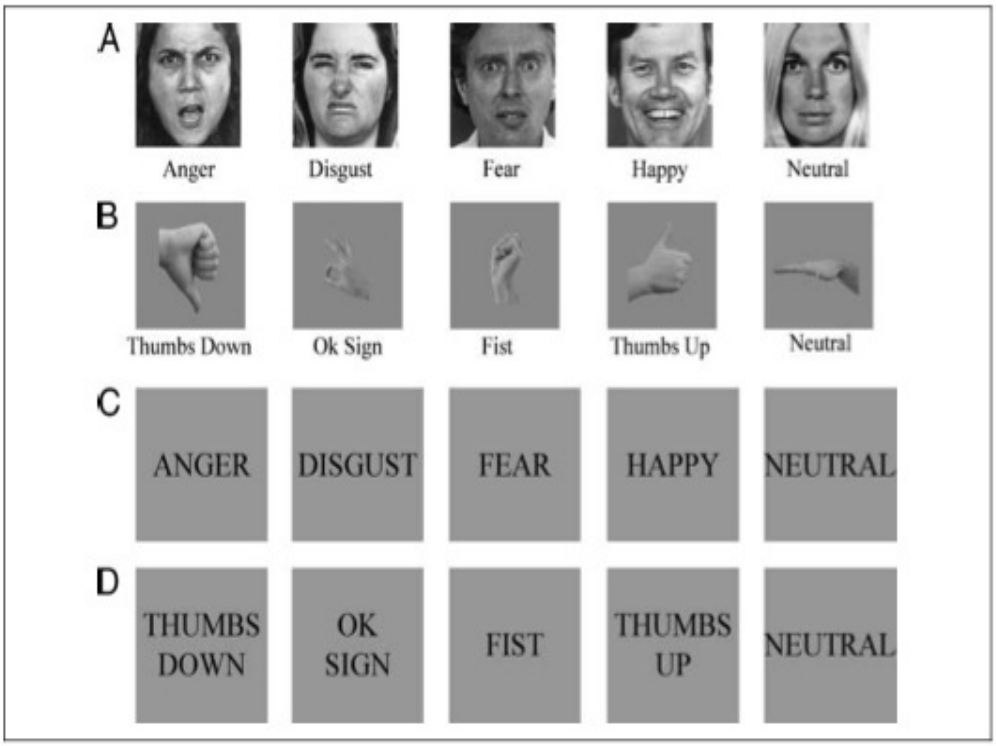
Who Are These People? What Do They Think They're Doing?

1. "Unfolding interaction in *your position*"

The interaction in the gallery occurred in the context of *your position*, a participatory audio installation made by Jen Hofer and myself. Jen and I had made the first version of this piece for a literary performance event in Los Angeles called *Enter>text*;[7] here, because the event involved ongoing, simultaneous performance events and an audience that roamed among these, we decided to use audio and headphones to allow for an intimate experience among the bustling activity of the larger event. We conceived of the audio dialogue as a way to catalyze a shared encounter among the pairs of strangers we invited to do the piece, and the dialogue always referenced the specific space in which *your position* was presented, facilitating a connection between the unfolding interaction between participants and the recorded dialogue. Thus, Jen and I revised and re-recorded[8] the text of the dialogue for each presentation of this work.

Gallery-goers were not instructed to interact with each other or to take on the roles of the speakers they heard on headphones. As my voice-over explains to the actors in *Analyzing the Analyst*, the only thing participants are explicitly instructed to do (by displayed text) is to try it *with someone they don't know*. This was important, because we wanted the discomfort of standing too close to a stranger to catalyze reparative action, and thus heightened attention to both the audio and to each other. All other cues for how to engage with the piece came from the physical arrangement of objects: two sets

of red footprints on a raised platform cued people where to stand, and thus both oriented them to be face-to-face and constrained the distance between them. A CD-player on a plinth had two sets of headphones extending from it, and the PLAY and STOP buttons on the player were labelled for emphasis. Even though both headphones extended from the same device, for some of the participants, I could see them discovering that they and their partner were, in fact, listening to the same thing.[9]



A figure describing stimuli presented to subjects in an fMRI study of brain activity in response to facial expressions and social hand gestures (Montgomery and Haxby 2008).

2. "In which these 'unfolding interactions' became the object of an experimental collaboration with a cognitive neuroscientist."

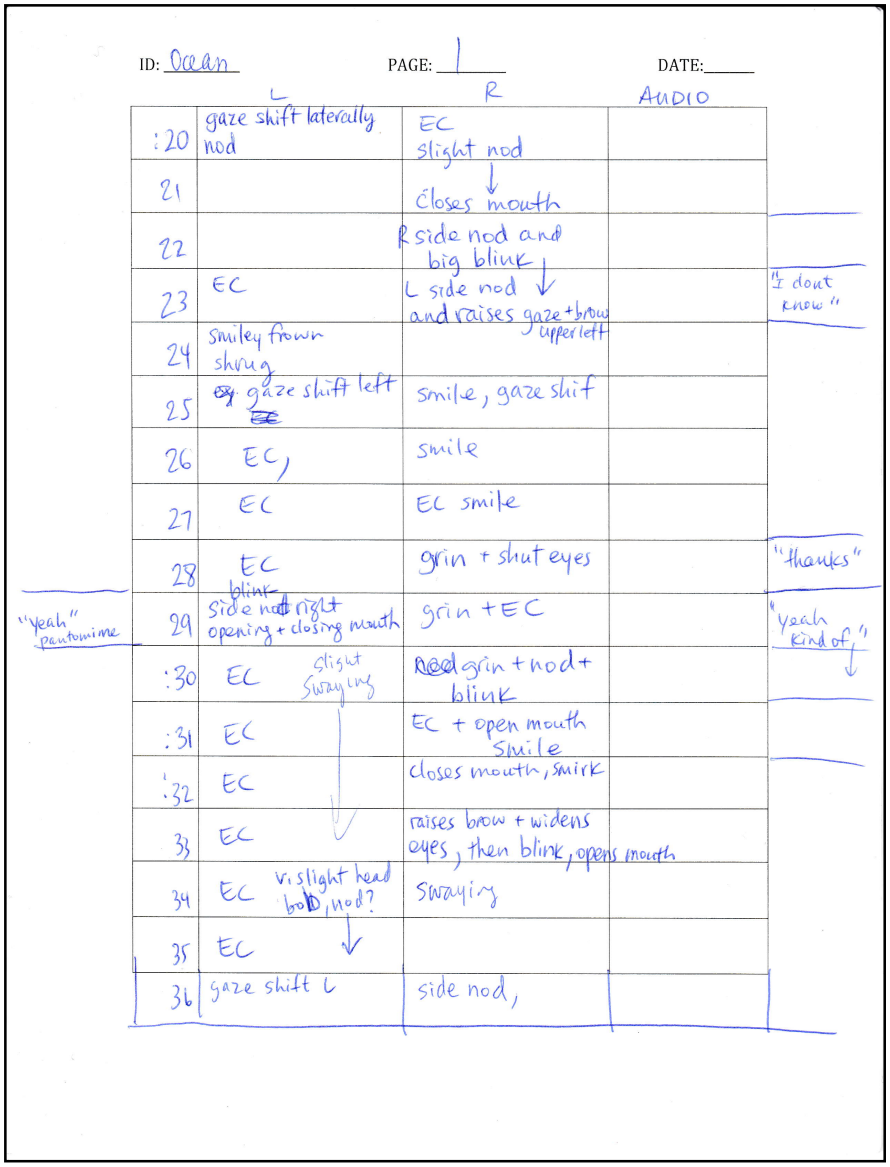
When I invited Jaime Pineda, a professor in UCSD's Department of Cognitive Science, to see *your position* at the gallery, I (as a graduate student) had already taken a class with him on the mirror neuron system[10] and had visited his lab a handful of times to observe lab members plan, troubleshoot and conduct a study measuring functional connectivity in the brains of Autistic and typically developing children. I invited Dr. Pineda because of his interest in embodied theories of cognition, and because I believed that these rich, nuanced interactions I was seeing in *your position* posed an interesting counterpoint to the kinds of experimental paradigms that Dr. Pineda, and many others, typically use in the lab to identify the neural correlates of social action. In order to identify what was happening in the brains of experimental subjects while they were engaged in interpreting or responding to socially relevant stimuli, researchers often used imaging technologies, like functional magnetic resonance imaging (fMRI) or electroencephalography (EEG).

Until recently, these technologies were quite restrictive in respect to movement, and, in the case of fMRI, in respect to the possibility of testing more than one individual at a time. Thus, even for cognitive neuroscientists who were interested in exploring how situated bodily *inter*action impacts

cognitive processes and their neural correlates, available technologies and conventional practice tended to restrict studies to researching immobilized and isolated individuals. In order to evoke socially relevant tasks, many such studies use videos of expressive faces (e.g., Montgomery and Haxby 2008, as pictured above), hand movements (e.g., Liew et al. 2011), and actionable objects and scenes (e.g., Iacoboni et al. 2005), to give a few examples. These stimuli flash on video screens, prompting a subject to respond according to a given task. Unlike the highly inter-responsive pairs in *your position*, these stimulus-response paradigms were largely *unresponsive* to the responses of participants. That is, regardless of participants' choices, the next stimulus would automatically appear. Thus, although the growing body of research on the neural correlates of social cognition has yielded highly impactful and important findings, there remain aspects of open-ended real-world interaction (like the complex, multimodal interpretation and response of an interlocutor) that could not be captured by this work. For Dr. Pineda, at least, this was already a matter of interest: how could the work they do in the lab become more generalizable to dynamic, real-world (or "ecologically valid") situations?

When Dr. Pineda tried *your position* and observed the richness in participants' emerging interactions, I asked him how might a dynamic interaction like this one be studied in the cognitive neuroscience lab. This question led to further discussion, and subsequently to our decision to consider this thought experiment through the practical experience of together examining the videos of people interacting in *your position.* In doing this, we were exploring how one might decompose the ongoing flow of behaviour into generalizable and computationally relevant components ("to code the video," as Dr. Pineda referred to it), while *at the same time* trying to retain a sense of the flow of intersubjective meanings that emerged locally for each pair.

We had wanted to begin from an intentionally naive position, allowing our strategies for analysis to emerge from the interactions we observed in *your position.* However, needing to decide on a practical method to do this, what we attempted to deploy was *video coding*, a technique that presumed gestures and communicative action to be composed of functionally similar (and therefore code-able) elements, like smiles, frowns, and nods. In *Analyzing the Analyst*, we can see Dr. Pineda suggesting that we could try looking at, and coding, each individual in isolation, and then comparing these two streams of code in order to identify communicative vs. non-communicative (or what he called "spontaneous") gestures, and myself agreeing, "Let's try that." The coding sheet we created and used for this purpose is pictured below.



The coding sheet Dr. Pineda and I used in the analysis of interaction in *your position*. The left-hand column is the second-by-second time code of the video clip we are analyzing. In *Analyzing the Analyst*, our discussion focuses on gestures made between the :33 second marker and the :36 second marker of the video clip. EC is our abbreviation for eye contact. This coding sheet is the first of three pages for this session.

What we found, as we tried to proceed in this manner, was that we had trouble *naming* many events and gestures that were clearly communicative; indeed, looking later at videos of our own process of analysis showed that, when troubles arose in naming gestures, we relied more heavily on qualitative and embodied interpretation of what people might have *meant* when performing those gestures in the flow of interaction. As we attended to what any instance of, say, a frown might have been intended or taken to mean, we also became aware of the difficulty in assuming that phenotypically similar gestures were semiotically similar across the interaction.

We met eight times over the course of one academic quarter, with each session lasting between one and two hours. During our first meeting, I asked Dr. Pineda if we could record our sessions, and he agreed. At that time, I didn't know what these videos would be used for, only that they provided a

trace that would be available after our face-to-face meetings. For each subsequent meeting, then, I set up a tripod-mounted camera and microphone facing us as we faced the videos on the computer screen.

It was only in our last two sessions that we looked back at these videos of *ourselves* analyzing the video interactions of others. Our initial observations about our interactions were largely focused on our surprisingly numerous and varied enactments of the gestures and expressions we were trying to interpret and code. We speculated—as in the one scene in *Analyzing the Analyst* where we discuss our practices as analysts—about why we might be physically enacting these gestures, and what such enactments may facilitate. Creating this reflexive second layer of video data—allowing us to examine our own strategies as we analyzed the interactions of others—had raised questions rather than answered them: *Why, at any given moment, were we enacting or reenacting the gestures we were analyzing*? *To whom are those enactments directed, and what do they accomplish in terms of our interaction or the interpretive task at hand*?

3. "In which, to consider this, I attempt to restage our analysis with actors."

While an important part of the project includes taking up these questions with Dr. Pineda and doing a systematic analysis together of our video interactions, I was also interested in seeing how these enactments could be analyzed differently, and specifically through the logics and practices of theatre. In this, I wanted to maintain a reflexive approach—including myself as a participant in any such act of analysis—while being cautious not to introduce a recursive path that would again lead to the same questions (italicized in the previous paragraph) we had already identified with Dr. Pineda.

For a theatre director and actors working together to stage a play script, this process typically begins with some form of "table work"—sitting down with the text, reading through it and identifying and exploring the characters and events to be enacted. It seems important to stress here that, while table work has been counterposed to more movement-based processes of analysis and discovery (what is sometimes called "getting on your feet," or, when you no longer rely on the printed text and are thus less restricted in your movement, "going off book"), in practice the relation between table work and "on your feet" work is much more ambiguous, as *Analyzing the Analyst* suggests. While table work has a number of aims—including building familiarity and ease among the members of the group assembled, and experiencing the play script in a different modality through hearing it read out loud—one of the key functions of table work (but also of "on your feet" work) is to collaboratively analyze and discover the flow of communicative actions that constitute the play script's characters and events.

This is the task that three performers and I undertook on one summer day as we met for a day-long process of table work. The performers were all people I'd met socially while doing unrelated archival research at McGill University. Importantly, though all three had lives as performers, they hailed from very different performance traditions. Stephen Quinlan, the blond-haired performer playing the character "Y," is trained as a dancer and puppeteer. Fortner Anderson, the silver-haired performer playing the role of "J," is a performance poet, hailing from an avant-garde tradition of conceptual and performance art and embodied poetics. Of the three performers, only Francisco Rosas Gomez, the black-haired performer to play "Y," comes from a background of making theatre, both as a performer and as a director, even though he has in recent years moved away from theatre work to pursue an MFA in Intermedia Arts at Concordia. Jesse Freeston, a local filmmaker, shot the

entire rehearsal singlehandedly with two cameras, two shotgun microphones, and two Lavalier microphones.[11]

Staging a theatrical reenactment of our interaction seemed to offer multiple points of entry into the questions that Dr. Pineda and I had posed, and to productively centre the many-layered and multiply relevant act of reenactment itself. The most useful outcome of this strategy, I believe, was the sudden urgency of the problem of *what* to reenact. In other words, how could I set the scene for the actors, in order to make this interaction available to them? I chose not to show the actors the video of the interaction, but rather to make it "available" by transcribing the video-recorded interaction into a transcript that would constitute our play script.

In creating this transcript, I worked in the tradition of qualitative interaction analysis, specifically using a system of notation developed by Gail Jefferson (1938–2008), a social scientist involved in the study of "naturally occurring" interaction (Jefferson 2004; Hepburn and Boden 2013). Jefferson's style of transcription has been variously taken up by different approaches to interaction analysis, including conversation analysis (CA), discourse analysis (DA), and ethnomethodological approaches (EM). While the use of such transcripts differs in significant ways across CA, DA, and EM projects, it may be easiest to discuss what a Jeffersonian transcript presumes and is meant to do by juxtaposing it to the video coding that Dr. Pineda and I tried to deploy when analyzing videos of *your position.* Our attempts to code video operated according to the logics of content analysis, a *quantitative* method of analysis in which counting and coding allows a researcher to find regularities in their target phenomena. For *qualitative* researchers using Jeffersonian transcription, this sort of counting and coding "obscures the subtly contexted nature of conversational interaction as well as the sorts of turn-by-turn displays of understanding and repair that have been effectively used in conversation analysis" (Potter 2004, 205).

Instead, Jeffersonian transcripts take great care to notate events in the interaction that might be seen as extraneous or irrelevant to what participants are talking about, especially when those events seem to index communicative action as gauged by the responses of interlocutors. In the case of CA, for example, Jonathan Potter describes why researchers take great pains to notate what might be considered "unimportant" aspects of the interaction:

> Social scientists often treat talk as a conduit for information between speakers: there is a message and it is passed from one person to another. When we use this picture it is easy to imagine that what is important is some basic package of information, and then there is a lot of rather unimportant noise added to the signal: hesitations, pauses, overlaps, choice of specific words, and so on. For conversation analysts this view is fundamentally misguided. Rather than treating these features of talk as simply a blurred edge on the pure message, these features are treated as determining precisely what action is being performed as well as providing a rich analytic resource for understanding what that activity is. . . . It is for this reason that talk is carefully transcribed as it is delivered rather than being rendered into the conventional 'playscript' that is common in some kinds of qualitative work. (2004, 209–10)

In the tradition of this sort of analysis, the transcript is not a transparent window into a past interaction (just as the researcher is not transparent in regards to her research site), but rather is a document of an analyst's engagement with, and interpretation of, an interaction that was available to them. For this project, however, my choice of making a Jeffersonian transcript was not only because

of its qualitative orientation to the analysis of interaction, or because it was itself a mode of analyzing interaction, but also because such transcripts are themselves a means of re-presenting these interactions. In these sorts of analyses, transcripts thus partially constitute a possibility for disputing the analyst's interpretation. In other words, these transcripts—though emphatically disavowed as transparent presentations of the "actual" event—offer the opportunity for an "evaluation that readers themselves can make when they are presented the transcript alongside of its analytic interpretations" (Potter 2004, 204). For me, the issue of re-presentation or setting a scene is a deeply shared concern in both theatre and science, both of which passionately and painstakingly arrange the material discursive conditions through which a phenomenon can be experienced, interrogated, and known.

Thus, for a reader, the transcript provides a means for (painstakingly!) reconstructing a moment of meaningful interaction. For the actors I worked with, having no recourse to the video meant that they needed to orient to the transcript and explicitly reconstitute or *re-member* the different textual streams of action prescribed for their assigned character while they simultaneously searched for meanings that could give sense to the interaction they are playing; we are shown this beautifully in Part 3 of *Analyzing the Analyst* when performer Stephen Quinlan tries to re-member the words ("this very active thing that she did") with the gesture ("moving my hands in front of my face as if I'm washing my face") with the meanings and intentions potentially at play in their synchrony ("because you're talking about the person's face") as a creative, embodied process of analyzing that moment of interaction.

At the same time, these transcripts and their hyper-detailed gestural, tonal, and temporal notations posed particular challenges to the task of performing them. This can be seen in *Analyzing the Analyst* when performer Francisco Gonzales Rosas asks me if I think it is possible to "exactly" enact this densely notated script. Is it possible to eliminate one's "own natural reactions?" he asks. I reply, "I don't know, let's find out." This funny exchange hides a tangle of problems and propositions. Francisco, as someone who has a history in and deep understanding of theatre, is gently trying to probe whether I understand that this script, with all gestures choreographed and notated *ad absurdum* was misaligned, at its core, with the expectation in theatre that the actor should interpret the text, and that creating a gestural life is part of this interpretive achievement. Yet for me, what is interesting about this impossible and misaligned task is not the performance we make at the end, but rather our iterative process of reconstructing these interactions, and the resources we bring to bear on this particular sort of analyzing-by-doing. In other words, I pursue an investigation of Dr. Pineda's and my analytic practices by attending to the ways that the actors rehearse and reconstitute this interaction that they come to know *through the act of reconstituting it*. In this respect, of course, it is not only the performers' actions that are relevant here, but also my own interpretive responses and directorial interjections to guide the actors toward elusive nuances of the interaction, to call attention to the context or meaning of a gesture, or to correct the gestures, movements, vocal dynamics, and timing of the performers.

What Do We Do with This?

Here, with the *Analyzing the Analyst* video and this supplementary text, I have presented the materials and methods of a project that aims to explore practices and concepts of embodiment in theatre and cognitive neuroscience, in advance of presenting and discussing the project's findings.

I began editing video to make *Analyzing the Analyst* in mid-August, 2017, and in the midst of this two-month-long editing process, I have felt closer to and more passionate about this material than ever before. And I felt the extent of that passion in the pain of all that I have had to omit in the final twenty-minute video: all the fascinating, surprising interactions that reveal so much and yet resist explanation. But this very issue—how to make present an irreducible phenomenon, an experience, an emergent field of interaction—is a problem that I, as filmmaker, share with the I in the cognitive neuroscience lab, the I in the rehearsal room, and the I making transcripts in order to see and make available the nuances of what's happening, and thus in order to know more, or differently.

I worry that, for scholars of performance, the video might inspire the interpretation that a scientific or linguistic approach to analyzing communicative behaviour is an impossible or laughable enterprise. That is the inverse of my intention throughout this laborious and time-consuming work. Instead of reading these juxtapositions of performance, lab, and rehearsal as disciplinary divides through which we condemn or applaud one set of practices while validating our own, I hope that these juxtapositions can orient us to how much we already know about meaningful human interaction, through both explicit and tacit modes of analysis in each of these spheres of activity.

The sort of layering that is afforded by the video is meant to undercut a straightforward comparison of these sites, in which the comparer resides comfortably outside the phenomena she is comparing. So, for example, a comparative reading might pit my interpretive approach against, say, Dr. Pineda's. This sort of comparison makes critique easy, and could, I imagine, support an argument that condemns scientific approaches as reductive or compromised by falling short of a purported objectivity. Yet this criticism would miss the important ways that tacit and embodied ways of knowing flow through even the most earnest attempts at reduction in all of these sites. To undermine this assumption of stable, pre-defined disciplinary presumptions and methods, I am embedded in and indebted to each of these material-discursive situations. In this way, I want to foreground the native interdisciplinarities and particularities in each situated encounter as they are registered through my many "I"s.

What to do with this? For me, I will continue working with Dr. Pineda and actors to take up the materials and methods here, and focus on analyzing specific intersections across these. Thus, for example, Dr. Pineda and I can investigate our own reenactments of, say, "front-nods" and "side-nods" by looking at the ways in which the actors and I attempt to reconstitute these actions. In this way, by using these layered situations and myself as both agent and instrument for registering meaning,[12] I hope to complicate the simple application of theatre to cognitive neuroscience, or vice versa, by calling upon and toggling between the logics of both, in practice. For theatre scholars who engage with cognitive sciences, I hope to suggest that *methodological* encounters between these sites of engagement can offer ways to explore these relations while resisting scientism on the one hand, or oppositional critique, on the other.

Notes

1. "Supplementary Material" is the category title used by this online journal for content that cannot be included in *Performance Matters*' primary interface, which is a PDF Reader. Thus, for a case like this one, where the text is supplementary to the video, and not vice versa, there is no way to indicate this formally, outside an assertion in text, as I am making here.

2. An explicit instance of such an oppositional relation can be found in Stefan Helmreich's *Silicon Second Nature* (1998).

3. Of course, I hope it is clear from my stated aims here, but even more so from the video itself, that I do not take *data* to mean that which is given and prior to engagement; my use of data follows what Johanna Drucker called *capta*, phenomena that are not given but rather captured in particular ways, and thus always already presuppose an interlocutor. My project takes up Drucker's imperative to design interpretive and analytic systems based on humanistic and probabilistic premises (Drucker 2011).

4. My use of "experimental" is meant to gesture toward the use of the term both in the theatre and in the lab. My sense of what delineates these practices as experimental is close to how scholar and poet Joan Retallack described it: "Experiment is conversation with an interrogative dynamic. Its consequential structures turn on paying attention to what happens when well-designed questions are directed to things we sense but don't know" (2007).

5. This was pointed out to me by Sarah Klein, who provided invaluable feedback on an earlier draft of the video.

6. See the anthology *Practicing Comparison: Logics, Relations, Collaborations* for a number of views on how comparison might be re-conceptualized in practice (Deville et al. 2016).

7. *Enter>text* is a series of immersive literary events, curated by Henry Hoke and Marco Franco di Dominico (http://henry-hoke.com/ENTERtext).

8. In earlier versions, we had tried various configurations for the voices in the recording: a dialogue between a male- and female-presenting voice, between two female-presenting voices, and two male-presenting voices. We found that, when the voices were male-female, this tended to overdetermine how the participants related to the material and involved less moment-moment negotiation between pairs. Thus, when we presented the piece at the San Diego Art Institute, during a group exhibit called *Ephemeral Objects*, curated by Andy Horowitz, we used a recording with two male voices. While this choice could be critiqued as reifying the neutrality and transparency of male voices, it could equally be defended as not adopting the female recorded voice as the default in situations where recorded voices are in the service of human action. While of course these issues are crucial in the tacit meanings that such choices propagate, our decision to use two male-presenting voices (and not two female ones) in this iteration of the piece arose from the fact that two friends with male voices, Grant Leuning and Eric Leonardis, were available and willing to come to a recording session.

9. The pair that we see most in *Analyzing the Analyst* were actually recorded a week before the exhibition officially opened. These recordings were initially made for another piece that would be exhibited at the same show: *their position*, made with Eric Leonardis in response to *your position*. The younger of the two participants is Ocean Bell, (at the time) an eleven-year-old family friend who, with his father, accepted my invitation to be recorded while trying the piece. His interlocutor is a high school student who was assisting with the installation of an adjacent exhibition of student work, and who I invited on site. Though this pair differed from many others who were simply attending the gallery, however, the sort of nuanced, dynamic interaction that characterized their response to the installation was seen, in some form, in the majority of the pairs I watched doing the piece. (Names were used or omitted according to participants' and their guardians' consent.)

10. The mirror neuron system (MNS) refers to groups of cells in the brain that have both motor and sensory function, and are active both when a research subject makes a goal-oriented movement, and also when they simply observe that movement being done by another. It is still a matter of debate among cognitive neuroscientists whether these cells can be thought of as a system, and thus is sometimes referred to as the "putative MNS" (Recent surveys of this literature include Kilner and Lemon 2013; Campbell and Cunnington 2017).

11. When I had asked Jesse to document the process, I already anticipated that the video material from this rehearsal would be somehow brought to bear on the other two layers of video material. The performers and the filmmaker were each paid about $100 for the day's work. In the case of the performers, each had been invited to participate because they'd previously expressed interest in the project.

12. See Klein and Marghetis (2017) in this issue for a different example of this reflexive approach.

References

Blair, Rhonda, and Amy Cook. 2016. *Theatre, Performance and Cognition: Languages, Bodies, and Ecologies*. New York: Bloomsbury Methuen Drama.

Campbell, Megan E. J., and Ross Cunnington. "More Than an Imitation Game: Top-down Modulation of the Human Mirror System." *Neuroscience & Biobehavioral Reviews* 75: 195–202.

Cook, Amy. 2007. "Interplay: The Method and Potential of a Cognitive Scientific Approach to Theatre." *Theatre Journal* 59 (4): 579–94.

Deville, Joe, Michael Guggenheim, and Zuzana Hrdličková. 2016. *Practising Comparison: Logics, Relations, Collaborations*. Manchester: Mattering Press.

Drucker, Johanna. 2011. "Humanities Approaches to Graphical Display." *Digital Humanities Quarterly* 5, No. 1: 1–21.

Falletti, Clelia, Gabriele Sofia, and Victor Jacondo. 2016. *Theatre and Cognitive Neuroscience*. New York: Bloomsbury Methuen Drama.

Iacoboni, Marco, Istvan Molnar-Szakacs, Vittorio Gallese, Giovanni Buccino, John C. Mazziotta, and Giacomo Rizzolatti. "Grasping the Intentions of Others with One's Own Mirror Neuron System." *PLoS Biology* 3 (3): 529–35.

Jefferson, Gail. 2004. "Glossary of Transcript Symbols with an Introduction." In *Conversation Analysis: Studies from the First Generation*, edited by G. H. Lerner, 13–31. Philadelphia: John Benjamins.

Kilner, James M., and R. N. Lemon. 2013. "What We Know Currently About Mirror Neurons." *Current Biology* 23 (23): R1057–62.

Klein, Sarah, and Tyler Marghetis. 2017. "Shaping Experiment from the Inside Out: Performance-Collaboration in the Cognitive Science Lab *Performance Matters* 3 (2): 13–37.

Knorr-Cetina, Karin. 1981. *The Manufacture of Knowledge: An Essay on the Constructivist and Contextual Nature of Science*. Oxford: Pergamon Press.

Latour, Bruno, and Steven Woolgar. (1979) 1986. *Laboratory Life: The Construction of Scientific Facts*. 3rd ed. Princeton: Princeton University Press.

Liew, Sook-Lei, Shihui Han, and Lisa Aziz-Zadeh. 2011. "Familiarity Modulates Mirror Neuron and Mentalizing Regions During Intention Understanding." *Human Brain Mapping* 32 (11): 1986–97.

Lynch, Michael. 1985. *Art and Artifact in Laboratory Science*. London: Routledge & Kegan Paul.

Mol, Annemarie. 2002. *The Body Multiple*. Durham, NC: Duke University Press.

Montgomery, Kimberley J., and J. V. Haxby. 2008. "Mirror Neuron System Differentially Activated by Facial Expressions and Social Hand Gestures: A Functional Magnetic Resonance Imaging Study." *Journal of Cognitive Neuroscience* 20 (10): 1866–77.

Potter, Jonathan. 2004. "Discourse Analysis as a Way of Analyzing Naturally Occurring Talk." In *Qualitative Methods: Theory, Method and Practice*, 3rd ed., edited by David Silverman, 200–21. London: Sage.

Retallack, Joan. 2007. "What Is Experimental Poetry and Why Do We Need It?" *Jacket* 32. http://jacketmagazine.com/32/p-retallack.shtml.

Spatz, Ben. 2015. *What a Body Can Do: Technique as Knowledge, Practice as Research*. Abington: Routledge.

Varela, Francisco, Evan Thompson, and Eleanor Rosch. 1991. *The Embodied Mind: Cognitive Science and Human Experience*. Cambridge, MA: MIT Press.

when they are anonymous they are free

&/_[

real-time is a spectrum
this is a "moment"
a moment can be a millisecond or it can be two years
time(s) is(are) in flux
pastpresents and futurememories
this is a slice of time(s)
a slice of spatial sediment
there is something physical to it
time(s) manifest(ing) materially, physically
like dust or fatigue

iu curate time(s) in certain ways
subconsciously subjectively
iu perform time(s)
subconsciously subjectively
iu emphasize on-going performances of time(s) and the
re-performances of time(s) which at least i believe to be accurate
in the meantime of living
(truth emerges in iu believing even if and as things change even when they do)
do iu iterate perform iterate for reason(s) meaning(s) truth(s)?
pfffffffffffffffffffffffffffffffffffffffffffffffffffffffiterativity

1 frame performances
1 millisecond performances
2 year (bend give or take + -) performances
periods of time(s) lifetime(s) ∞ lives performances
as iu shift the scale iu get granular
a slice break(ing) into small(er) pieces

how do iu define that which cannot be defined/closed/concluded/over?
(never over) (frozen + warm)
when do words fail us?
when do words change us?
how to put words out of time(s) more than "in time"?

time(s) as experiments in or as folding and unfolding structures
truth(s)?
delete that word retrieve it forget it continue a feeling being a moving shifting system of time(s)

mattering is still a question

&/_[is a human mindbody. They slowly morph while staying in the same place. They are perhaps best understood through textural sounds that are not quite aligned with a strict rhythmic grid.

On Repetition: Writing, Performance & Art. Edited by Eirini Kartsaki. Chicago: University of Chicago Press, 2016. 231 pp.

Reviewed by Nathan Flaig

Eirini Kartsaki's edited volume *On Repetition: Writing, Performance & Art* offers a rich exploration of repetition as a complex and vital device across a range of creative contexts, including theatre, dance, performance art, stand-up comedy, music, film, and poetry. *On Repetition* deconstructs the binary of the original/copy, revealing the poignancy of repetition as a conceptual tool for creators to evoke particular affective responses. The volume articulates repetition in both content and form, with contributions that write performatively, turning toward a refusal of closure. From this provocative standpoint, repetition emerges differently in each contribution, taking shape as a returning, an echo, an archive, a doubling, a haunting, the unfinished, and the citational. The various contributors to the volume mine these notions through a multiplicity of theoretical and methodological approaches, offering readers a richness of content from which to ponder the depth of the repetition as a creative trope and as a useful mode of appraisal when approaching creative works within a postmodern context.

The greatest strength of the volume lies in its multipronged appraisal of repetition, whereby contributors re-read, re-articulate, and re-format the concept of repetition in multidisciplinary contexts. The overall effect of this range of articulations produces a dialogue of sorts, in which a conversation around the affective, performative, creative, and intellectual applications of repetition modulates from chapter to chapter. This produces a feeling of unsettledness for the reader while pointing to the strength of the collected contributions from a curatorial perspective; they seem to hang together in such a way that each unique piece offers a significant angle in the approach to repetition as boundless possibility.

Early chapters take a robust theoretical approach to repetition. Swen Steinhäuser's "Of Secret Signals, Absent Masters and the Trembling of the Contours: Walter Benjamin, Yvonne Rainer and the Repeatability of Gesture" discusses repetition within the context of "being-in-rehearsal" and the radical performativity that is implied by repetition's situation toward the future. Furthering this theoretical exploration, Alan Read's "All the Home's a Stage: Uncanny Encounters Between Auditorium and *Oikos*" engages with Søren Kierkegaard/Constantin Constantius' take on repetition and the disorienting effects of being-at-home/coming-home. Read probes the scholarly "fear of the familiar," as it haunts the inherent citationality of academic enterprise, which is nonetheless plagued by the pressure to be "original."

The following chapters in the volume situate their analyses within specific case studies that deploy some aspect of repetition. Silvia Battista's "Repetition as Technology of the Numinous in Performance: *The Artist Is Present* by Marina Abramović" approaches the use of repetition in Marina Abramović's highly publicized performance/retrospective at MoMA within the purview of Rudolf Otto's concept of the numinous, exploring the relationship between the sacred and the secular within contemporary performance practice. Taking a novel approach to the analysis of repetition within Abramović's practice from a spiritual perspective, Battista explores the highly affective, quasi-devotional experiences of audiences when reciprocating Abramović's gaze from within the performance space. A major strength of this chapter lies in its creative and significant approach to spiritual practice within the context of contemporary performance; however, I did long for a more

in-depth discussion of the parallels between Abramović's performance and ancient religious practices.

Emma Bennett's unpacking of Stewart Lee's "The Rap Singers" joke continues the probing of repetition set out by Battista's analysis, while harking back to Read's discussion of academia's fear of repetition. Bennett offers up a wonderful passage on close readings and the process of returning to texts again and again through scholarly inquiry and performatively engages in reading and re-reading Lee's comedic routine as theory, as allegory, as bodies, and as Stewart Lee himself. In doing so, Bennett provides salient insights into the process of re-engaging with works to produce varied results. She concludes with a meta-reading of "The Rap Singers" as pointing to the impossibility of closure through linguistic representation and suggests that the delivery of the punch line allows us to (re)encounter this possibility in a unique fashion.

The next two chapters engage with repetition from the artist's point of view. Claire Hind and Gary Winters' contribution, "The Crying Channel" unpacks the authors' creative process in dialogue with Freudian theory and the shifting archive of reinterpretations of Roy Orbison's "Crying" on the Texas Community Cable TV Network. Lauren Barri Holstein's chapter outlines the use of repetition within her provocative feminist performance art, in particular with her pieces *How to Become a Cupcake* and *Splat!* While Holstein and Hind/Winters' contributions added significant dialogue on repetition from the artist's perspective, I found that these sections did not cohere, despite a shared focus on repetition's creative application.

However, the feminist groundwork laid by Holstein's chapter pairs nicely with Alice Barnaby's contribution, which details the repetitive nature of nineteenth-century pin-prick imagery. Barnaby's analysis of the "pointlessness" of pin-prick imagery connects the "monotonous" art-form to wider historical and societal shifts underway in the nineteenth century, providing a cogent discussion of pin-prick imagery as significant in a context of art appreciation that functions along lines of masculinist authenticity, subverting these dominant assumptions. Repetition is placed at the centre of this analysis, and such a focus gives way to an illuminating confrontation of masculinized systems of aesthetic worth through its re-evaluation of a domestic pastime.

The following two chapters take up the theme of repetition through poetry. Gareth Farmer's chapter provides a thoughtful and intriguing take on Andrea Brady's writings in relation to the process of interpellation and the inherited symbolic systems that impress upon the subject. Linda Kemp's contribution shows how Geraldine Monk's poetry holds a space for trauma, adding an important affective dimension to the work. Although both chapters brought excellent insights to the volume, namely for their focus on poetics and affect, these selections seemed to treat repetition as secondary.

However, Ruth McPhee's "Déjà-vu, Doubles and Dread: The Uncanny and Christopher Smith's *Triangle*" takes the discussion firmly back to repetition. McPhee's analysis of the shifting temporalities in *Triangle* is accessible and insightful, conveying a considered level of detail to concepts like the uncanny and déjà-vu. Kartsaki's contribution "Farewell to Farewell: Impossible Endings and Unfinished Finitudes" brings the volume to a close on a high note. Her impressive navigation of the cyclical process of returning takes into account the distance travelled by reader throughout the volume, ending the work on a positive affirmation of repetition's inexhaustive potential. Furthermore, Clare Foster's "Afterword: Repetition or Recognition" provides a poignant

and succinct dénouement to the volume, tying together the threads of inquiry woven by the various contributions to the work.

In sum, *On Repetition* follows through on its somewhat lofty aims, turning and returning to repetition from a multitude of vantage points in order to activate the expansive potential of the phenomenon. As a reader, I found myself constantly rethinking what it means to repeat with each successive chapter, coming to the end of work with a renewed appreciation for a concept that feigns simplicity, demonstrating the effectiveness of the volume as a work that engages with repetition through both content and form. A major strength of this particular collection lies in its multidisciplinarity and its theoretical breadth. Although the contributions range in quality and depth of engagement with the unifying theme of repetition, the collection as a whole transcends these weaknesses. *On Repetition* is a useful and engaging guidebook to an often under-analyzed and under-considered phenomenon, breathing new life into areas that perhaps have appeared well trodden and overlooked through its careful navigation of the creative possibilities of repetition.

The Routledge Companion to Michael Chekhov. Edited by Marie-Christine Autant Mathieu and Yana Meerzon. New York: Routledge, 2015. 434 pp.

Reviewed by Conrad Alexandrowicz

As I write this, I'm in the middle of rehearsals for Giraudoux's *The Madwoman of Chaillot* at the University of Victoria's Department of Theatre, in which I'm employing various key tools developed by Michael Chekhov over the course of his career as an actor, director, and visionary pedagogue. They include the Imaginary Body, Archetypal and Psychological Gestures, Atmospheres, and Qualities of Movement. It has been fascinating to read this wide-ranging and very thorough collection of essays by a host of renowned Chekhov scholars and practitioners in Europe, the UK, and the US while engaged in the process of introducing a cast of twenty young actors to what is for them an entirely new set of ideas and practices about acting and the theatre.

My own exposure to Chekhov's methods occurred in the summer of 2014 when I participated in the National Michael Chekhov Association's (NMCA) annual Summer Training Intensive, held at the University of Southern Maine. Instructors and actors Lisa Dalton and Wil Kilroy, passionate, devoted and articulate adherents of Chekhov's work, were mentored by the late Mala Powers, whose name appears frequently in this book; while working as an actor in Hollywood, she was taught and coached by the Russian master. I was struck by many things about the work: that it proceeds from the assumption that an actor is an artist, not merely a puppet; by its balance of methods that reveal meaning in both text and the body; and by its use of specific, sensible, and accessible tools in the creation of characters. Chekhov's method relies on specific techniques to stimulate actors' imaginations via the medium of the body, rather than emotional substitutions derived from personal history. Together his methods define the word "psychophysical" in the realm of acting.

In their introduction, hardworking editors Marie-Christine Autant-Mathieu and Yana Meerzon claim that "Chekhov's ideas are well-known and widely taught today" (1). This is a relative and debatable point: most of my students had never heard of him, and I suggest that familiarity with his body of work is specific to geographical location or institutional disposition. In the biographical information on the NMCA website Dalton and Kilroy describe his "unique contribution to acting [as] one of the best-kept secrets of the theatrical world" (http://www.chekhov.net/chekhovintro.html). Why is this the case?

Born in 1891 and the nephew of Anton Chekhov, Michael Chekhov became one of Konstantin Stanislavsky's most brilliant pupils and is widely considered to be the finest actor Russia has ever produced. Already deeply in trouble with the authorities due to his innovative directing and teaching methods, he left the Soviet Union in 1928, never to return, and embarked on a peripatetic journey as an artistic exile, which took him to Germany, Austria, Latvia, Lithuania, France, the famed Dartington Hall in England, New York City, and finally Hollywood, where he appeared in a number of films and was nominated for an Academy Award for his work in Hitchcock's *Spellbound*. He was lucky to escape as he did, given that his fellow theatre visionaries in Soviet Russia fared much worse: Stanislavsky spent his last years under virtual house arrest, while Vsevelod Meyerhold was tortured and murdered by Stalin's police in 1940. One of the gripping things about this volume is the picture it paints of the astonishing ferment in the arts and letters in Russia in the first decades of the last century, the life of which was, tragically, squeezed to death by the Soviet regime. As Maria Ignatieva

writes, the "humanistic traditions of Silver Age Russian culture, with its multiplicity of viewpoints and scientific and artistic search for the meaning of human life, was gradually crushed by Stalinist officialdom, which would be firmly established by the mid-thirties" (173).

One imagines that Chekhov would be one of theatre's "best-kept secrets" if he had *not* left the Soviet Union, given the efficacy, comprehensiveness, and versatility of his method, equally applicable to stage and screen acting. But he remains a secondary figure by comparison with his much more famous mentor and teacher, despite the fact that his work was transported whole, as it were, due to his exile, unlike that of Stanislavsky, which came to the West in bits and pieces. Moreover, it was not subjected to the vicissitudes of translation because Chekhov—apparently much to his discomfort (according to Autant-Mathieu, writing on page 88 of this volume)—was forced to work and teach in English when he came to Dartington Hall and thereafter to the US, whereas Stanislavsky's writings were subjected to what is now regarded as a very problematic process of translation. The devoted following Chekhov's work has acquired over many decades has failed to dislodge the American "Method" as the hegemonic force in actor training in North America. As Ann Bogart and Tina Landau observe in *The Viewpoints Book*, "our misunderstanding, misappropriation and miniaturization of the Stanislavsky system remains the bible for most practitioners. Like the air we breathe, we are rarely aware of its dominance and omnipresence" (Bogart and Landau 2005, 16).

Scholar Sharon Marie Carnicke has undertaken crucially important work on this topic, given the extent of the problem to which Bogart and Landau allude, exposing the complex and troubled history of Stanislavsky's work and its legacy. She notes that by the time of the Moscow Art Theatre's tours to New York in 1923 and 1924, the Soviet regime had already determined that realism was the only theatrical genre that could serve the goals of the revolution, and that in their enthusiastic response to the work "Americans became unwittingly and ironically complicit in developing his Soviet image" (Carnicke 2010, 16). In this collection, Carnicke has contributed an essay about how the remarkable Russian actor and teacher Mariya Knebel kept Chekhov's work alive in the deep freeze of Soviet cultural policy. She notes that "before emigrating, Michael Chekhov had already become persona non grata on two counts: his broadly imaginative approach to acting, which stretched the bounds of realism, and his deep belief in anthroposophy, the spiritual tenets of Rudolf Steiner" (191). And as Monica Cristini writes earlier in the volume, "Steiner was not only a philosopher, but also a playwright, director, teacher of actors, and, last but not least, founder of eurythmy, a new and original kind of *spiritual dance*" (70, italics in original), in which both musical pitches and those of the human voice were keyed to specific movements of the body. Indeed, the figure of Steiner is evoked all through the collection, a testament to the importance of his metaphysical ideas to Chekhov, and their animation in every component of his method.

The book is divided into four sections and considers Chekhov's work from every conceivable perspective: chronological development, historical context, collaborations and affinities, interdisciplinary links and applications, and contemporary usages. In the first part, "Michael Chekhov in Context: Theory, Practice, Pedagogy," Andrei Kirillov writes astutely and convincingly about what is perhaps the most significant departure Chekhov made from Stanislavsky's System: his rejection of "affective memory" as the principal device in the actor's toolbox in favour of his imagination and his physicality. According to Kirilov, Chekhov rejected "the idea that the actor's performance should be conditioned by personal, emotional, affective memories, since they always belong to the sphere of the ego. Declaring such . . . experiences derived from life to be unsuitable on stage, he instead favours objective, creative, fantastic, impersonal, or suprapersonal experiences, and

draws a strict line between these two kinds of experiencing" (48). Kirillov notes the implicit contradiction in the Stanislavsky System, which requires that the actor reproduce lived experience in public: "The very nature of theatre contradicts the nature of natural experience" (44). And, as Monica Cristini observes, this can be traced back to Steiner, who believed that "the life of the actor should remain separated from the life of the character, because the latter lives in a world that does not belong to real life but to the artistic reality on stage" (76). Underlining this idea, Autuant-Mathieu notes that Steiner's anthroposophy was Chekhov's "secret guide, gradually edging out . . . Stanislavsky" (87).

Perhaps the most renowned of Chekhov's inventions is the Psychological Gesture (PG), which is neatly summed up by John Lutterbie as "a powerful tool in the development of action and character . . . [c]ombining the force of physical movement with the imaging of psychological states" (96). Actors devise movement phrases, drawing from Chekhov's list of Archetypal Gestures—Push, Pull, Lift, Smash, Gather, Throw, Tear, Drag, Penetrate, and Reach—in addition to other elements, that emblematize their characters, the meaning of a scene, or the arc of an entire play. Lutterbie argues for Chekhov's prescience in this area: "Chekhov's understanding in practical terms of the visceral connection between movement, emotion and cognition predates what neuroscientists are coming to accept only now: the brain cannot be divorced from the body, and reason and emotion are inseparable" (102). Put that in your pipes and smoke it, "Method acting" gurus!

Gytis Padegimas writes movingly of his time as a theatre student in Soviet Moscow in the 1970s and being fed a steady diet of the state-approved version of the Stanislavsky System. He came upon an underground, *samizdat* copy, much dog-eared and frayed from passing through so many hands, of Chekhov's *On the Technique of Acting*. He reports being "awestruck" by its contents, which revealed and valorized the human dimensions of spirit, of imagination and creativity in actor training that made the grey reality of Socialist Realism seem utterly inadequate. Chekhov's theories and practical advice encouraged him "to dig deeper into the mysteries of existence as an antidote to the ruling communist doctrine of materialism" (343). Teachers and directors Lionel Walsh and Cynthia Asperger write of their productive use of Chekhov's methods in rehearsing contemporary plays, in Walsh's case Michel Marc Bouchard's *Down Dangerous Passes Road*, and in the case of Asperger, *Tender Napalm*, by Philip Ridley: these approaches seem to have passed the test of time.

Other writers have noted fascinating connections between Chekhov's aesthetic philosophy and certain Eastern discourses: Daniel Mroz explores the affinities between his system and the *Yinyang Wuxing* cosmology of China, while Jerri Daboo explores the profound influence *Kathakali* dancer/actor Uday Shankar had on Chekhov while both were in residence at Dartington Hall. She proposes that it was the representation of archetypes in classical Indian dance that particularly inspired Chekhov, and invokes the example of the grandfather: "If the actor was to only use the memory of his or her real grandfather, then the portrayal will be limited by this memory. However, if the actor were to use the image of the archetypal—the universal, quintessential grandfather—the image would include all the grandfathers in existence" (292).

It is hard to imagine Michael Chekhov, so much a son of Russian culture—and of European sensibility generally—managing to survive in Hollywood, California, and indeed, as Jacqueline Nacache notes at the beginning of her essay, it's no secret that he had very little respect for it (328). But he spent his last twelve years there, and it's fascinating to read about the accommodations that he made—and that were made for *him*—to find some workable middle ground between his vision of the actor and the practices of Hollywood's movie culture. But Chekhov's genius first revealed itself

in his acting, and it seems appropriate that he returned to it in the last years of his life. However, as Nacache points out, it is paradoxical that "thanks to the permanence of film, it is only those roles that interested him the least, created in the restrictive atmosphere of the Hollywood film set, which today give us reliable evidence of his work" (328).

The collection ends, appropriately enough, with Joanna Merlin's account of her participation in Chekhov's acting classes in Los Angeles, beginning in 1949. She recalls how this experience changed her life, inspiring its latter sixty years "with an enduring optimism about the actor's unlimited artistic potential" (389). A well-known actor on stage as well as in films and television, Merlin is the only surviving Chekhov pedagogue who trained with him. She recounts the struggles undertaken by his many students to keep his methods alive over decades in the US and to promote them within the profession when Lee Strasberg's Method was the dominant discourse on both coasts. But she notes the growing interest in psychophysical methods such as Chekhov's: "In the years following Lee Strasberg's death in 1982 there has been a growing openness and hunger for alternative approaches to acting training in the US" (392). She credits various forces for this, including the influence of Grotowski, yoga, *Viewpoints*, and the work of Tadashi Suzuki. There are now numerous Michael Chekhov schools around the world, as well as practitioners in colleges and universities who have adopted his methods.

This collection is a fascinating, provocative, and even moving body of writings about one of the great inventors and visionaries of twentieth-century theatre, and forms a useful addition to the extant literature. It will be a welcome source and support for scholars as well as practitioners and may inspire some of the latter to look more closely into their own pedagogical positions and practices. This extends to theatre-makers as well. As Julia Listengarten notes, "Chekhov's theoretical discoveries and practical applications in theatre foregrounded cross-disciplinary and inter/multi-cultural practices subsequently developed in post-1950s experimental theatre" (264). The reverberations of this are still working themselves out in our own cultural moment, and in the digital age, we continue to test modes of cross-disciplinary and inter/multi-cultural practice, albeit with a changed inflection. And therefore Michael Chekhov still has much to teach us. Speaking from a Canadian perspective, I propose that his vision of the theatre's possibilities deserves much wider currency.

References

Bogart, Ann, and Tina Landau. 2005. *The Viewpoints Book*. New York: Theatre Communications Group.

Carnicke, Sharon Marie. 2010. "Stanislavsky and Politics: Active Analysis and the American Legacy of Soviet Oppression." In *The Politics of American Actor Training*, edited by Ellen Margolis and Lissa Tyler Renaud, 15–30. New York: Routledge.

Performing Queer Modernism. By Penny Farfan. Oxford: Oxford University Press, 2017. 154 pp.

Reviewed by Stephen Low

In *Performing Queer Modernism,* Penny Farfan charts how queerness was an essential feature of the work of influential modernists and, consequently, was instrumental to the emergence and development of modernist performance. To establish this relationship between queerness and modernist performance, Farfan appeals to close analyses of dramatic texts and accounts of dance performances from the modernist era. She also situates these plays and performances alongside other works of art by the artists considered, artistic responses to the artists and performances examined, criticism of the works analyzed, and contemporary scholarship. Her book provides insight into how queerness helps us better understand modernist art more broadly, and modernist performance specifically.

For Farfan, the productive capacity of "queer" stems from its adjectival power to describe that which disturbs normative regimes. Farfan also employs queer as "a verb that refers to the action or process of unsettling established cultural forms and modes of reception as they intersect with sexual norms and themes" (3). She aligns this conception of queerness with modernist performance when she argues: "if queerness aligned with modernist aesthetics as traditionally understood in terms of formal difficulty and experiment, it was not simply coincident with and analogous to modernism, but also created it" (3).

The opening chapter, "'[T]his feverish, jealous attachment of Paula's for Ellean': Homosocial Desire and the Production of Queer Modernism," offers an analysis of *The Second Mrs. Tanqueray*, by Arthur Wing Pinero, that incorporates Eve Kosofsky Sedgwick's distinction between the homosocial and the homosexual. This chapter argues that "representations of homosociality on the modern stage could open up space for queer dynamics and desires, both among the characters themselves, and between actors/characters and spectators" (12). Farfan charts how Pinero's play subverts the narratives that often attend the conventional figure of the "fallen woman" by displacing Paula Tanqueray's need for attention and redemption from her husband to his daughter, Ellean, who has just returned home from a convent. In so doing, she argues that Paula's hysterical attachment to Ellean, which is depicted as having the potential to redeem the "fallen woman" through the "love of a good woman," dramatizes a queer homosocial desire.

In the second chapter, "'Fairy of Light': Performance Ghosting and the Queer Uncanny," Farfan argues that Loie Fuller's technologically experimental skirt-dance, *Fire Dance,* was exemplary of queer performance, both in its aesthetic and also in the ways the performance correlates to Oscar Wilde's *Salome*. The use of modern lighting technology that captured the voluminous fabric of her large skirts in darkened auditoriums made Fuller appear fire-like and ghostly, making her dance uncanny. Farfan aligns Freud's uncanny with queerness in the sense that both embrace indeterminacy and the unsettling of binaries. Farfan suggest that, by staging Salome's dance for Herod in her *Fire Dances*, Fuller "ghosts" Wilde's popular adaptation of the biblical story performed in Paris two years prior, which links her and her performance to Wilde's non-normative sexuality. Farfan also notes that Fuller, like Wilde, was known to be a homosexual, and her body, which was described as similar to Wilde's, was queerly masculine. Farfan argues that "*Fire Dance* thus superimposed the image of the

queer feminist heretic onto the traces of the erased homosexual martyr in a layering of uncanny doubles" (35).

"'[W]ithout the assistance of any girls': Queer Sex and the Shock of the New," the third chapter, provides an analysis of Nijinsky's *Afternoon of a Faun* to illustrate how he performed queer male sexuality that was neither masculine nor feminine, human nor animal, heterosexual nor homosexual. Farfan states: "the narrative structure of *Afternoon of a Faun* intersected with the ballet's innovative choreographic style to foreground a dissident male sexuality that disrupted conventional expectations of heterosexual narrative resolution and in doing so contributed to the emergence of new sexual identities and queer spectatorship" (44). She also notes Nijinsky's disinterest in the female nymphs who appear in his ballet. In contrast to his disinterest in the nymphs, his interest in the scarf left behind by one of the nymphs constitutes an act of autoeroticism. This refusal of heterosexuality is the dominant queer choreographic narrative feature that eschews ballet's convention to conclude their narratives with heterosexual pairings. This, combined with Nijinsky's flattened two-dimensional choreographic style—which further queered both ballet and modern dance conventions—establishes this work for Farfan as exemplary of a queer modern aesthetic.

In the fourth chapter, "'I think very few people are completely normal deep down in their private lives': Popular Plato, Queer Heterosexuality, Comic Form," Farfan charts the influence of Plato's *Symposium*, specifically the articulation of androgyny, on Noel Coward's *Private Lives*. Farfan "considers *Private Lives* as another such 'ghost' bringing early twentieth-century uses of Plato to advance thinking about queer sexualities into open view on the popular comic stage" (58). Specifically, Farfan argues that Amanda and Elyot, the protagonists, are representative of the androgynous halves of a divided whole who long to be reunited, as described in Aristophanes' origin story of heterosexual love. Farfan positions her analysis in this chapter as exemplary of how queer sexualities were presented, and commercially successful, in mainstream theatre in the English-speaking world.

Farfan's last chapter, "'What are you trying to say?'—'I'm saying it': Queer Performativity in and across Time," argues that two plays by Djuna Barnes, *To the Dogs* and *The Dove*, which were often thought to be failures at the time of their writing, nevertheless resonate with subsequent non-playgoing audiences (including critics and theorists), and so "continue to 'perform' in the present moment" (69). Farfan claims the plays "can both be understood as metatheatrical modernist parodies that self-reflexively replay dominant representational conventions in order to stage queer feminist critiques of representation" (75). For example, in *To the Dogs*, the protagonist, Helena, sits with her back to the audience throughout the play, which, as Farfan argues, is a refusal of the mastering, male gaze. Barnes also eschews conventions of dramatic action, which further queers this work. Farfan argues that in *The Doves*, Barnes incorporates a canonical painting to critique compulsory heterosexuality and normative gender power dynamics, thus also challenging hetero-patriarchal modes of representation.

In *Performing Queer Modernism,* Farfan provides thorough research and astute analyses to illustrate how queerness can help us better understand modernist performance. Farfan's incorporation of critical responses, reviews, and artwork to frame and support her analyses is rigorous almost to a fault; Farfan's own voice can be lost under the weight of her citations. Regardless, not only would her book be a useful addition to any syllabus on queer performance or modernist art, it should be held up as a strong example of performance and theatre studies scholarship.

Performance Studies in Canada. Edited by Laura Levin and Marlis Schweitzer. Montreal & Kingston: McGill-Queen's University Press, 2017. 464 pp.

Reviewed by Jennifer Chutter

When asked to review *Performance Studies in Canada*, my initial sarcastic thought was, "Oh great! Another book celebrating Canada published during its sesquicentennial." However, upon reading the collection of essays, it seems that the aftermath of the Canada 150 celebrations is the perfect time to explore the performance of Canadian cultural identity, Indigenous-settler relations, and whose stories are told and how. In their introduction to the collection, Laura Levin and Marlis Schweitzer suggest that by viewing all behaviours as performance—be it dance, the presentation of self in a political context, or the naming of a place—performance studies can be used as a decolonizing tool to expose the settler practices that are embedded in everything we do. The essays in this collection avoid positioning "Canadian culture as superior to and fundamentally different from" the US; instead, the scholars focus on situating their work within the existing performance studies scholarship, while also introducing "alternative ways of reading culture as performance" (24). The inclusion of Indigenous perspectives, marginalized communities, and language politics displaces the more traditional Eurocentric approach to performance studies. The strength of this collection is how many of the essays reflect on Canada as a settler nation.

The collection is divided into four sections. In "Part One: Performing Geographies," the four essays explore how place shapes performance and performance shapes place. In "Calgary's Cultural Topography: The Performance of a City," Susan Bennett looks at the role of public buildings and plazas in downtown Calgary and how people move through and use space. Peter Dickinson also situates his autoethnography in an urban setting in his discussion of dance performances that take place outside in Vancouver. In their focus on how the built form allows for the creation of specific place-making practices, these two urban essays contrast with the other two essays, which illustrate how Indigenous peoples have been erased from the landscape through colonial practices. In "Xeyxelómós and Lady Franklin Rock: Place Naming, Performance Historiography, and Settler Methodologies," Heather Davis-Fisch draws attention to the ways in which the colonial state preserves a certain collective and cultural memory that is then challenged by Indigenous performances of place. Julie Nagam, in "Travelling Soles: Tracing the Footprints of our Stolen Sisters," outlines how performance can be used as a decolonizing tool. Through her examination of the travelling display of moccasin vamps, Nagam suggests that the display creates a "living archive" of Indigenous histories, as well as cultural resilience. She suggests that it is through the use of objects that colonial legacies can be confronted by, for example, physically representing the number of missing and murdered Indigenous women, but also the act of cultural survival as represented through the beading work on the moccasins. The four essays illustrate both acts of creation and erasure as attached to specific geographic landscapes.

Moving beyond the vast geography of Canada, "Part Two: Spectacles of Nation," brings together three essays that look at the performance of a national identity from economic, military and athletic perspectives, while at the same time challenging the myths upon which our national identity is based. While on the surface the marketing of American Girl in Canada can be viewed as the expansion of a neoliberal consumer culture, Schweitzer guides the reader further into the parallels between the cultural work of American Girl dolls and US imperialism and questions the performance of cultural

identity on children generally, but Canadian children specifically. She challenges the myth that Canadians are oppressed by US cultural and economic dominance and instead shows the similarities between nations through a reading of how children perform their acquisition of the American Girl doll in online videos. Natalie Alvarez explores the performance of Canada's peacekeeping cultural identity in her essay, "Presumptive Intimacies and the Politics of Touch: 'Strategic Culture' in Simulations of War." Alvarez's essay is based on her observation of military simulations that train Canadian soldiers to understand and interpret Afghani "cultural systems, traditions, and practices" in order to more effectively carry out their peacekeeping mission (172). Helene Vosters rounds out this section with her essay, "Sochi Olympics 2014, Canadian Truth and Reconciliation, and the Haunting Ghouls of Canadian Nationalism," looking at how Canada presents itself publicly on the world stage as a pristine nation unblemished by colonial practices, and how this contrasts with the reality of Indigenous and non-Indigenous relations. Rather than viewing Canadian cultural identity as a static construct, these essays challenge the myths on which it is based in order to illustrate the cracks in the foundation.

The cracks in Canadian cultural identity become more exposed in "Part Three: Reframing Political Resistance." This section presents three essays that challenge the reader to view the performance of activism, political posturing, and artistic displays through the lens of what they are informing their audiences about the underlying oppressive structures of colonialism, contemporary political culture, and patriarchy and language politics. Dylan Robinson's "Enchantment's Irreconcilable Connection: Listening to Anger, Being Idle No More" illustrates the importance of Idle No More gatherings as displays of anger, as well as cultural survival. Robinson further develops the idea of the differences between settler understanding of Indigenous dance and song as an aesthetic performance, rather than as an act of resistance and a form of political activism. Laura Levin reflects on the role of performance in politics in her examination of Toronto's former mayor, Rob Ford. Levin suggests that rather than viewing Ford as an aberration in Canadian politics, he should be viewed alongside other US leaders who have mastered performance art in politics. Erin Hurley explores how theatre and dance in Quebec challenge views of performance studies in English Canada. Through her study of two multidisciplinary artists, Leslie Baker and Andréane Leclerc, Hurley shows how a performance studies methodology disrupts the tendency to view Canada as a unified nation.

As an emerging performance studies scholar, "Part Four: Practising Research" gave me the most food for thought as the four essays presented different approaches to practising, critiquing and engaging with performance theories from a distinctly Canadian perspective. MJ Thompson maps out the cultural importance of Québécois Louise Lecavalier's dance expression. By juxtaposing oral history and the physical buildings of Montreal, Thompson creates a biography of Lecavalier and her work. Naila Keleta-Mae also uses history and place to tell a story in her reflective piece "on love: Performance as Pedagogy." Keleta-Mae illustrates how she used performance as a way for her predominately non-Black students to explore the history of Black slavery in Canada. For her students, writing and performing a play together allowed them to confront unconscious stereotypes and "to grapple with the ethical and aesthetic questions raised when predominately white students, faculty, and staff perform and produce non-white work" (332). Brian Rusted explores the practice of embodied writing in his discussion of Don Wright's artistic practice and work through the creation of his own texts. In "Working Art—Working Knowledge: Doing the Visual and Making the Material Matter," Pam Hall explains how she makes everyday practice and knowledge accessible to a wider audience by archiving everyday practices, such as knitting and salting cod in rural Newfoundland. These four essays show the interdisciplinarity of performance studies as a research practice, as well as new ways to give voice to stories that are often untold.

While the collection of essays spans the Atlantic and Pacific coasts, there is a distinct lack of scholarship addressing performance in the Prairies and the North. As Pam Hall suggests, we need to recognize different "ways of knowing and doing and being in the world" (370). Greater inclusion of other rural forms of performance would help to round out this collection and make it a more inclusive representation of Canada. While MJ Thompson's essay, "Two-way Street: The Icon in the City," fits with the collection of research practices, it would be better juxtaposed with Peter Dickinson's, "Choreographies of Place: Dancing the Vancouver Sublime from Dusk to Dawn." Both essays discuss the role of place in producing a particular performance of dance in an urban environment. Reading these two pieces consecutively would help to highlight the regional and cultural differences between Montreal and Vancouver, but would also show the parallels in how the natural topography and built landscape play a role in the presentation of different forms of dance.

All of these essays highlight how performance studies can be used to challenge our existing ways of making meaning and understanding our world. Calling our attention to the embedded nature of the settler narrative within Canadian society is the first step in unravelling it. As Ric Knowles suggests in his "Afterword" to the collection, exploring the ideas of state through how they are performed allows us to unsettle their ideological ties. Through its diversity of ideas and approaches *Performance Studies in Canada* inspires scholars to keep asking challenging questions about the role of performance in Canada, whether it is used to critique the actions of our political leaders, to give voice to the marginalized, or to view performance as a decolonizing tool.