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POSTHUMAN MUSICAL CONTEXTS: LIVE PROCESSING'S  
IMPACT ON PERFORMANCE PRACTICE IN  
ELECTROACOUSTIC MUSIC

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## INTRODUCTION

Electronics, particularly amplification and live processing, are frequently encountered in music today. As options continue to become more portable and affordable and as venues diversify beyond concert halls, even originally acoustic works may be amplified. The use of electronic media has created new roles and musical contexts for performers that have no precedent within older human or acoustic contexts, and new approaches to performance may be required to play in tune, adjust timbre, and control dynamic levels. I describe these approaches and the technology necessitating them as posthuman. I have frequently performed in posthuman settings in both contemporary classical and popular music, and have observed a wide range of possible scenarios and solutions as a violinist working in New York City. In posthuman musical contexts, an unprecedented amount of variety is found, caused by diverse equipment, environments, and skill sets of the individuals operating electronics, resulting in many possible musical outcomes. It is therefore unlikely that a coherent single performance practice will emerge from repertoire incorporating posthuman elements, but the discrete approaches gathered from studying practice within posthuman scenarios still warrants documentation, as they may collectively comprise a resource for future practitioners to utilize.

In the literature on performance practice with electronics, relationships

among performers and electronic elements have been explained primarily by drawing parallels to relationships found in contexts without electronics, such as between soloists and accompanists, or among partners in chamber music. Discussing *Songs from the Moment* (2008) for piano and live electronics by Bryan Jacobs (b. 1979), pianist Xenia Pestova describes sections in which the pianist performs in synchrony with a click track as comparable to “a more standard model of following a conductor in a non-solo ensemble role.”<sup>1</sup> In sections of the same work in which the pianist uses a MIDI pedal to trigger changes in electronics, she compares the MIDI pedal to “a second instrument.”<sup>2</sup>

Through interviews with performers and in my personal experiences performing with electronic elements, I have found that comparisons to acoustic contexts with only human performers are not always applicable. In Kaija Saariaho’s *Nymphéa*, comparing the electronics to a “chamber music partner” yields no insight regarding how a performer’s realization of the score might be impacted by live processing like reverberation (often shortened to “reverb”), harmonization, and modulation effects. While performing with rock band OWEL (pronounced “oh-well”), parallels to human models offer little insight regarding how to choose appropriate parameters for similar live processing electronics that best accommodate other electronic sounds on stage. Electronic elements in these contexts do not behave like human performers and do not generate material with

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<sup>1</sup> Xenia Pestova, “Models of Interaction in Works for Piano and Live Electronics” (DM diss., McGill University, 2008), 61.

<sup>2</sup> Ibid., 62.

which performers interact as they would in an exclusively acoustic context. New models and vocabulary, therefore, are necessary as a starting point for discussing practices in these contexts. Themes from literature on the posthuman, which investigates the impact of technology on human experience, help describe these new relationships and practices, offering an alternative to exclusively human frameworks and interactions.

The literature also advocates for an exclusively interactive relationship between performers and electronics, encouraging "constant listening."<sup>3</sup> Yet relationships among performers and electronic elements are not always interactive; degrees of interaction and performer agency change depending on the musical context. Human-oriented models encouraging interactivity are inapplicable to contexts in which performers "coexist" with or are only marginally aware of the electronic elements used. Relying solely on parallels to human-oriented, non-electronic contexts restricts a performer's ability to embrace the full potential of live processing and other non-interactive electronic elements. It is especially problematic when discussing relationships within works incorporating non-interactive electronics that do not require strict synchronization.

The scholarly literature on electroacoustic music suffers from a lack of a performer-led discourse. There are few publications by performers, despite the

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<sup>3</sup> Pestova, "Models of Interaction in Works for Piano and Live Electronics," 13; Elizabeth McNutt, "Performing Electroacoustic Music: A wider View of Interactivity," *Organised Sound* 8 (2003), 300; Julieanne Klein, "Live and Interactive Electronic Vocal Compositions: Trends and Techniques for the Art of Performance" (DM Thesis, McGill University, 2007), 48.

existence of many practitioners working with music containing live processing elements spanning many genres. Exceptions to this include musicians who have written on the performance of works for solo instrument and live electronics, including violinist-composer Mari Kimura, flutist Elizabeth McNutt, vocalists Julieanne Klein and Larisa Montanaro, clarinetist Rachel Yoder, and pianist Xenia Pestova.<sup>4</sup> Their work considers the performer's relationship with electronic elements, including logistical issues which emerge from the use of new hardware, software, and amplification, and it also discusses how the performer musically relates to the electronic elements. Relationships between performer and electronics encompass a wide range of issues, primarily because electronic elements assume many forms and musical functions. There is no doubt a challenge in representing musical practice through musical notation and text; while practitioners may develop terminology and concepts to address new issues presented by electronics, these approaches are often not shared via print resources. Although performers possess valuable practical knowledge, it stays localized to their immediate professional circle if left unpublished, maintaining

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<sup>4</sup> Mari Kimura, “Creative Process and Performance Practice of Interactive Computer Music: A Performer’s Tale,” *Organised Sound* 8 (2003): 289-290; Elizabeth McNutt, “Performing Electroacoustic Music: A Wider View of Interactivity,” *Organised Sound* 8 (2003); Julieanne Klein, “Live and Interactive Electronic Vocal Compositions: Trends and Techniques for the Art of Performance” (DM Thesis, McGill University, 2007); Larisa Montanaro, “A Singer’s Guide for Performing Works for Voice and Electronics” (DMA diss., University of Texas at Austin, 2004); Rachel Yoder, “Performance Practice of Interactive Music for Clarinet and Computer with an Examination of Five Works by American Composers” (DMA diss., University of North Texas, 2010); Xenia Pestova, “Models of Interaction in Works for Piano and Live Electronics” (DM diss., McGill University, 2008).

the disconnect between published theory and performed practice. As a result, present scholarly discourse overrelied on frameworks that are no longer compatible, including representations of “current practice” that privilege concepts of interactivity, such as Pestova’s models of interaction, which are used in her work to articulate all possible points at which interaction may occur.<sup>5</sup>

The literature on performance practice with electronics is almost exclusively limited to contemporary classical music, disregarding pop and rock genres that confront similar issues. Collaboration across genres is increasingly common, as demonstrated by groups such as yMusic, the Bang on a Can All-Stars, and Alarm Will Sound’s “Alarm System” project.<sup>6</sup> To gain a more complete perspective of the impact of live processing electronics, I compare my experience with electronic elements in stylistically dissimilar contexts: an independent rock band, and contemporary classical music. Both contexts incorporate similar non-generative electronics and occasionally fixed elements such as prerecorded track, yet the experience working within the contexts found in these works differed significantly.

In this study, I investigate the impact of posthuman mediation on categories of performance practice, including how performers perceive and exercise agency over a spatial acoustic, tone quality, and ensemble balance, and

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<sup>5</sup> Xenia Pestova, “Models of Interaction in Works for Piano and Live Electronics” (DM diss., McGill University, 2008).

<sup>6</sup> yMusic, <http://ymusicensemble.com/>; Bang on a Can All-Stars, [https://bangonacan.org/bang\\_on\\_a\\_can\\_all\\_stars](https://bangonacan.org/bang_on_a_can_all_stars); Alarm Will Sound, “Alarm System”, <http://www.alarmwillsound.com/projects/>.

how the formation of a performance tradition might be consequently impacted. I also explore the applicability of tropes from the literature on the posthuman to describe current practice as an alternative to frameworks proposed by practitioners such as Pestova and McNutt. In my second chapter, I discuss the posthuman and posthumanism, a field that discusses the impact of technology on human experience and encompasses a wide range of disciplines. I review the literature on the posthuman in music, and apply tropes from the literature to historical examples of electroacoustic music. The third and fourth chapters discuss current practices framed through the concepts and terminology of the posthuman that emerged as thematic. “The Posthuman in Music by Kaija Saariaho” describes my experience and interviews with performers regarding posthuman contexts in *Nymphéa* (1987) and *Frises* (2011), in which performers have limited agency over the live electronics. “The Posthuman in Music by OWEL” discusses the independent rock band OWEL, in which I performed as a violinist and vocalist. While similar live processing electronics are used, performers implement and configure their own electronics and possess more agency over their own electronics while on stage. The final chapter steps back to discuss the broader applicability of posthuman tropes, and how emergent themes from posthuman musical contexts reframe performance practices as more concerned with the navigation of a larger network and awareness, and not necessarily with direct interaction or individual decisions regarding notational realization.

Through grounded theory analysis of interviews, my own experience, and the current literature, I question generalizations currently present in the literature on performing with electronics, and begin to address the under-representation of current practice, of discussions of live electronics, and of non-classical perspectives. Three broad themes emerge, including the broad viability of posthuman tropes as a descriptor of both historical and current practices with technology across genres. Customizability and adaptability emerge as thematic across practices, as experiences within a context may vary with equipment and preferences of performers and engineers. A network-oriented practice emerges throughout scenarios, as individuals respond to a continually changing system.

# CHAPTER I

## PERFORMANCE PRACTICE AND THE POSTHUMAN

### Origins of Performance Practice

The field of performance practice originated from the efforts of German scholars such as Robert Haas (1886-1960), Arnold Schering (1877-1941), and English scholar Arnold Dolmetsch (1858-1940), who sought to learn how music was performed in the seventeenth and eighteenth centuries by examining treatises from that era.<sup>1</sup> Dolmetsch's *The Interpretation of the Music of the Seventeenth and Eighteenth Centuries Revealed by Contemporary Evidence* (1915), Schering's *Aufführungspraxis alter Musik* (1931), and Haas's *Aufführungspraxis der Musik* (1931) are among the first works to survey historical resources on the performance practice of early music with the modern performer in mind. These publications synthesized written resources, revealing historical conventions for how musical notations were realized at the time of their composition. Dolmetsch's *The Interpretation of Music* addresses topics that he found most relevant to the "proper" realization of music from the seventeenth and eighteenth centuries, including the characteristic tempi to take for each musical genre, and the stylistically "appropriate" realization of rhythmic notation, ornaments, and figured

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<sup>1</sup> Stanley Sadie and Howard Mayer Brown. "Preface," in *Performance Practice: Music after 1600*, ed. Stanley Sadie and Howard Mayer Brown (New York: W.W. Norton and Company, 1989), ix.

bass.<sup>2</sup> His discussion refers to treatises and prefaces by musicians and composers, including flutist Johann Joachim Quantz (1697-1773), keyboardists Carl Philipp Emanuel Bach (1714-1788) and Daniel Gottlob Türk (1750-1813), and organist-composer François Couperin (1668-1733). Their writings offer a valuable but incomplete representation of a rich oral performance tradition. Dolmetsch acknowledges this ever-changing tradition, and its importance in decisions regarding notation's ambiguity.

For nine hundred years notation has progressed, and still it is far from perfect. We are not often conscious of this with regard to modern music, for most of what we wish to play is already known to us from previous hearing; and when it is not, the style of the music is familiar enough to enable us to interpret the written text correctly without having to think much about it. But future generations will find difficulties and doubtful interpretations where all seems clear to us. A hundred years ago people wrote their music still less accurately than we do now, so that if we want to play in the original style a composition of Beethoven, for example, we find the text incomplete and imitative interpretation perplexing, for the leading players of our time do not agree in their readings... Time, however, has already obscured these memories.<sup>3</sup>

Dolmetsch and his contemporaries believed that the scrutiny and synthesis of documentary sources, such as treatises and manuscripts, was the best way to address aspects of performance not evident from notation alone. As oral traditions diverged from the practices of that time period, these documentary sources became the main reference point for conventions of realization for music written in the seventeenth and eighteenth centuries. Today, the field of performance

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<sup>2</sup> Arnold Dolmetsch, *The Interpretation of the Music of the XVIIth and XVIIIth Centuries, Revealed by Contemporary Evidence* (London: Novello and Co, 1915), vii.

<sup>3</sup> Dolmetsch, *The Interpretation of the Music of the XVIIth and XVIIIth Centuries*, v-vi.

practice explores a wide variety of genres of music spanning all time periods.

Musical notation will never fully represent the details of music as performed, and thus performers play an essential role in creating a realization of musical notation that addresses the ambiguities in notation regarding rhythm, *rubato*, tone production, dynamics, and intonation, and passing this information along as oral traditions. The resources performers use to create informed realizations and the aspects of music that take priority naturally vary from era to era, and performers, informed by both their training and independent research, construct and maintain knowledge of multiple oral traditions. This knowledge is further influenced by feedback from teachers, colleagues, and live and recorded performances.

Discussions of performance practice in the Classical era (ca. 1750-1820) and eras prior to 1750 refer to composer manuscripts and consider treatises, correspondence, diaries, periodicals, and pictures.<sup>4</sup> By the mid-nineteenth century, documentary sources from performers became increasingly common and diverse, including composers' manuscripts, marked parts from performers, method books, treatises addressing issues of performance in more detail, period instruments, and a larger body of reviews, memoirs, correspondence, and musical criticism.<sup>5</sup>

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<sup>4</sup> Johann Joachim Quantz, *On Playing the Flute* (New York: Free Press, 1966); Carl Philipp Emanuel Bach, *Essay on the True Art of Playing Keyboard Instruments* (New York: W.W. Norton, 1949); Leopold Mozart, *A Treatise on the Fundamental Principles of Violin Playing* (Oxford: Oxford University Press, 1985); Neal Zaslaw, "Introduction," in *Performance Practice: Music after 1600*, ed. Stanley Sadie and Howard Mayer Brown (New York, W.W. Norton and Company, 1989), 207-21.

<sup>5</sup> D. Kern Holoman, "Introduction," in *Music after 1600*, ed. Stanley Sadie and Howard Mayer Brown (New York, W.W. Norton and Company, 1989), 335-6.

Starting in the 1950s, editors of critical editions of Classical repertoire attempted to distinguish between the composer's original notation, and revisions made by subsequent editors.<sup>6</sup> However, even in meticulously crafted Urtext or interpretative editions, questions remain that stem from the inherent ambiguity of Western notation regarding the contextual realization of articulation markings such as dots, dashes, and wedges, the actual duration of notes in relation to their notated rhythmic values, and the composer's musical intentions.<sup>7</sup> Guidance for how these ambiguities might be resolved may be found within oral performance traditions concerned with that music's style.

The concept of orality in spoken discourse was initially introduced by Walter Ong (1912-2003) and Eric Havelock (1903-1988).<sup>8</sup> They built on the work of Milman Parry (1902-1935), who discussed the impact of orality on the structure and organization of Homeric poetry of the 12<sup>th</sup> century BCE.<sup>9</sup> Because Homeric poetry was initially memorized and not committed to text until approximately 750 BCE, it was structured in a way that was memorable, and therefore was more formulaic and based in cliché than previously believed.<sup>10</sup> As poetry was a main source of cultural knowledge in ancient Greece, this organizational style affected how knowledge in pre-literate society was codified,

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<sup>6</sup> Zaslaw, "Introduction," 209.

<sup>7</sup> Clive Brown, *Classical and Romantic Performing Practice, 1750-1900* (Oxford: Oxford University Press, 1999), 2.

<sup>8</sup> Walter Ong, *Orality and Literacy: 30th Anniversary Edition* (New York: Routledge, 2012); Eric Alfred Havelock, *Preface to Plato* (Cambridge: Harvard University Press, 1963).

<sup>9</sup> Milman Parry, *The Making of Homeric Verse: The Collected Papers of Milman Parry* (Oxford: Clarendon Press, 1971); William Nickerson Bates, "Notes on the Dating of the Homeric Poems," *The American Journal of Philology* 46, No. 3 (1925): 266, doi:10.2307/290384.

<sup>10</sup> Peter T. Struck, "Homer and Epic," accessed January 28, 2019, <http://www.classics.upenn.edu/myth/php/homer/index.php?page=hande>

retained, and developed over time. The idea that pre-Homeric Greece operated differently because it was an oral culture, and that its poetry – a primary source of knowledge for pre-literate Greece – was structured in a particular way as a result revolutionized Homeric studies. As literacy became more widespread, knowledge diversified; there were "new inventible ways of speaking about human life, and therefore of thinking about it, which became slowly possible for man only when they became inscribed and preservable and extendable in the alphabetic literatures of Europe."<sup>11</sup> Ong and Havelock investigated the impact of the written word on human consciousness. While Havelock focused on the impact of writing as ancient Greek civilization transitioned from oral to written knowledge, Ong discussed orality in modern pre-literate society, and the existence of residual orality in literate society today.<sup>12</sup>

Concepts of orality may similarly inform the field of performance practice. Although not necessarily concerned with speech, it is concerned with sound and the practice of creating a sound event from its notated representation. Performance traditions, in how they are transmitted and remembered, share some similarities with orally-based thought and expression. Analogously, they engage with formulaic devices and practices of demonstration and reveal a similar tendency to discard information no longer relevant to present usages. Oral

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<sup>11</sup> Eric Alfred Havelock, *Origins of Western Literacy* (Toronto: Ontario Institute for Studies in Education, 1978), 50.

<sup>12</sup> Eric Alfred Havelock, *Preface to Plato* (Cambridge: Harvard University Press, 1963); Havelock, *The Muse Learns to Write: Reflections on Orality and Literacy from Antiquity to the Present* (New Haven: Yale University Press, 1986); Walter Ong, *Orality and Literacy: 30th Anniversary Edition* (New York: Routledge, 2012).

knowledge utilized in music-making shares many properties in common with oral spoken discourse, particularly in how a loss of information occurs when oral discourse is recorded in print. This has implications for how performance traditions are preserved and discussed. Oral performance traditions also assume different roles based on the prevalence of notation within the genre it concerns. Western classical music relies on these conventions to “fill in” details of performance left unclear by notation, which serves as the main point of reference for performers. Genres outside of Western Classical music such as folk music or popular music like OWEL, however, often rely on rote learning and memorization, making these orally communicated practices the main vehicle of transmission and performance.

### Performance Practice and the Posthuman in Contemporary Music

Contemporary studies of recent performance practice are now informed by recordings, available as a significant resource since the early twentieth century. The repository of previously mentioned documentary sources has grown, as preservation methods have improved. These sources supplement evolving oral traditions, and influence how performers address notational ambiguities. There is rarely one solution; pianist Ian Pace proposes a relationship between performer and score that treats ambiguities of notation as a source of interpretive freedom even in very precisely notated music, using selections of works by Elliott Carter (1908-2012), Mauricio Kagel (1931-2008), Pierre Boulez (1925-2016), Morton

Feldman (1926-1987), Michael Finnissy (b. 1946), Karlheinz Stockhausen (1928-2007), and Brian Ferneyhough (b. 1943) as examples. Pace suggests many possible ways to musically realize the notation, and that any realization is potentially valid (though some potential realizations are more appropriate than others).<sup>13</sup> With audio and video documentation, it is now easy to document many possible realizations of a new work; therefore, multiple practices may now be easily supported within a single oral performing tradition.

The interpretation of notation and the performer's relationship to the score are central concerns in the performance practice of contemporary music.<sup>14</sup> Notational practices vary from composer to composer. Types of contemporary music (such as electroacoustic music) that do not feature explicitly documented performance conventions provide a rich opportunity for studying how performers refer to a set of tacit, orally-based conventions to navigate unfamiliar musical territory, or form conventions for contexts with little precedent. Articles and dissertations by practitioners concerned with performance practice in electroacoustic music mostly uphold the perspective that performers should understand the output and behavior of all the elements in a musical context, acoustic and electronic. It is assumed that this familiarity allows performers to sensitively interact with electronics, resulting in a more nuanced and thoughtful performance. I question the validity of this perspective, as much remains to be

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<sup>13</sup> Ian Pace, "Notation, Time and the Performer's Relationship to the Score in Contemporary Music" in *Unfolding Time*, ed. Darla Crispin (Leuven: Leuven University Press, 2009), 152.

<sup>14</sup> Paul Griffiths, "Since 1940," in *Performance Practice: Music after 1600*, ed. Stanley Sadie and Howard Mayer Brown (New York: W.W. Norton and Company, 1989), 483.

discussed regarding what “interact” means, and the processes by which performers engage with technology.

Current models for describing relationships among performers and electronic elements do not adequately illustrate scenarios with live processing. Interactivity in electroacoustic music is routinely characterized by heavy use of parallels to acoustic ensembles with only human actors, such as chamber music, and soloists with accompaniment. I will suggest that live processing electronics such as those found in electroacoustic music by Kaija Saariaho (b. 1952), or in performances with independent rock band OWEL, create a “posthuman musical context,” one in which the electronic elements create an effect impossible or highly impractical to replicate via solely acoustic means. Posthuman elements transform how a performer prioritizes select details of performance and affects the performer’s control over the sound heard by the audience. Amplification, for instance, makes it less important for a performer to play loudly enough to be heard; when small ensembles are amplified and mixed by an engineer, the engineer is more aware of the ensemble’s levels and has greater control over its collective sound. This shift in how agency is exercised and what aspects of performance are prioritized impacts performance practices directly relating to the performers’ conceptions of themselves on stage.

Posthuman musical contexts feature a wide network of human and electronic actors, and may contain unprecedented relationships among instrumentalists, electronic elements, and engineers. Depending on the electronics

and the musical materials involved, different degrees and types of interactivity may characterize a given performance. However, the degree of interactivity does not necessarily dictate the quality or “meaningfulness” of a performance. Performers may act more passively instead, especially when performing with electronics that do not generate musical material, such as amplification and live processing. I characterize this state not as interactivity, but as “coexistence.” Coexistence with electronics is neither interaction nor the absence of awareness.

As performances are mediated by electronic and additional human elements (such as the engineer) in posthuman contexts, performance practice potentially becomes less concerned with decision making and more with navigating expanded networks of interaction and new forms of agency. Performers may be required to focus on details outside of the realization of their part and coordinating their actions with others on stage. Performers may also need to communicate with engineers that control details like tone quality and dynamic level, or operate electronics with new types of interfaces. Practice in posthuman contexts necessitates the prioritization of adapting to changes of equipment, engineer, and sound systems, and making decisions about how and when to act, and what to interact with.

### Definitions

**Performance practice** refers to how musicians realize their part in a musical work, whether through interpreting notation or recalling music learned by

rote. Information essential to replicating a particular realization is embedded in ephemeral features such as sound, movement, and gesture, and may be represented via text resources only to a limited extent. The discourse on performance documents current convention, or reconstructs earlier ones through consideration of historic documentation. Studies concerned with older genres discuss traditions formed over time. Flutist Barthold Kuijken's treatise on early music performance, for example, is concerned with music from the Baroque and pre-Baroque eras and systematically addresses topics such as pitch, temperament, tempo and rubato, rhythm, phrasing, articulation, dynamics, instrumentation, treatment of continuo parts, ornamentation, cadenzas and improvisation, as well as issues not directly concerned with the notated score, such as the attitudes of the audience and performer, and the concepts of emotion and affect.<sup>15</sup> Kuijken's study is typical in presenting conventions of a specific era as shown through treatises, manuscript scores, and anecdote. Performance practice studies concerning later eras may refer to audio and video recordings.

**Oral Traditions** are collections of information that initially existed in pre-literate cultures lacking writing systems. They were passed down through word of mouth, not committed to print, and therefore structured to facilitate easy recollection. Oral traditions are repetitive, comprised of formulaic structures, rely on cliché, and are not prone to radical change. Performance practice in Western Classical music uses musical notation and documentary sources to clarify how

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<sup>15</sup> Barthold Kuijken, *The Notation is Not the Music: Reflections on Early Music Practice and Performance* (Bloomington: Indiana University Press, 2013).

notation should be translated to sound, but also relies on several distinct oral traditions to realize performance details. Oral traditions may exist regarding the performance of a specific work or the collected works of a composer, which may then be further generalized in some cases to provide broad guidelines for music from one stylistic period. Broader generalizations regarding style, however, must always be qualified by consideration of the performance history surrounding that work.

Multiple traditions may be consulted to realize performance instructions within a single work, especially if that work refers to several distinct earlier styles. Neoclassicism in music, for example, refers to conventions from both the Classical era referenced by the approach, and the practices contemporary to the work in question. The process of how earlier performance practices are utilized in this genre depends on the preference and experience of the performer, and what the composer may have intended by incorporating that material.<sup>16</sup> Traditions may be shaped by discourses that influence current practitioners; performances of J.S. Bach's *Sonatas and Partitas* for solo violin, for example, have changed significantly over time. Recordings by violinists active in the early 20<sup>th</sup> century onwards such as Jascha Heifetz (1901-1987), Yehudi Menuhin (1916-1999), Nathan Milstein (1904-1992), and Arthur Grumiaux (1921-1986) use a range of approaches to phrasing and choices of tempo, but all feature a relatively sustained

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<sup>16</sup> Paul Griffiths, "Since 1940," 484.

sound with liberal use of vibrato.<sup>17</sup> More recent recordings now incorporate historically informed practices to varying extents. Hilary Hahn (b. 1979), who released recordings of the *Sonatas and Partitas* in 2018 and 1997, uses a sustained sound and continuous vibrato, closer in style to performers from the preceding generation.<sup>18</sup> The recording of the full sonatas and partitas by Johnny Gandelsman (b. 1978), in contrast, sustains notes and vibrates far less throughout. Gandelsman also holds the bow several inches closer to the center of the stick than what is typically taught today.<sup>19</sup> Traditions may also change as performers “catch up” to repertoire ahead of its time; in comparison to its earliest recordings, later recordings of Stravinsky’s *Le Sacre du Printemps* maintain more consistent tempi and remain more rhythmically together, especially in sections with many metrical changes like the “Sacrificial Dance” movement.<sup>20</sup>

**Orality** is a state of discourse, particularly speech, in which essential information that contributes to an utterance’s meaning is embedded in the aural characteristics of speech and their temporal unfolding, including inflection and

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<sup>17</sup> Jascha Heifetz, *Jascha Heifetz Plays Bach: The Sonatas & Partitas for Solo Violin BWV 1001-1006*, IDIS 6535/6, 2008; Yehudi Menuhin, *Sonatas & Partitas for Solo Violin*, EMI Classics, 1999; Nathan Milstein, *Partitas 1-3*, EMI Classics, 1998; Arthur Grumiaux, *Complete Sonatas and Partitas for Solo Violin*, Decca 1993.

<sup>18</sup> Hilary Hahn, *Hilary Hahn Plays Bach: Violin Sonatas Nos. 1 & 2; Partita No. 1*, Decca, 2018; Hilary Hahn, *Hilary Hahn Plays Bach*, Sony, 1997.

<sup>19</sup> Johnny Gandelsman, *J.S. Bach: Complete Sonatas & Partitas for Violin*. In a Circle Records, 2018, <https://johnnygandelsman.bandcamp.com/album/js-bach-complete-sonatas-and-partitas-for-violin>.

<sup>20</sup> Igor Stravinsky, cond., and the Walter Straram Concerts Orchestra, “Stravinsky Rite of Spring 1929 Recording Stravinsky,” YouTube, 27:15, <https://youtu.be/GydNsfaAxJ4>. Leonard Bernstein, cond., and the New York Philharmonic, “Igor Stravinsky The Rite of Spring Leonard Bernstein,” YouTube, 30:00, <https://youtu.be/a9M2oTHa3GM>; Jaap van Zweden, cond., and the Radio Philharmonic Orchestra, “Stravinsky: Le Sacre du printemps / The Rite of Spring - Jaap van Zweden - Full concert in HD,” YouTube, 29:08, <https://youtu.be/5UJOaGIhG7A>.

loudness. These features cannot be represented elegantly in writing, and must instead be learned through example.<sup>21</sup> The development of writing systems gradually and profoundly impacted the societies in which it emerged, revolutionizing how information is stored, distributed, and structured. This in turn changed how individuals retain and recall information.

The distinction between orality and literacy is not clearly delineated. Certain texts, including the Homeric poetry through which concepts like orality were pioneered, are now written down, but remain residually oral. Residually oral texts were meant to be recited, or were written by individuals still operating within more “oral” frameworks. Any text may become oral by being recited out loud; this newly oral content would vary slightly among recitations. A recited text’s meaning is affected by the manner in which that written passage is recited. A similar loss of information happens when representing musical sound via notation; details important to performers with regard to how musical sound may need to be produced may only be represented approximately. Part of the performer’s role is to make decisions about how to address ambiguities in notation, by referring to established conventions in performance practice (or, if there are no conventions, making decisions using their best judgment).

As a musical style ages and ceases to be current common practice, the oral tradition of performing is eventually forgotten, preserved only partially through text resources. It therefore must be reconstructed. Performance traditions from the

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<sup>21</sup> Ong, *Orality and Literacy*, 6-9.

twentieth and twenty-first centuries benefit from a more complete representation via audio and video recordings. Considering these sources might lead to a performance that is stylistically “appropriate,” based on convention. A balance between awareness of existing convention and personal innovation is recommended. Kuijken, by describing both aspects of informed performance as “authenticity,” defines informed performance as based on extensive research and the thoughtful adherence to historical precedent:

As a minimal sign of respect and responsibility toward both the composer and the audience, I feel I have to put together, accept, and apply all the existing evidence, as illustrated [in this book]... by trying to assemble this giant jigsaw puzzle, I might approach some kind of a “Historical Authenticity.” ... However, besides the exterior facts and their interpretation leading to Historical Authenticity, I also need “Personal Authenticity.” ... It is my personal contribution to the [historical] image that is mirrored, here and now, to the listener.<sup>22</sup>

Discussions of performance practice in music with scant historical precedent or agreed-upon conventions are concerned with navigating new equipment, notational systems, and documenting ways to realize notation.

**Creative process** governs decision-making through which an individual approaches a musical task and sees it to completion, whether that is preparing a work or giving a performance. For a performer, creative process involves synthesizing previously acquired knowledges and skills with new received knowledge, such as feedback from performer colleagues and composers, and supplemental research, utilizing it to address the performance task at hand.

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<sup>22</sup> Kuijken, *The Notation is Not the Music*, 93.

Creative processes vary among individuals in response to the nature of the performance task.<sup>23</sup> Kinderman and Lockwood investigate creative process in composition through the examination of sketches and primary sources. Violinist Mari Kimura, who composes and performs electroacoustic works and implements her own electronics in Max/MSP, describes her creative process as based largely in troubleshooting equipment and creating solutions through designing software that suits her preferences regarding the visibility of the electronic element. My study describes the impact of posthuman, non-interactive electronic elements, such as live processing, on the creative process of performers.

**Interpretation** articulates the perspective on a musical work from a individual performer's viewpoint. I am concerned with how posthuman electronic elements impact the interpretive decisions of performers or performing ensembles. Different interpretations lead to different realizations of the score, which are possible because of the inherent ambiguity of musical notation. Interpretations result from the creative process of performers. After interpretation is manifested in a form of realization – such as a rehearsal or performance – feedback from this further informs the creative process. Both the details of a performance itself and the resulting feedback contribute to the evolution of performance practice.

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<sup>23</sup> William Kinderman, *The Creative Process in Music from Mozart to Kurtág* (Chicago: University of Illinois Press, 2012); Lewis Lockwood, *Beethoven: Studies in Creative Process* (Cambridge: Harvard University Press, 1992); Marissa D. Silverman, "A Performer's Creative Processes: Implications for Teaching and Learning Musical Education," *Music Education Research* 10(2) (2008): 249; Gary S. Glassman, "All You Need is Creativity: The Beatles Creative Process" (EdD Dissertation, University of La Verne, 2007)

**Electroacoustic music** incorporates sound from a loudspeaker.<sup>24</sup> Input provided to the loudspeaker varies widely and includes both sound from mechanical sources such as computers, synthesizers, and playback devices, and sound from amplified acoustic sources such as instruments, and vocalists. Music that only consists of only sound from a loudspeaker with no live performers is called **acousmatic music**. Today, electronic elements are commonly found in many musical genres, including music that did not originally incorporate loudspeaker elements. The means by which electric sound is produced may also vary: electronic musical material may be “fixed” and played back during a performance as a prerecorded track, or “live” and generated in real time. Electroacoustic music also necessitates, in most cases, the use of an engineer and mixing equipment, fundamentally changing live musicians’ approaches to managing tone production, ensemble balance, and intonation.

**Live electronics** provide variable output in performances and contrast with fixed, or prerecorded electronics, which are played back as an audio file and remain the same from performance to performance. Live electronics are subcategorized as interactive and non-interactive. In interactive electronics, the electronics generate musical material in response to a performer's input, which the performer responds to in the style of a dialogue.<sup>25</sup>

**Interactivity** in electroacoustic music is characterized by an “active-

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<sup>24</sup> It is important to acknowledge that this is a very broad generalization, taken from its own complex and varied field; my definition of electroacoustic music is based on that in *Electric Sound* by Joel Chadabe.

<sup>25</sup> Julieanne Klein, “Live and Interactive Electronic Vocal Compositions: Trends and Techniques for the Art of Performance” (DM diss., McGill University, 2007), 24.

reactive reciprocal relationship” among performers and electronic elements.<sup>26</sup> Klein characterizes this relationship as resembling a musical dialogue in which the performer acts and the computer “responds,” and the performer responds in turn. How musical interchanges among performers and electronic elements are experienced by performers and audiences varies among musical works and performers; a range of material generated by the performer and electronics exists in these works, and the extent to which the performer is aware of their effect on the computer’s output and how much time elapses between a computer’s response to a performer’s input may also vary. Non-interactive elements do not possess a dialogue-oriented, active-reactive reciprocal relationship. In posthuman musical contexts with a high level of performer agency, performers may engage in a different type of relationship with non-interactive electronics, if they have a high degree of control over the electronic parameters.

**Coexistence** is proposed in this study as an alternative to an interactive, dialogue-oriented relationship, used instead of “non-interactive.” While live processing elements do not generate material to which the performer responds by altering their behavior or changing the manner in which they realize their role in a work, the performer may maintain awareness of the element in other ways. Coexistence, as a concept, creates room for a relationship in which live performers and electronic elements inhabit a musical context together, but do not necessarily engage in an interactive dialogue. Considering coexistence and

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<sup>26</sup> Klein, “Live and Interactive Electronic Vocal Compositions,” 27.

interactivity as ends of a spectrum allows for greater descriptive nuance, as a range of awareness and impact of electronics are possible in practice. Considering a spectrum rather than a duality also helps accommodate for the modularity of electronic elements in many contemporary setups; electronics may have functions with which a performer coexists such as live processing, while also possessing functions with which performers attend to or interact with more, such as prerecorded sound.

**Live Processing** is a subset of live electronics in which the performer's input is modified in real time. The specific effect in use may vary. Delay effects replicate material played for a predetermined span of time, rate of repetition, and length of repeated material. Modulation, harmonization, distortion, and pitch shifting affect timbre and perceived pitch. Reverberation modifies the perceived acoustic properties of a space. While live processing like delay and pitch shifting are possible to notate, many effects concerned with timbral transformation or spatial perception are only representable to a limited extent using traditional notation.

Live processing elements in an electroacoustic musical context **mediate** the sound between the performer and audience.<sup>27</sup> Mediation ranges from simple amplification to complex live processing, but generally indicates a point between the live performer and audience through which the sound may be modified.

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<sup>27</sup> Paul Sanden, *Liveness in Modern Music: Musicians, Technology, and the Perception of Performance* (New York: Routledge, 2013); Philip Auslander, *Liveness: Performance in a Mediatized Culture* (New York: Routledge, 2008).

Human performers such as engineers operating mixing boards assume a central intermediary role between stage and audience. Mediation by electronic elements creates a **posthuman musical context**. Electronic elements or networks of humans and electronic elements within a posthuman context behave in ways without direct precedent in acoustic contexts. My examination of these new contexts is grounded in the wider literature on the posthuman, concerned with “...the meeting point of humans and machines that reconfigures humanistic conceptions of the autonomous, creative self.”<sup>28</sup>

The posthuman also features **distributed cognition**, in which actions and agency are shared among one or more human and electronic actors within a system. Descriptions of relationships within posthuman contexts by the current literature tend to be reductive; consideration of a more systems-oriented mode of practice based in the posthuman may begin the process of acknowledging complexities inherent in performance with electronics. Within a systems-oriented approach, **feedback loops** are used to describe interactive relationships between human and electronic elements, in which the performer’s actions are influenced by the electronics’ output. Relationships denoted by feedback loops include those more comparable to human contexts such as those described in work by Pestova or McNutt, coexisting relationships that do not respond to comparisons to human contexts, and interactions occurring over longer spans of time such as consulting recordings, or incorporating feedback over the course of a sound check.

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<sup>28</sup> J. Thomas Brett, “Minds and Machines: Creativity, Technology, and the Posthuman in Electronic Musical Idioms” (PhD diss., New York University, 2006), vii.

Posthuman musical contexts significantly impact performance practice. The performer's sense of space, instrumental timbre, ensemble balance, and ability to exercise **agency** over the sound as heard by the audience are subjected to mediation by new devices and software. Depending on the type of electronics and how the electronics are designed, a performer may only be able to exercise agency at certain points. In an amplified context, performers control dynamics at the level of their instruments and via their personal volume controls if they have any, but the engineer controls their volume level at the mixer and therefore has more agency, with the ability to override their decisions.

I apply tropes, thematic concepts from the wider literature on the posthuman, to describe processes and contextual features in my study. The most frequently used terms include **mutation**, **hybridity**, **cyborg**, **virtuality**, **simulation**, and **disembodiment**, all of which are used to describe aspects of a performing context possible only through the use of technology. Mutation modifies the input of a performer, and is a main function of live processing. Hybridity is the mixture of human and electronic sound within a context, as when live processing coexists with acoustic sound in *Nymphéa* but operates with little input from the performer. Cyborg also indicates a coexistence of sound and results in musical hybridity, but suggests that technology is directly incorporated into the creation of musical gestures. Cyborg performers in OWEL, for example, operate external interfaces, which allow for more direct control over electronics in performance. Virtuality gives the impression of a presence or environment not

physically located within a performance space. Virtuality results from simulation, which, using technology, mimics phenomena including spatial acoustic and specific timbres. Reverberation, for example, uses a speaker array and a signal processing algorithm to copy the acoustic properties of a room. By simulating the echoes and reflections of sound within a space, reverberation imparts virtuality as the room is made to sound different than it would naturally sound.

Disembodiment is the disassociation of sound from the source. Especially in scenarios with monitoring and heavy amplification, disembodiment may impact the experience of the performer and audience. I discuss the posthuman and the above tropes in more detail in the following chapter, and continue to refine these terms as they are applied to describe the posthuman in music by Saariaho and OWEL.

### Methodology and Data Collection

To investigate current practices in posthuman musical contexts, I adopt a grounded theory methodology in which data collection and analysis proceed simultaneously, informing one another.<sup>29</sup> Through reflective memo writing and analysis of interviews, themes emerge from the data collected, are grouped into categories and, if possible, related and grouped in a way that constructs theory grounded in the data collected.<sup>30</sup> Data used includes semi-structured interviews of

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<sup>29</sup> Anthony Bryant and Kathy Charmaz, *The SAGE Handbook of Grounded Theory* (London: SAGE Publications, 2007), Introduction.

<sup>30</sup> Bryant and Charmaz, *The SAGE Handbook of Grounded Theory* (London: SAGE Publications, 2007); Kathy Charmaz, *Constructing Grounded Theory: A Practical Guide Through Qualitative*

musicians that recorded *Nymphéa*, my own experience working with *Nymphéa* and other works by Saariaho, and memos and recordings of my work with OWEL. Both memos and interviews were coded for themes.<sup>31</sup>

My study of work by Saariaho reached out to musicians who recorded the work *Nymphéa* and incorporated my own experience with *Nymphéa* and *Frises*. I interviewed musicians from Ensemble Gelber Klang, Kronos Quartet, and Cikada Quartet, and asked questions via email regarding their approach to learning their individual parts, the point at which live processing was incorporated into rehearsal, the engineer's role, and how electronics may have impacted the way the performers realized notation (Appendix A). Themes that emerged from the interviews, which illustrated the range of approaches employed by performers in even a very small subset of electroacoustic music and the vital role played by the engineer, informed my own performance of *Nymphéa* and my thoughts regarding *Frises*, which is discussed later in the chapter. Memory is a key delimitation of my study, particularly of *Nymphéa*, which was premiered over thirty years ago. In spite of the time that has passed, interviewees provided valuable insight regarding *Nymphéa*'s performance.

To gather data about my experience in OWEL, I engaged in self-study

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*Analysis* (London: SAGE Publications, 2006); Juliet Corbin and Anselm Strauss, *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (Los Angeles: SAGE Publications, 2008); Barney Glaser and Anselm Strauss, *The Discovery of Grounded Theory: Strategies for Qualitative Research* (Chicago: Aldine Publishing Co., 1967).

<sup>31</sup> Svend Brinkmann, “Unstructured and Semi-Structured Interviewing”, in *The Oxford Handbook of Qualitative Research*, ed. Patricia Leavy (New York: Oxford University Press, 2014); Eva Magnusson, *Doing Interview-Based Qualitative Research: A Learner’s Guide* (Cambridge: Cambridge University Press, 2015), doi:10.1017/CBO9781107449893; Johnny Saldaña, *The Coding Manual for Qualitative Researchers* (Los Angeles: SAGE Publications, 2013)

through memo-writing and written reflections on recorded performances and rehearsals (Appendix F). Memos describe my experience in rehearsals and shows and are supplemented by recordings, focusing on when rehearsals or performances are impacted by electronics used. Recordings consulted for memo-writing are available online and are referred to throughout the chapter (Appendix G). Regular questions addressed in memos, coded later for themes and analyzed, focused on issues that emerged and if any features of performance needed to change as a result.

Prior to May 2018, memos discussed troubleshooting to fix issues with equipment, and parameters for live electronics. During the May tour, I created memos reviewing recordings of the nine sets performed during that tour. The memos demonstrate the wide range of experiences possible in posthuman musical contexts due to the distribution of agency among human and electronic actors. Recordings of rehearsals and performances were made with an iPhone 6 and reviewed either through my monitor speakers at home, or through studio monitoring headphones. Memos were compiled and coded for themes after the May 2018 tour. The first round of coding included all memos, from the start of my work with OWEL to the end of the May 2018 tour (Appendix E). Coding was guided by my experience working with the electronics in the Saariaho and prior experiences working with pop and rock bands in similar venues prior to joining OWEL. Three themes emerged from the full collection of memos: a high degree of disconnect between the perceived sound on stage and the house balance as

heard in the recording, heavy reliance on monitoring while on stage, and disparate experiences in performance depending on the engineer.

After coding the full collection of memos for themes, I coded a subset of memos written during the May tour to examine the impact on intonation, ensemble balance, and tone quality. Coding focused on specific details of performance such as intonation and tone quality, and each code was qualified with a positive or negative weight, depending on if the comment coded described a negative or positive aspect of the performance as observed from the recording. Remarks were tallied to observe trends, and re-examined with the specific song and performance recordings in mind. The May tour memos contain comments regarding intonation, balance, and an observed disconnect between the perceived sound on stage and the sound in the hall, which indicate my priorities during the May 2018 tour.

#### Rationale for Comparison

How posthuman contexts dictate performance practice depends on equipment, interfaces operated by performers or engineers, and musical processes within a work. Both electroacoustic works by Saariaho and performances by OWEL utilize live processing electronics, but the degree of control performers have over the electronics and the sound that reaches the audience differs. In posthuman contexts, performers employ different approaches when rehearsing and performing, even if electronic elements appear the same. In Saariaho's work,

performers have very little control over the live processing electronics. In OWEL, the performer has a high degree of control over the live electronics. The performer's experience, therefore, will be different. In addition to the immediate relationship between performer and electronics, posthuman contexts may contain different types of relationships among performers, and among performers and engineers. I will compare practice in high-agency and low-agency environments and discuss how our understanding of them may be enhanced by using posthuman tropes, rather than appealing to incompatible parallels to acoustic contexts.

Both scenarios differ in fundamental ways that are important to acknowledge. The difference in genre is most apparent; Saariaho's work is contemporary Western classical music, and OWEL is an indie rock band. Musicians performing Saariaho realize written notation and operate mostly predetermined electronics in works like *Frises* and *Nymphéa*, which are twenty minutes long. In OWEL, music is learned mostly by rote with minimal use of written aids, electronics are chosen and configured by performers, and sets are comprised of shorter songs ranging from three to seven minutes in length, which may each require different live processing settings. More potential for contextual variety exists while performing with OWEL. Engineers change with the venue, and each performer has their own individual assemblage of equipment. OWEL's practice of meeting once a week over a longer span of time for performances also made it possible to make major changes in electronics and test them in context. In work by Saariaho, only a few meetings may occur in ensemble works, and

electronics are introduced after the first few rehearsals; in this arrangement, little to no opportunities exist for performers to experiment with sound design.

In spite of the ways they contrast, a comparison is still compelling due to a few vital similarities. Both contexts feature a shift of agency from the performer to other individuals like engineers or the live electronics, necessitating a more network-oriented approach. Performers must work with new elements that modify their sound to ensure that they are heard by the audience as intended. Electronics in both scenarios also have similar roles: live electronics add timbral and textural variety to ensembles. When presented alongside each other, descriptions of work by Saariaho and performances by OWEL create a more inclusive representation of current practice that accommodates multiple genres and processes previously not described adequately through frameworks assuming interactivity.

## CHAPTER II

### THE POSTHUMAN

Discussions of the posthuman are concerned with how technology impacts human experience, as life is increasingly mediated by technology. The literature is interdisciplinary and draws from a variety of topics within the arts and sciences, ranging from the depiction of the posthuman in science fiction, to how technology impacts the creation and consumption of art and alters the human body. J. Thomas Brett, in his dissertation on the posthuman's impact on creative process in electronic music, defines the posthuman as "...the meeting point of humans and machines that reconfigures humanistic conceptions of the autonomous, creative self."<sup>32</sup> He describes it as a movement, and as a state of being in which technology and humanity are more closely integrated than ever before:

...a movement in critical thought that challenges and aims to move beyond humanism, a set of values born during the Renaissance that espouse a view of the human subject defined through the idea of autonomy, rationality, free will, self-determining agency, and consciousness as the core elements of human identity. Moreover, the posthuman can be considered a category of life that involves the construction of a particular technological-human subjectivity in which humans are defined as hybrid material-informational entities with porous boundaries.<sup>33</sup>

Literary critic Katherine Hayles describes posthumanism as "a point of

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<sup>32</sup> Brett, "Minds and Machines: Creativity, Technology, and the Posthuman in Electronic Musical Idioms" (PhD diss., New York University, 2006), vii.

<sup>33</sup> Ibid., 16.

view or way of experiencing the world that “privileges informational pattern over material instantiation.”<sup>34</sup> Author Peter Mahon describes studies of the posthuman as “the exploration of scientific research on current, cutting-edge and future tools and technologies and how they affect, and will continue to affect, humans.”<sup>35</sup> A significant portion of the literature is dedicated to emerging fields described as the posthumanities, and posthumanism. Rosi Braidotti and Justin Adams Burton discuss the emerging field of posthumanism, and how it differs and represents a break from the field of humanism. Questioning the primacy of human thought and reason is a central theme in posthumanist thought, challenging the prevalence of humanism in literature, politics, cinema, anthropology, feminism, and technology.<sup>36</sup> Later discussions seek to frame posthumanist studies in a way that challenges power imbalances that subjugate marginalized groups, such as queer people and people of color. Burton views “posthumanism” as a highly variable term, but as a term and field that could be transformative, if framed mindfully:

While many use posthuman simply to refer to a state of being that embellishes and extends the human body through technological means, this particular notion captures only a fraction of the term’s potential.... A more robust account of the posthuman includes not only physical but also cultural and social dimension of what it has meant to be human (and, of course, decades of feminist, critical race, and queer theory have shown that the physical is itself culturally determined). Specifically, posthumanity, at its best, critiques and redresses the more traditional constructions of human that have historically privileged whiteness, masculinity, heterosexuality, capitalism, and able-bodied-ness over other

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<sup>34</sup> Katherine Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* (Chicago: University of Chicago Press, 1999), 2.

<sup>35</sup> Peter Mahon, *Posthumanism: A Guide for the Perplexed* (New York: Bloomsbury Academic, 2017), 25.

<sup>36</sup> Neil Badmington, ed. *Posthumanism* (London, Palgrave, 2000), 9.

dispositions, constructions that have left many on the periphery of humanity if not locked out altogether.<sup>37</sup>

Collectively, the above texts create a complex definition of posthumanism in flux. My study is neither comprehensive in the manner of Braidotti and Hayles's studies, which broadly define the posthuman, nor concerned with how technology alters existing power dynamics. However, the ubiquity of technology in the making and dissemination of music make it apparent that the posthuman emerges within music of many genres, and is transformative for performers acting within today's musical contexts.

### Posthuman Tropes in Music

The posthuman as it impacts performers acting within a musical context has been explored by Brett, who studies how technology impacts the creative process in instances of electronic music-making, describing musical practices such as sampling, and new musical instruments using tropes that have emerged from the literature on posthumanism. His thorough overview of the posthuman provides a series of small studies showing how technology impacts musical contexts ranging from historical studies of chance procedures in the music of John Cage, to ethnographic studies of collectives using technology to make music, such as the collective Share.<sup>38</sup> The posthuman has also been considered in relation to musical performance by the musicologist Joseph Auner:

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<sup>37</sup> Justin Adams Burton, *Posthuman Rap* (New York: Oxford University Press, 2017), 16.

<sup>38</sup> "SHARE.global", accessed February 20, 2019, <http://share.dj/global/>.

In no aspect of our lives has the penetration of the human by machines been more complete than in music. Every stage of production, distribution and consumption in the musical life of the industrialized world has been so permeated by technology that we no longer even recognize complex devices such as a piano as technological artefacts, while at the same time the idea of a ‘piano’ now spans the range between the shiny black assemblages of wood, metal and plastic (or ivory) in our living rooms to the music software triggering piano samples on a laptop computer. Music circulates through manifold layers of mechanical devices, electronics and digital translations in the long passage from its origins in a musician’s mental and embodied conception to our eardrums.<sup>39</sup>

The foundational literature by Hayles, Badmington, and others contain “a lexicon of posthuman concepts or tropes.”<sup>40</sup> When describing the posthuman in musical contexts, Brett uses these tropes to describe contexts and musical processes. These tropes include control, transcendence, communication, disembodiment, encoding, cyborg, hybridity, infection, mutation, programming, regeneration, simulation, trauma, and virtuality, and are applied flexibly.

The human senses and body can be *extended* and *heightened* through “hyper” musical processes such as rapid tempo drum programming; *transformed* or *mutated* through devices such as the vocoder and other sound processors; *muted* or *erased*, where musicians and listeners “lose themselves” through technology the weightless of ambient or the emotional “indifference” of some algorithm-generated compositions; and *mirrored* or *doubled* through “smart” or intelligent music software that is interactive, improvising as it accompanies to approximate another musical mind.<sup>41</sup>

Brett applies tropes flexibly throughout this study. He often uses words such as “transformed” and “mutated” interchangeably, and does not provide

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<sup>39</sup> Joseph Auner, “Sing it for Me: Posthuman Ventriloquism in Recent Popular Music,” *Journal of the Royal Music Association* 128, no. 1 (2003): 99.

<sup>40</sup> Brett, “Minds and Machines,” 16.

<sup>41</sup> Ibid., 359.

definitions prior to their use; these terms, much like posthumanism itself, are very much in flux. I will discuss each trope he initially introduces, and how it may be used to describe musical processes and features. The mutation, hybridity, cyborg, virtuality, simulation, and disembodiment tropes, mentioned in the previous chapter, are used frequently in my study to describe novel results of technology encountered in performances of music by Saariaho and OWEL.

Mutation, which refers to “an ongoing, autonomous process of change,” can be applied to describe any type of change that occurs due to technology, at least somewhat independently of human activity.<sup>42</sup> In music, mutation occurs as material is manipulated and transformed. Sampling, for example, mutates and repurposes prerecorded material, and occurs frequently in music ranging from *musique concrète* to hip-hop. Live processing like reverberation, harmonization, and modulation effects mutate the timbre of the instrument. How sound may mutate may be determined by a human operating the device causing that effect, but mutation may also occur “unintentionally” as a result of how machines operate, including distortion due to overdriven speakers, feedback, degradation of sound quality due to sample rates, and latency. Some of these incidental mutations, like distortion, are now used intentionally.<sup>43</sup>

Hybridity is a contextual feature which occurs as the output of machines is integrated with human action. Technological hybrids have become ubiquitous, as

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<sup>42</sup> R.L. Rutsky, “Mutation, History, and Fantasy in the Posthuman,” *Subject Matters: A Journal of Communication and the Self* 3, vol. 2 (August 2007): 103.

<sup>43</sup> J.J. Anselmi, “Ride the Feedback: A Brief History of Guitar Distortion,” *Noisey*, Feb 23 2017, [https://noisey.vice.com/en\\_us/article/wn7ja9/ride-the-feedback-a-brief-history-of-guitar-distortion](https://noisey.vice.com/en_us/article/wn7ja9/ride-the-feedback-a-brief-history-of-guitar-distortion).

humans use computers of all shapes and sizes to aid in scheduling, self-care, transport, entertainment, and communication. In music, hybridity is created through the commingling of electronic and acoustic sound, and therefore encompasses all electroacoustic music. Because of the broad range of genres, practices, and elements found within the genre of electroacoustic music, further qualification is necessary.

Past discussion of the electronics creating it, hybridity may be qualified through discussion of how the performers and audience are specifically impacted. How electronic sound is heard in a work, and what aspects of performance are affected may be considered; in my study, ensemble, timbral, and textural hybridity emerge as notable. The extent to which performers interact or coexist with electronics, how electronics redistribute performer agency, and the appearance of visual signs of electronics on stage may impact perceived hybridity. The prominence of electronics within a hybrid context may vary depending on the musical content and setting, as physical signs such as control devices and conspicuous speakers, and how prominently electronic sound is mixed may draw attention to electronics in a work. This presence of electronics is discussed by violinist-composer Mari Kimura, who prefers less visual interaction with computer electronics on stage, and designs electronics accordingly.<sup>44</sup> This preference contrasts with that of violist-composer Trevor New, who uses an

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<sup>44</sup> Mari Kimura, “Creative Process and Performance Practice of Interactive Computer Music: A Performer’s Tale,” *Organised Sound* 8 (2003): 289-290.

armband to make visually conspicuous musical gestures.<sup>45</sup>

The presence of control devices in hybrid contexts, particularly devices controlled directly and substantively by a performer that extend their ability to control musical parameters, are described using the cyborg trope in this study. The term “cyborg,” a portmanteau of “cybernetic organism,” was originally coined in a discussion of adapting the human body to space and travel, and has appeared frequently as a subject in popular culture and science fiction literature.<sup>46</sup> With the ubiquity of technology, however, cyborgs become increasingly commonplace:

Cyborgs actually exist. About 10 percent of the current US Population are estimated to be cyborgs in the technical sense, including people with electronic pacemakers, artificial joints, drug-implant systems, implanted corneal lenses, and artificial skin. A much higher percentage participates in occupations that make them into metaphoric cyborgs, including the computer keyboarder joined in a cybernetic circuit with the screen, the neurosurgeon guided by fiber-optic microscopy during an operation, and the adolescent game player in the local video-game arcade.<sup>47</sup>

Hayles and Braidotti engage in a broad discussion of the concept of cyborg and how it extends beyond the idea of machines augmenting a physical body. Hayles, in a later chapter, discusses how autopoietic theory, which discusses the nature of living systems, poses how larger systems (such as a nation-

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<sup>45</sup> Trevor New, “MYO Armband - controlling sound through movement,” February 5, 2019, video, 22:14, <https://youtu.be/PXuIaFit5K0>.

<sup>46</sup> Manfred E. Clynes, and Nathan S. Kline, “Cyborgs and Space” *Astronautics* (September 1960): 27.

<sup>47</sup> Hayles, *How We Became Posthuman*, 115.

state) might be a type of cyborg.<sup>48</sup> Philosopher Rosi Braidotti proposes that domesticated cats and dogs, as “nature-cultural compounds” and “creatures of mixity,” also might be considered a cyborg, as a living product of human-derived domestication.<sup>49</sup> I adopt a narrow definition of cyborg similar to Hayles’s “metaphorical cyborg,” in which performers’ music-making is augmented by technology, but not necessarily directly incorporated into a performer’s body. Therefore, a performing cyborg may be created through devices like volume pedals, vocoders, or a midi controller set to operate parameters within an audio interface. The devices are operated by performers as they also play their instrument, and are distinguished from electronic instruments which may possess similar control surfaces, like synthesizers and drum machines, in that they are not a primary generator of sound but an auxiliary device in a musical context, yet possess substantive functionality that may be used by a performer to dynamically modify the sound of their instrument.

The cyborg trope is used as a starting point to discuss performers’ relationships with external interfaces; these interfaces do impact performance, as performers must spend time learning to operate devices, especially if they require new types of movement. A violinist, for example, would most likely need to practice operating foot pedals. Discussion of how a performing cyborg is comprised might focus on the gear used and the impact of those devices,

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<sup>48</sup> Hayles, “The Second Wave of Cybernetics: From Reflexivity to Self-Organization,” in *How We Became Posthuman*, 131-159.

<sup>49</sup> Rosi Braidotti, *The Posthuman* (Cambridge: Polity Press, 2013), 71.

including types of parameters it allows performers to control and the advantages and limitations it might possess. In contexts like amplified popular music, in which performers' equipment may be different from one another, this interplay of equipment and how it might impact experience is particularly rich.

By simulating a reality other than the one in which we live, technology creates a sense of virtuality, defined by Hayles as “the cultural perception that material objects are interpenetrated by information patterns.”<sup>50</sup> Virtual reality (VR) systems, which use powerful computers and special hardware such as headsets and control devices like gloves or wands to create an immersive, interactive experience for users, has gained popularity as computers and hardware have improved, with potential applications in fields including art, entertainment, education, medicine, and design.<sup>51</sup> Virtuality also emerges in relations with non-immersive devices; televisions, for example, create their own sense of virtuality as viewers engage with actors on the screen.<sup>52</sup> Video games often require players to engage with that game’s designed physics and styles of movement, conceiving of ways to move and act that are not possible or practical in reality. Engaging with virtuality as an audience or user involves becoming acquainted with the new

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<sup>50</sup> Hayles, *How We Became Posthuman*, 13.

<sup>51</sup> Chris Woodford, “Virtual Reality,” *Explain That Stuff!*, last updated March 23, 2019, <https://www.explainthatstuff.com/virtualreality.html>; Simon Chandler, “Virtual Reality’s Latest Use? Diagnosing Mental Illness,” *Wired*, published January 15, 2019, <https://www.wired.com/story/virtual-realities-latest-use-diagnosing-mental-illness/>; Medical Virtual Reality (website), USC Institute for Creative Technologies, accessed March 26, 2019, <http://medvr.ict.usc.edu/>; James Vandezande, “Virtual Reality as a Design Tool: What We’ve Learned and Where We’re Going,” Hellmuth, Obata & Kassabaum, Inc. (website), accessed March 26, 2019, <https://www.hok.com/thought-leadership/virtual-reality-as-a-design-tool-what-weve-learned-and-where-we-go-from-here/>.

<sup>52</sup> Margaret Morse, *Virtualities: Television, Media Art, and Cybersculture*. (Bloomington: Indiana University Press, 1998): 19.

framework imposed by that virtuality, and learning how it may be similar or different from our own surroundings.

In music, performers acquaint themselves with the temporal, timbral, and logistical constraints of new media such as prerecorded sound, and apparatuses including microphones, and controllers. With live processing, performers experience their sound transformed, and may need to modify how they play to produce their desired sound using processing, as is demonstrated by some types of live processing in OWEL. Simulation, a process in which a different reality is emulated, results in virtuality. Reverberation processing simulates how sound echoes and is absorbed by the textures and materials that comprise a particular space, causing the audience and occasionally the listener to perceive their surroundings differently than they might naturally do so. Discussions of simulation in music might include the dissonance created by an aural simulation such as reverberation and the surrounding visual environment, that simulation's plausibility, and how a simulation might refer to a type of surrounding or thing emulated. Reverberation, for example, may emulate the acoustic of a distinct space, such as a stone church, a famous concert hall, or a room of any size and material. While a reverberation device like the Electro Harmonix "Cathedral" pedal may refer to a cathedral in name, its use in a musical context may or may not evoke those images in the mind of a listener.<sup>53</sup>

Disembodiment, the disassociation of information from a material source,

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<sup>53</sup> Reverb (channel), "Electro-Harmonix Cathedral Stereo Reverb | Reverb Demo Video," YouTube, published Aug 9, 2016, <https://youtu.be/0FTZvDMeEVo>

is used in my work to describe the separation of a sound from its origin; including live performers subject to spatialization sounding as if they are in a different space, and the incorporation of novel sounds via prerecorded media. This, especially amplification and monitoring, may directly impact and require new approaches to performance. Disembodiment is a byproduct of the conversion of material originating from an embodied source to information; that information, which may include images, sound, movement, and matter, may be abstracted and used in countless ways. MIDI keyboard data exemplifies this potential for abstraction. Keyboard controllers send a note on, pitch, velocity, and note off message when a key is pressed. While this data may be used to operate a MIDI instrument, which takes that data and translates it to sound, the same data may be used elsewhere. In the digital audio workstation Ableton, MIDI messages are “mapped” to functions within that software ranging from sample playback, effects toggling, and stopping and starting recording.<sup>54</sup> The MIDI information initially created by a keyboard may be disembodied from its source and utilized in a completely different way.

Tropes are refined and categorized over the course of this study, and are also categorized into processes and features. Processes such as encoding, infection, mutation, feedback loops, programming, regeneration, trauma, simulation, and transcendence occur over time. Posthuman contextual features such as cyborg, hybridity, virtuality, control, and communication describe the

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<sup>54</sup> “Keyboard MIDI Mapping in Ableton Live,” ADSR Music Production Tutorials, YouTube, April 25, 2016, [https://youtu.be/DhCpn3\\_0-f4](https://youtu.be/DhCpn3_0-f4).

larger environment, are concerned with the interaction between human and electronic elements, and are often caused by posthuman processes. In live sampling, mutation is a process that creates posthuman hybridity as the electronic performer manipulates prerecorded sound, mixing human gestures and machine-like gestures that are impossible or highly difficult to replicate via exclusively acoustic means.

A few other concepts present in the literature are useful for framing posthuman musical contexts. Distributed cognition, discussed in work by Hayles and Mahon, is present in almost any context containing amplification and significantly impacts practice. In a distributed system, performers exist as a single part of a larger context with electronics and other individuals such as the engineer. The performer's agency over the sound heard by the audience is distributed over the network of electronic elements; the engineer and other human actors may mediate their sound. Thus the posthuman contains a “collective heterogeneous quality:”

Similarly, the presumption that there is an agency, desire or will belonging to the self and clearly distinguished from the “wills of others” is undercut in the posthuman, for the posthuman’s collective heterogeneous quality implies a distributed cognition located in disparate parts that may be in only tenuous communication with one another ... If “human essence is freedom from the wills of others,” the posthuman is “post” not because it is necessarily unfree but because there is no a priori way to identify a self-will that can be clearly distinguished from an other-will.<sup>55</sup>

The posthuman is also characterized by a lack of clear boundaries between

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<sup>55</sup> Hayles, *How We Became Posthuman*, 3.

humans and technology. Occasionally, posthuman elements in a musical context can not be differentiated from the human:

A second characteristic of the digital and biotechnological age is its immersive nature, as new habitats for the containment and circulation of communication are created. Digitally generated virtual worlds offer new forms of ‘post-bodied’ activity, and the unitary face-to-face self is superseded by the multiple self - the simulated, fictive identity of the electronic chat-room or the multi-user domain, the avatar or synthesized self of a digital synthesized interactive environment. Virtual reality allows the user to project a digitally generated self into cyberspace, synthesizing new spatial and temporal contexts within which alternative subjectivities are constructed. In this context, digital technologies are being used not so much as tools - extensions of the body - as total environments.<sup>56</sup>

Feedback loops within posthuman contexts incorporate technology and the creative processes of musicians, and are a sign of an interactive relationship. When formed between musicians and electronic instruments, amplification, or processing, feedback loops impact the way performers learn, rehearse, and perform musical material. Feedback loops may occur between human collaborators within the span of a single performance, or over the course of multiple performances. The absence of feedback loops in a performance of a work is also notable.

Posthuman tropes provide a way to describe the influence of technology that cannot be explained through referral to acoustic contexts. Performers may experience disembodiment as their sound is distributed through the room via speakers and disassociated from its source. An engineer, through panning, may

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<sup>56</sup> Elaine L. Graham, *Representations of the Post/human: Monsters, Aliens and Others in Popular Culture* (Manchester: Manchester University Press, 2002), 4-5.

mitigate this disembodiment through determining where in space an individual performer's sound shall be perceived as they play on stage. Considering distributed cognitive systems helps determine appropriate points at which to exercise agency; this is a key concern of my study. Virtuality is also an influential feature of posthuman contexts, created through the use of sampled sounds, or through the use of effects that suggest a space. Prerecorded electronic tracks and looped material create a virtual ensemble of human and electronic elements. Instruments used need not be physically present, nor behave in ways that resemble byproducts of human action, necessitating different actions from performers.

Posthuman elements create a network of interaction that may be more complex than a typical acoustic setting. Interactions such as feedback loops and coexistence relationships occur, and musical agency is distributed in countless ways among elements. The idea that electronic elements in a work create a context more complex than a typical acoustic setting is not new; the impact is discussed using “models of interaction” in Pestova’s work.<sup>57</sup> Her discussion focuses on finding new points at which to interact with the electronics, and recognizing the increased complexity of musical contexts containing electronics. I adapt Pestova’s models of interaction to accommodate contexts containing both interactive and coexisting relationships, and use networks to articulate how posthuman processes and features emerge and impact actors.

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<sup>57</sup> Pestova, “Models of Interaction,” 113-126.

## Disembodiment and Transformation in Early Electronic Works

Posthuman tropes effectively describe processes found in historically significant electronic works and provide insight with regard to performer experiences. Works made through the manipulation of prerecorded sound are often examples of mutation through physical manipulation of the recordings, disembodiment of those sounds from their sources, and virtuality as those manipulated sounds are presented in sonic settings, suggesting a different space or a different role from what the sounds are usually associated with.

These posthuman processes are found in the earliest examples of works for tape. In *Étude aux chemins de fer* (1948), Pierre Schaeffer (1910-1995) spliced and rearranged train sounds, mutating the material so that musical parameters such as rhythm, timbre, and pitch are emphasized.<sup>58</sup> The mutation distances the train noise from the original source, creating a sense of disembodiment, and imparts a sense of virtuality in which the train is reimagined as a source of musical material. Egyptian composer Halim El-Dabh's *Ta'abir al-Zaar* (1944), which uses manipulated recordings of a women's healing ceremony called *zaar*, also features mutation and disembodiment, but imparts a different sense of virtuality through the use of echo chambers to manipulate the timbre and perceived setting of the recorded voices.<sup>59</sup> The recorded material, recorded in Cairo by El-Dabh, sounds as if it is in a reverberant space; the echo used suggest a

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<sup>58</sup> Pierre Schaeffer, "Etude aux chemins de fer," Nov 11, 2007, YouTube, <https://www.youtube.com/watch?v=N9pOq8u6-bA>

<sup>59</sup> Fari Bradley, "Halim El Dabh: An Alternative Genealogy of Musique Concrète," *Ibraaz* 009, no. 5 (November 2015), <https://www.ibraaz.org/essays/139>

spaciousness not present in *Étude aux chemins de fer*.

Live electronics with analog equipment, used as early as 1939, also exemplify the posthuman: John Cage (1912-1992) incorporated radios and phonographs operated in real time into his five *Imaginary Landscape* pieces (1939-52), *Cartridge Music* (1960), *Fontana Mix with Aria* (1958), and *HPSCHD* (1969), in which seven harpsichordists play with prerecorded computer-generated sounds.<sup>60</sup> Radios and phonograph equipment create a hybrid musical context, as these elements incorporate sounds not found in acoustic contexts. Performers within these contexts determine ways to work with electronic sound along a spectrum of interaction or coexistence. Stockhausen's *Mikrophonie I* (1967) offers another case of hybridity, as performers manipulate microphone positioning in relation to a tam-tam struck by various objects, and filter the microphone's output using filters and potentiometers.<sup>61</sup> The tam-tam's sound is manipulated and mutated at the microphone, and also by the engineer operating filters, distributing the control over the musical result heard by the audience. The disconnect between physical gesture and resulting music, especially in a visually striking piece like *Mikrophonie I* in which four performers are crowded around a single tam-tam with strikers and microphones (Figure 1), also creates a sense of

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<sup>60</sup> "Fontana Mix," [http://john Cage.org/pp/John-Cage-Work-Detail.cfm?work\\_ID=79](http://john Cage.org/pp/John-Cage-Work-Detail.cfm?work_ID=79); Stephen Husarik, "John Cage and LeJaren Hiller, HPSCHD, 1969," *American Music* 1 (1983): 1-21; Joel Chadabe, *Electric Sound: The Past and Promise of Electroacoustic Music* (New Jersey: Prentice-Hall, 1997), 73.

<sup>61</sup> "Work Introduction - Mikrophonie I," accessed March 1 2017, <http://www.universaledition.com/composers-and-works/Karlheinz-Stockhausen/composer/698/work/3640>; "Karlheinz Stockhausen - Mikrophonie I - Film 1966", created August 17 2012, <https://youtu.be/EhXU7wQCU0Y>.

disembodiment.<sup>62</sup>



Figure 1. A performance of *Mikrophonie I*.

Tropes that emerge in works with live electronics depend on the how the live electronics function. *Hornpipe* (1967) by Gordon Mumma (b. 1937) uses microphones and what Mumma called a “cybersonic console” to listen to both the horn sounds and the space’s acoustic properties, creating a feedback loop. The horn player chooses pitches that alter the processing, creating an interactive loop generated by the horn player, acoustics, and electronics.<sup>63</sup> The microphones, as in *Mikrophonie I*, create hybridity within the musical context, but also a cyborg-like integration between the human performer and electronic elements as the musician’s decision-making process is directly influenced by the electronics.

In Boulez’s *Répons* (1981-1984) for 4X synthesizer and chamber ensemble, the 4X synthesizer processes the sound of the six soloists, who are arranged at the edges of the performance space surrounding the audience and

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<sup>62</sup> Zoy Winterstein, “Karlheinz Stockhausen - Mikrophonie 1 - Film 1966”, August 17, 2012, YouTube, <https://youtu.be/EhXU7wQCU0Y>

<sup>63</sup> Todd Winkler, *Composing Interactive Music: Techniques and Ideas Using Max* (Cambridge: MIT Press, 1998): 11.

centrally located chamber ensemble. The soloists' playing, timbrally manipulated and transposed, is played back in speakers at different locations in the space.<sup>64</sup> Timbral manipulation and transformation, as in the tape works by Schaeffer and El-Dabh, mutates the original source material, and the altering of the perceived position of the sound creates a sense of spatial disembodiment for listeners and performers. The musical gestures in *Répons* depend on musical hybridity created by the 4X's manipulation of soloist parts:

From a musical point of view Boulez uses sound transformations as a means of taking a musical idea born and used in the instrumental realm and extending it into the world of electronics. In this way the coherence between the two worlds is maintained and the overall musical vocabulary is expanded. Taking a very simple example, when the soloists enter for the very first time they all play arpeggiated chords together. The basic idea of an arpeggio is that one 'rolls' the chord, that is, one plays the notes of the chord 'smeared' out over time. Boulez takes this very simple idea and proceeds, in the next entrance of the soloists, to have the soloists come in one after another playing, again, arpeggiated chords. The chords in turn are transformed by the computer in such a way that the arpeggiated chords are themselves arpeggiated. The overall result of the soloists and the transformed sounds together is that of an arpeggio of an arpeggio of an arpeggio.<sup>65</sup>

Even the earliest examples of electroacoustic work incorporate sound from unconventional sources, unique transformations of timbre, and novel means through which musical gestures are created. Using tropes to describe musical processes and practices welcomes the field of performance practice to the broader discourse on the posthuman. The terms supply descriptive systems for musical

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<sup>64</sup> Donal Henahan, "Concert: 'Répons,' by Boulez, *New York Times*, March 6 1986, <https://www.nytimes.com/1986/03/06/arts/concert-repons-by-boulez.html>

<sup>65</sup> Pierre Boulez, *Répons* (London: Universal Edition, 1985), vi.

contexts, practices, and processes that do not respond to current proposed models, such as contexts with electronics that do not generate musical material, or those containing electronics with multiple musical roles. In the next two chapters, I discuss how posthuman tropes are applicable to describe a range of electroacoustic performance scenarios. In works by Saariaho, the performer has limited control over the electronic parameters, which are mostly preset. In music by independent rock band OWEL, the performers have more control over the electronic parameters and more flexibility. In both contexts, the posthuman emerges and impact the performer in different ways, and different networks of relationships form among performers, electronics, and the engineer.

## CHAPTER III

### THE POSTHUMAN IN MUSIC BY KAIJA SAARIAHO

The music of Finnish composer Kaija Saariaho (b. 1952) invites colorful descriptions: “her work has the vivid evanescence of a dream, it conjures a weightless physicality, it shimmers with invisible light.”<sup>66</sup> Saariaho considers harmony, texture, and timbre main focuses of her compositional process.<sup>67</sup> Influences on her compositional process include the post-serial aesthetics of her early training with Paavo Heininen and Magnus Lindberg, spectralism, psychoacoustic research, computer technology, and close collaboration with performers such as flutist Camilla Hoitenga and cellist Anssi Kartunen. In this chapter, I will discuss how posthuman tropes emerge and impact performance practice in her works for stringed instruments and electronics, particularly *Nymphéa* (1987) for string quartet and live electronics, and *Frises* (2011) for solo violin and live electronics.

Many textures are found within Saariaho’s solo and chamber works, ranging from those with a few melodic lines against a sustained background, to polyphonic textures in which individual lines are distinctly heard, to dense micropolyphony in which each instrument contributes equally to a mass of sound.

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<sup>66</sup> Tom Service, “Meet the Composer: Kaija Saariaho in Conversation with Tom Service,” in *Kaija Saariaho: Visions, Narratives, Dialogues*, ed. Tim Howell et al. (Burlington: Ashgate, 2011), 3.

<sup>67</sup> Ibid., 12.

In electroacoustic contexts, textures are built collectively from the instrumentalists and live processing output, creating a hybrid world of acoustic and electronic sound. Saariaho derives a variety of different tone colors through extended string techniques such as overpressure, extreme *flautando*, extreme *sul ponticello* and *sul tasto*, microtonal writing, and whispered text. Using live processing, she modifies the string sound further through effects that mutate the sound. In *Nymphéa*, instruments create complex texture through string tremolo, frequently interspersed with dynamic or timbral “hairpins” — gestures that increase, peak, then decrease over a specified span of time. At other points in the piece, a collective sound is built through overlapping tapering gestures, featuring sharp decrescendos, changes in bow pressure, or changes in string contact point.

Collective tremolos or dense polyphony sometimes serve as a homogenous accompaniment to single melodic lines in a single instrument, or are passed from part to part (mm. 17-23), but occasionally individual melodies from each string part create even denser micropolyphony, as a composite of intervals and contours are formed (mm. 103-108, Figure 2). The quartet’s sound is further modified by live processing such as delay, harmonization, and reverberation, creating timbral and textural hybridity as electronic sound and acoustic sound are blended. Harmonization and phasing effects mutate the sound of the first violin and cello (mm. 17-23), creating a slightly different texture than if they were playing without processing. Harmonization in this context plays back the performer’s input alongside a microtonally modified version of the performer’s

input, creating a subtle “beating” effect. Phasing effects create periodic timbral variation in each performer’s sound. This mutation creates a modified texture that could only be acoustically replicated with extreme difficulty.

The image shows two pages of a musical score for string quartet and electric piano. The top page (Measures 17-23) includes parts for violin, violin 2, alto, cello, and electric piano. The bottom page (Measures 103-108) includes parts for violin, violin 2, alto, cello, and electric piano. Both pages feature complex rhythmic patterns and dynamic markings such as *s.p.*, *N*, *tempo I*, *tempo II*, *mp*, *mf*, *p*, *f*, and *tr.*. Measure 17 starts with a 6/8 section followed by a 2/4 section. Measure 18 begins with a 2/4 section. Measure 19 starts with a 5/8 section followed by a 2/4 section. Measure 20 starts with a 5/8 section followed by a 2/4 section. Measure 21 starts with a 5/8 section followed by a 2/4 section. Measure 22 starts with a 5/8 section followed by a 2/4 section. Measure 23 starts with a 5/8 section followed by a 2/4 section. Measure 103 starts with a 5/8 section followed by a 3/4 section. Measure 104 starts with a 3/4 section followed by a 2/4 section. Measure 105 starts with a 2/4 section followed by a 5/8 section. Measure 106 starts with a 5/8 section followed by a 2/4 section. Measure 107 starts with a 5/8 section followed by a 2/4 section. Measure 108 starts with a 5/8 section followed by a 2/4 section. A note in Measure 23 specifies "mutes all but violin (take silently the mutes off)".

Figure 2. *Nymphéa*, Measures 17-23 (top) and 103-108 (bottom).

*Frises*, as a solo violin work, possesses more instances of single melodic

lines supported by a background of either sustained pitches. Through the use of live processing, the violinist and electronics create a hybrid combination of electronic and acoustic sound of comparable density to parts of *Nymphéa*, which may include the output of processing, the violinist's material played back, or sampled sounds. The second movement, "Frise de fleurs," uses reverberation with an extremely long decay time to prolong pitches played by the violinist (Figure 3). The violinist's notes are sustained by processing, as new pitches are layered on top (mm. 1-28). The violinist also alternates between normal and harmonic (light) finger pressure during each gesture, and occasionally alternates rapidly between two notes, creating a complex texture of frozen notes of several different pitches and timbres.



Figure 3. *Frises*, movement 2, measures 1-10.

The use of live processing to enhance textures is one way in which posthuman hybridity emerges in Saariaho's music. The electronics in Saariaho's music frequently contain live processing such as reverberation and modulation effects, and prerecorded samples. These electronics are always implemented in

Max/MSP, and the settings are largely preset.<sup>68</sup> The description of the electronics in the score is minimal. In *Nymphéa*, the score has numbers in circles to denote a change to a new electronic “scene” but little else; in *Frises*, composed later, the description of the electronics is more detailed, sometimes denoting rhythms or transposed pitches (Figure 4). During performance, a pedal is pressed to cause events such as preset changes in live processing parameters, triggering of prerecorded samples, and recording and playing back the performer’s input. Despite the use of an external pedal, the performer and electronics do not comprise a cyborg, due to the limited ability to customize the electronics and the foot pedal’s limited functionality. The performer’s ability to control electronics is especially limited in *Nymphéa*, in which only live processing is used. While pedal use in *Frises* triggers a wider range of events including prerecorded sample playback, loop recording, and pitch shifting, the lack of opportunity for customization on the part of the performer or engineer precludes designation as a cyborg.



Figure 4. An example of electronics notation in *Frises*.

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<sup>68</sup> “Electronics for Kaija Saariaho’s pieces,” accessed January 10, 2019, <http://www.petals.org/Saariaho/Electronics.html>

The use of prerecorded material also creates hybridity in Saariaho's work. In *Frises*, carillon and synthesized mallet instrument are incorporated. *Vent Nocturne* includes sustained whispers, bell-like inharmonic tones, and wind noise that accompany the violist. In ...*de la terre*, fixed elements include speech, and wind. Prerecorded content is disembodied from its source, and often amplified so that it is louder than how it would naturally sound, particularly recordings containing human whispering and breath.

Reverberation is frequently used in Saariaho's music, enhancing instrumental textures and creating a virtual space. Saariaho initially introduced reverberation into her work to improve the sound of the acoustically dry performance space at Sibelius Academy.<sup>69</sup> Spatial reverberation is applied throughout whole works, so that the output of the electronics is distributed among an array of speakers to emulate the echoes and reflections within this virtual space. Processing affecting timbre such as harmonization, modulation effects, and additional reverberation effects are also routed to spatial reverberation.

An engineer located at the back of the performance space operates the electronic elements, and maintains an appropriate balance between acoustic and electronic sound. Performers depend on the engineer to manage balance in the house, and also for their own monitoring. Therefore, significant agency is redistributed from performers to the engineer. Flautist Petri Alanko, commenting on his experience with Saariaho's *NoaNoa* for flute and electronics, remarks that

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<sup>69</sup> Nadia Sirota, "Kaija Saariaho, Ears Open," *New Sounds*, <https://www.newsounds.org/story/kaija-saariaho-mtc-ears-open/>

performers are largely at the mercy of the engineer operating the live processing, noting that engineers may affect the music nearly as much as the performer on stage, who may not have any idea how they sound in the house.<sup>70</sup> The exact role of the engineer and their relationship with the electronics varies with the musical context and the preferences of that context's human actors; in this chapter, I discuss how the engineer may impact low-agency contexts such as those in *Nymphéa* and *Frises*.

The presence of feedback loops in this music, which suggest an interactive relationship, is limited, as the performers in music like *Nymphéa* have little agency over the electronic element, and many of the more passive effects such as live processing do not significantly impact the performer's experience and musical decisions. In works like *Frises*, however, performers do at times need to rhythmically align and play in tune with the electronics. The electronics, therefore, have a greater impact on the performer's decisions, making it more essential for the performer to hear the electronics. Because of this relative lack of reciprocal feedback loops, performers may not find it helpful to be actively aware of or engage in an interactive relationship with electronics in performance as suggested by the literature; alternative coexisting relationships have not been studied. I will describe these non-interactive relationships present in *Nymphéa* and *Frises* using the concepts of distributed cognition, feedback loops, virtuality,

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<sup>70</sup> Tania Riikonen, "Shaken or Stirred - Virtual Reverberation Spaces and Transformative Gender Identites in Kaija Saariaho's *NoaNoa* (1992) for Flute and Electronics," *Organised Sound* 8, No. 1 (April 2003): 110.

hybridity, and disembodiment, and describe how the posthuman impacts performance practice in the rehearsal and performance of these works.

### Practices in *Nymphéa*

*Nymphéa* for string quartet and electronics was commissioned by Lincoln Center and Doris and Myron Beigler for the Kronos Quartet.<sup>71</sup> The piece was one of three large commissions Saariaho received in the late 1980s, including *Lichtbogen* (1986) and *Io* (1987), both for large ensemble and electronics. In her program notes on *Nymphéa*, Saariaho says that she aimed to “broaden the colours of string instruments and create music by contrasting limpid, delicate textures and violent, shattering masses of sound.”<sup>72</sup> While composing *Nymphéa*, Saariaho had the symmetrical image of a water lily and its transformation as viewed from “different dimensions and perspectives” in mind.<sup>73</sup> In a later interview, she notes that the lily’s symmetry is altered by its environment, such as passing water or waves, also served as inspiration for the basic idea of the work.<sup>74</sup> Parallels to this idea of the transformation from surroundings are found in Claude Monet’s *Nymphéas*, a set of 250 paintings of a lily pond and its’ surroundings, which Saariaho studied prior to composing the work.<sup>75</sup>

*Nymphéa* is a prominent contribution to the electroacoustic repertoire. It is

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<sup>71</sup> Pirkko Moisala, *Kaija Saariaho* (Urbana: University of Illinois Press, 2009), 16.

<sup>72</sup> “Kaija Saariaho – Nymphéa”, Music Sales Classical, Accessed February 28, 2015, <http://www.musicsalesclassical.com/composer/work/11098>

<sup>73</sup> Ibid.

<sup>74</sup> Kaija Saariaho, “Meet the Composer” by Nadia Sirota, podcast audio, July 30 2015.

<sup>75</sup> Michael Rofe, “Capturing Time and Giving it Form: Nymphéa,” in *Kaija Saariaho: Visions, Narratives, Dialogues*, ed. Tim Howell et al. (Burlington, Ashgate, 2011), 88.

performed frequently, and five recordings have been made by Kronos Quartet (1993), Arditti Quartet (1996), Cikada Quartet (2001), Ensemble Gelber Klang (2003) and Meta4 String Quartet (2013) (Appendix D). The recordings vary in approaches to timbre, rhythm and tempo, and the balance between acoustic and electronic sound. Violinist David Harrington of the Kronos Quartet, which has commissioned works for string quartet for over forty years, describes the work as "a key part of Kronos' sound."<sup>76</sup> Many later works by Saariaho use live electronic elements like those found in *Nymphéa*. These include works for solo instrument and electronics like *Frises* (2011), *Vent Nocturne* (2006) and ...*de la terre* (1991).<sup>77</sup> Similar live processing elements are also found in works by other composers, such as those associated with Mari Kimura's *Polytopia* (2007) and *Voyage Apollonian* (2017), violinist Christopher Tignor's (b. 1976) album *Along A Vanishing Plane* (2016), and earlier examples, including George Crumb's *Black Angels* for amplified string quartet (1970). I intend for my description of the posthuman in relationship to *Nymphéa* to also relate to works such as these.

*Nymphéa*'s live processing electronics include delay, reverberation, harmonization, and modulation effects such as phasing, flanging, and chorus effects. The use and parameters of these effects are preset into "scenes" which are indicated using numbered cues in the score, and effects are often used in

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<sup>76</sup> David Harrington, "The Blossom in the Darkness: Reflections on Kaija Saariaho's *Nymphéa*," *Music and Literature* 5 (2014): 107.

<sup>77</sup> I have also personally engaged with Saariaho's work, having performed a significant amount of it involving violin in my second doctoral recital including *Nocturne*, *Frises*, *Calices*, and *Nymphéa*, and organized a concert where I ran the electronics for ...*de la terre*, *Vent Nocturne*, and *NoaNoa*.

conjunction with one another (Appendix B). Aside from the numerical cues, no descriptions of the electronics are provided. The live electronics transform the musical context by altering the perceived sense of space through reverberation, and timbres and textures created by the delay and modulation effects are impractical to create in an acoustic context with only live performers. The delay, harmonization, and modulation effects mutate the sound of the performers, creating hybrid textures as human and electronic sound coexist. Initially, effects were incorporated using the commercially available Yamaha DMP7 digital mixer and SPX90 effects processor prior to their implementation as a Max/MSP patch. The amplified string sound and electronic sound are mixed by an engineer, and levels, including those of a monitor playing back processed sound for performers, are customized according to the acoustic of the room and aesthetic preferences of the quartet and engineer. Depending on how they are mixed, the sound heard by an audience differs significantly among live and prerecorded performances.

To investigate how performers worked with live processing elements, I conducted semi-structured interviews through email with musicians that recorded *Nymphéa* (Appendix A). My findings from interviews of members from Kronos Quartet, Ensemble Gelber Klang, and Cikada Quartet demonstrate varied approaches used to coordinate the ensemble and work with electronic sound. Overall, they strongly suggest that while the performers were aware of the electronics in *Nymphéa*, the electronics did not significantly impact their interpretation of the notation. Despite having an important role in defining how

the work is categorized in the repertoire and received by the audience, the electronic part appeared to play no significant role in the musicians' creative process, as the performers did not attend to the electronic sound in performance. Instead, they focused primarily on coordinating the instrumental parts independently of the electronics using approaches equally applicable in strictly acoustic contexts, and coexisted with the electronic sound. The data illustrate the complexity of the relationship between instrumentalists and engineer: performers relied on the engineer for decisions about mixing, but varied in their involvement in those mixing decisions.

Among the three groups, the initial approach to the piece always focused on coordination of the instrumental parts, without any incorporation of electronics or amplification. The members of Ensemble Gelber Klang relied heavily on their first violinist Ulrike Stortz, who assumed the role of primaria (leader) for the instrumentalists and the engineer. Odd Hannisdal from the Cikada Quartet reported that the group focused primarily on pulse, and timbral details.

We almost always focus on pulse, meaning we try to hit the right tempo and then filling in with all the difficult notes. Focus[ing] on the pulse gives the music a flow, a special movement. Then we tried to give meaning to all phrases, in fact focusing on beauty, especially the noise parts. I remember we talked about creating both a light and a dark "grey" sound. Looking for beauty in quarter tones, dissonances, scratch effects and so on.

Stortz from Ensemble Gelber Klang described her conducting role in the piece:

...I had this feeling of chaos and I needed a long time with phases of individual practicing in change with rehearsals with the string quartet until I could recognize the form, development, and characters/timbres of the piece. As the primaria, I tried to lead the

ensemble through the score, so I practiced also a lot to conduct while playing.

Scott Roller, cellist in Ensemble Gelber Klang, confirmed that Stortz coordinated the instrumental parts through conducting with her scroll, and that the quartet spent considerable time working on their individual parts. Joan Jeanrenaud, from the Kronos quartet, emphasized approaches that incorporated score study and repetition of challenging passages.

....one should always study a score first to become familiar with the key [instructions provided by composer for the effects and symbols used]. Then I would suggest practicing just a few bars at a time and you can always have three members play a passage with the fourth member listening... at one point you need to play everything as written of course. Using a metronome can always help or again have one member count while listening to the other three.... and always take turns so everyone gets a chance to listen and count. And certain things like the heavy line that denotes heavy pressure with the bow, should be thought of just as you would for the marking for sul pont or sul tasto. It will become second nature after a bit of practice. A lot of it is just becoming familiar with it....so it requires repetition like any practice.

The approaches discussed above are employed when working on a chamber work with technically challenging and rhythmically complicated material, regardless of electronics. Though the live processing effects simulate a different acoustic and different timbres, no feedback loops emerged between the instrumentalists and electronics as *Nymphéa* was prepared. Electronics were incorporated once the quartet was almost entirely learned and the coordination among players set, and musicians paid minimal attention to the electronics in rehearsal and performance. As a result, their interpretation of the notation was influenced very little by the electronics. The musicians' primary focus was on

accurately executing the instructions found in the score, as if the performers were operating within a purely acoustic setting.

Hannisdal explicitly asserted that little consideration was given to the electronics in performance. His account of the Cikada Quartet's relationship with the electronics describes the electronics as having a superfluous role, significantly less important than the material played by the acoustic instruments.

Saariaho's score is very accurate, and we have always tried to be true to the score, whatever piece we play. In a way, this means we take little consideration of the influence of the live electronics while playing. *Nymphéa* is a brilliant piece with so many colours and nuances already written for the strings, in my taste, it is not a piece that needs to be covered with too much "special effects."

Jeanrenaud did not call the electronics "special effects," but also expressed that they were not the main focus for performers and did not impact the quartet's experience significantly.

And while you'll be aware of the electronics, I don't think while we were performing we were that concerned with them. By that point I do think you trust the work you have all done together...and perform like you would any piece.

Stortz and Roller described getting used to the electronics, in which the ensemble familiarized themselves with the processing in dedicated sessions after strictly acoustic sessions. Stortz referred to a period of adjustment, but recollections were spotty regarding what the process of adjustment specifically entailed:

We had...a lot of rehearsal time together with the live-electronics after we were able to play the piece more or less by ourselves (I hardly can tell how much, but we took our time without counting

hours...). Of course we had to adjust some places and it was a process of getting used to the new sounds.

The process of “getting used to the new sounds” indicates a feedback loop, differing from accounts by Jeanrenaud and Hannisdal. While it is evident from both Stortz’s and Roller’s description that the incorporation of electronics impacted Ensemble Gelber Klang’s creative process in some way, their recollection lacks detail due to the time elapsed since Ensemble Gelber Klang performed and recorded *Nymphéa*. Roller mentioned that the members of Ensemble Gelber Klang were familiar with the results of the processing, to the extent that they could correct the engineer if something was not triggered correctly.

I actually remember several situations where the string players noticed that Bryan (our electronics guy) had the wrong patch running...In that case we had assimilated the right electronics enough to notice something was wrong..

Roller was more openly critical toward relationships with the electronics that were not described in ways suggesting direct involvement, as is the case in Cikada and Kronos quartet. He largely attributed the lack of a relationship between a performer and the electronics to a lack of awareness of the electronics, and over-reliance on showcasing technical ability. In particular, he described the relationship between the ensemble and electronics as similar to a chamber music environment, but his description suggests that a chamber music relationship existed between the performers and their engineer Bryan Wolf, instead of with the electronic element and its audio output. The engineer is responsible for balancing

the quartet's unamplified sound, the quartet's amplified and spatialized sound, and the live processing output; and their role is described by Roller as equal in importance to the musicians' performance on stage.

And Bryan was...really the fifth player in the quartet, and had the task to trigger precisely, and to control his mix in the same way we were controlling our mix, and paying attention to dynamics and time, so it was really a chamber music approach to the electronics, of really integrating a lot with the electronics.

All respondents confirmed that the engineer, as responsible for the sound projected to the audience, played a vital role involving trust. The ensemble's ability to infer their balance in the house was based on their experience on stage; their agency over ensemble balance as perceived by the audience shifts to the engineer. Engineers are an integral part of any performance of electroacoustic music, as the member of the performing group that both hears the group as an audience member might hear them, and possesses individualized control over a group's overall sound. Stortz expresses this trust in Ensemble Gelber Klang's engineer Bryan Wolf. She remarked that the quartet was "...lucky because our engineer was very good in handling all [the material in the quartet.] We discussed at some points the mixture or special levels, but then we need to trust him and his ears because we could never hear the real sound in the performance or during the recording." Jeanrenaud recalled a more collaborative relationship between Kronos and their engineer, in which instrumentalists collaborated frequently with the same engineer and offered input regarding levels.

Once the quartet feels consistent, it would help the engineer to follow the score while you rehearse so they can become familiar

with it too. Then I would have them add the electronics when everyone feels comfortable... Definitely the quartet rehearsed more on their own but we also did quite a bit with the engineer after we had our parts down. We did not feel we had to adjust our playing while the live electronics were being used.

We would always take turns going out into the hall to check the balance and sound. So we could have input for the engineer as well. But we used an engineer we were very familiar with, so we trusted them as well. But it never hurts to listen and talk about things all together.

While there was agreement throughout that performers needed to trust the engineer, the relationship between the instrumentalists and engineer differed among the three quartets. Cikada Quartet and Kronos Quartet preferred to let the engineer take care of the sound without any input from the performers, taking a more “hands off” approach, while Ensemble Gelber Klang had a more collaborative relationship in which performers on stage gave significant input regarding levels and balance. Roller emphatically called his engineer a “fifth chamber musician,” stating later that he saw simply no other option to this arrangement, noting that “it’s just an instrument. He’s playing a computer, and we’re playing, you know, our respective pieces of wood. But the orientation and the purpose is the same, to make lively chamber music.”

Hannisdal had the most hands-off perspective of the respondents, and opted to trust the engineer. If the engineer was unable to read music, they would enlist the help of an additional person able to read music to follow the score during performances.

A good sound engineer is priceless, but even the not so good needs to be trusted, is my experience. You need them to take

responsibility and create something interesting for the audience. Too many inputs from us can create more confusion than help. With *Nymphéa*, we always had a skilled composer sitting next to the sound engineer.

While it is evident from recordings that the electronics exhibit a significant transformative effect, the processing may not be considered by the performers on stage in *Nymphéa*, who instead utilize a variety of relationships and styles of exercising agency. The engineer, as the only individual able to both hear and modify the mix of electronic and acoustic sound, helps navigate the disconnect between the sound in the house and the sound on stage, as posthuman tropes such as virtuality and hybridity are experienced by listeners, but not by performers. A lack of interaction with the live processing may also have resulted from the individually demanding parts, which seemed to take priority over attending to electronic sound. In the following section, I discuss performance in *Frises* for solo violin and live electronics, which provides an opportunity to observe different relationships among human and electronic elements within musical contexts not as dense, but with similar musical material and electronics.

### Practices in *Frises*

*Frises* (2011) for solo violin and live electronics is a four-movement work commissioned by the Borusan Art Centre in Istanbul, originally written for Richard Schmoucler.<sup>78</sup> The work was inspired by friezes by the Symbolist painter Odilon Redon (1840-1916), and also by mathematical concepts; the first, second,

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<sup>78</sup> “*Frises*,” Works, Kaija Saariaho, accessed December 11, 2018, <http://saariaho.org/works/frises/>.

and fourth movements are named after friezes by Redon, and the third movement, “Pavage,” is inspired by iterative, continuous geometric transformation, expressed musically through continual development of brief gestures and the sampling and reincorporation of the violinist’s playing through live looping.<sup>79</sup>

As in *Nymphéa*, spatial reverberation is applied throughout, creating the impression of a virtual space. In addition to reverberation, electronics in *Frises* contain sampled audio, and other live processing such as pitch shifting, and delay effects. Each movement contains additional distinct electronics, which create different musical contexts from movement to movement. There are fewer modulation effects affecting timbre in *Frises*; while the pitch shifting in the fourth movement changes the timbre, the sound of the violinist is usually unmodified and balanced equally in relation to the electronic sound. The first movement, “Frise jaune” (Yellow Frieze), contains sampled bell sounds triggered by the performer. The pitch and dynamic of the chimes are specified in the scene but range from single bells to clusters of five or more notes. The second movement, “Frise de fleurs” (Frieze of Flowers), contains an infinite reverberation effect at the beginning, then sustained vibraphone samples (from m. 29), and a rhythmic synthesized mallet percussion line (m. 65). The third movement, “Pavage” (Paving), contains delay effects of various lengths, and brief instances of pitch shifting. The fourth movement, “Frise grise” (Gray Frieze), uses a pitch shifter that transposes the violin down a half-step and three octaves. The pitch, rhythm,

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<sup>79</sup> Ibid.

and dynamics of the electronics are specified using an additional line in the score. Like *Nymphéa*, changes in the electronics are triggered by a foot pedal stepped on by the performer, and an engineer stationed at the back of the room maintains an appropriate balance between acoustic and electronic sound.

Hybridity also occurs throughout the work, although the means by which hybridity is created varies. The types of hybridity present depend on the musical role of the electronic elements. Timbral hybridity is present as acoustic sound blends with live processing; this includes spatial reverberation applied throughout the work, infinite reverberation in “Frise de Fleurs” (mm. 1-28), pitch shifting in “Pavage” (mm. 233-244), and all of “Frise grise.” How timbral hybridity is perceived depends on the balance of electronic and acoustic sound; while a predominantly acoustic mix would cause processing to subtly color the sound, a balance with more effects output might strongly suggest a different space and instrument, collectively and temporarily creating a sense of otherworldliness in the piece.

In addition to timbral hybridity, ensemble hybridity also occurs in *Frisés*. Posthuman hybrid ensembles are comprised of acoustic and electronic elements. The electronic sounds are sampled or synthesized, and the sampled sounds manipulated electronically. In “Frise jaune,” the violinist is accompanied by carillon bell sounds manipulated so that the bell sounds fade in, sustain, and fade out (Figure 5). Real carillons are a set of bells found in a tower and operated using small levers arranged as a keyboard; replicating the same arrangement

acoustically would be highly impractical, but the simulated bell sounds create a virtual environment in which violinist and carillon sound coexist. The bell sounds' attack, decay, sustain, and overall volume are also mutated, affecting their perceived scale and identity. The bell sounds are made softer than they naturally would be in an acoustic environment, so the violinist is heard as equally loud in context. The attack of the bell sound is also modified; instead of a loud, percussive attack from a striker as bells are normally played, most bell sounds in this context fade in from a *niente* dynamic. The lack of attack and additional sustain cause bell sounds in this context to exist as a texture, disassociated from its original source.

**I. Frise jaune**

**Libero, espressivo**  $\text{♩} = \text{c.54}$

Violin

Electronics

(1)

(2) Cloud of chimes,  
layers of ostinatos, "carillons"

(3) "carillons"

Figure 5. *Frises*, “Frise Jaune,” mm. 1-11. Violin is accompanied by carillon sounds.

Saariaho employs vibraphone-like sound in “Frise de fleurs” (mm. 29-65, mm. 90-101). Each sonority ranges from a single pitch to chords of up to eight notes, shares pitches with the violin part, and is sustained until the following

sonority is triggered (Figure 6). Unlike a vibraphone, there is no percussive articulation present at the beginning of each note or chord, and the sound is manipulated so that each sonority decays in a manner similar to the bell sounds in “Frise jaune.” The middle of this movement contains the vibraphone-like sonority accompanied by an eighth-note triplet line timbrally similar to the inharmonic bell sounds, with a stronger articulation to the start of the note and a much lower pitch register, creating a muddier texture.<sup>80</sup>

**Delicato ma deciso, poco doloroso**

$\text{♩} = 76$

**22** ↑ fichier ( $\text{♩} = 76$ )

**5**

N. ——————> S.T.

**mp**

**6**

**6**

**N. ——————> S.T.**

Figure 6. *Frises*, “Frise de Fleur,” mm. 30-38. Sustained vibraphone-like sounds accompany the violin. Vibraphone accompaniment is joined by bell-like triplets in m. 66.

The ensemble hybridity in “Pavage” occurs as the violin is sampled and

<sup>80</sup> Jennifer Koh, violinist, “Frise de fleur,” by Kaija Saariaho, from *Frises*, <https://youtu.be/qyvzw-HrR2I>

replayed as accompaniment. While the electronic part's sound is human in origin, the electronic playback is distinctly non-human, as the sampled material is repeated without the natural variance in timbre, attack, rhythm, and pitch a human performer provides. Therefore, the violinist's recorded playing is mutated into a posthuman accompaniment, transforming the function of the original violinist's input. This is especially apparent when a single note is repeated (mm. 1-58), and when single notes or measures are repeated (mm. 68-105, Figure 7).

**Energico, affilato**  $J = 96$   
pizz. arco  
**A tempo** **Leggiero, giocoso**  
pizz. arco  
① ↑ delay  $\downarrow (J = 96)$  ② ↑ delay repetition of this bar  $\downarrow$  later ( $J = 96$ )

Figure 7. *Frises, “Pavage,”* delay repetition of mm. 1-5 (top system) and mm. 68-72 (lower system)

The live-sampled accompaniment sounds progressively more mechanical as the movement continues. When delay is randomized, irregular rhythms are created (mm. 107-135). While the rhythms are playable, the exact repetition of articulations make the electronic accompaniment sound less human. In the most “human-sounding” material, large portions of the violin part are played back, creating canons between humans and electronics (mm. 195-235, mm. 245-254). Two-part canons are created as the violin plays along with its part displaced by

three beats (mm. 212-232, mm. 245-254), and a three-part canon takes place as an additional part displaced by two beats is added (mm. 195-209, Figure 8). Performers must play their part in a way that serves them later, as they are in canon with themselves.

Figure 8. *Frises*, “Pavage,” mm. 195-199. Three-part canon between live violinist and delayed recorded violin.

The violin part in *Frises*, like the individual parts in *Nymphéa*, is technically challenging and requires significant individual preparation. The electronics generate more musical material that can be notated but also have a more exposed role in *Frises*; because of this, it is more necessary to practice with the electronics, especially in movements requiring synchronization or precise pedal timing, like “Frise de Fleur” and “Pavage.” Performers might find it necessary to use a pair of small speakers or headphones as monitors in both rehearsal and performance, so that they are not dependent on the engineer or venue for monitoring. The performer’s experience of the electronics varies with the engineer, sound system, and room; a larger stage with forward-facing speakers will sound different on stage in comparison to a small room, in which the performer hears the speaker’s output clearly.

While *Frises* shares many of the live processing electronics found in

*Nymphéa*, agency is distributed differently, as the musical context is less dense, the violin sound is more present in the mix played back by speakers, and the performer is more aware of how they may directly impact the electronic sound. It is even more essential that a violinist secure an engineer able to help them manage monitoring and balance. Particularly with venue loudspeakers pointed toward the audience and the physical presence of their instrument so close to their ears, violinists may never be aware of balance in the hall. Engineers may alert performers to any issues balance resulting from limitations of a microphone or processing such as clipping, and as they manage levels, performers may prioritize creating a tone quality that projects less effectively in an unamplified context, if they are aware that quiet sounds are amplified.

Electronics in *Frises* occasionally impact the way a performer plays their notated part, unlike those in *Nymphéa*. In measures 69-95 of “Pavage,” loops of one measure are superimposed over new material in the violin (Figure 9). In this section, the violin plays an accelerating gesture, and the material at the end of each phrase is often so fast that maintaining clear articulation of notes under the slur becomes challenging. In unaccompanied contexts, or in contexts in which the accompaniment is flexible, a violinist may opt for a slower tempo to facilitate the projection of each individual note. The looped measure, however, makes the tempo inflexible, so slowing down is not an option. If the performer chooses to remain coordinated with the loop, it becomes necessary to sacrifice note precision in favor of tempo. There are no specifications for how the performer may

coordinate with the electronics at this point, though the eighth-note delay preceding the loop suggests that a strict tempo, at least for the first bar, is ideal so that the recorded material matches what is depicted in the score.



Figure 9. *Frises*, Movement 3, mm. 69-75.

For the entire fourth movement, the harmonizer transposes the violin line one half-step and three octaves below the violin (Figure 10). The violinist performs two lines; a *legato* melody in the upper register and a left-hand *pizzicato* half-note triplet accompaniment. The melody, when transposed, maintains the same contour and clearly sounds like a transposed version to the audience. The timbre of the *pizzicato* accompaniment, especially in the end of the movement when the left-hand *pizzicato* is played on the open G and D strings, sounds so low that it almost sounds like a bass drum, particularly if the sound system used has a large subwoofer. The timbral mutation caused by the processing further differentiates the two lines, and necessitates specific priorities in performance. Timbral consistency becomes a priority in the lower line, achieved by adjusting dynamics and occasionally microphone placement so that the *pizzicati* are

balanced with the upper line.

**Tranquillo, con tenerezza**  $\text{♩} = \text{c.48}$

\*ligne mélodique libre, expressive,  
l'accompagnement toujours bien rythmé

8-  
① harmonizer: transpose down semitone and 3 octaves

Figure 10. *Frises*, Movement 4, mm. 1-4.

In “Frise de Fleurs,” the live processing begins as a freeze effect, which sustains the input of the violin, resembling reverberation with a long decay time. The violinist builds a texture as the live processing sustains the resonance from small musical gestures. Dynamic and timbral instructions are specifically notated for the first five gestures; *mezzo piano*, with gradually lightening left-hand finger pressure, and gradually changing contact point to *sul ponticello* (Figure 11). Any variation in how these gestures are executed creates a different sounding texture, due to the freeze effect. While the score and performance instructions do not provide specific information about how these textures are heard, monitoring of the electronics allows the instrumentalist to learn how each individual gesture contributes to the texture being built. Awareness of their impact on the resultant texture may impact decisions regarding timbre, trill speed, and intonation.

**II. Frise de fleurs**

Figure 11. *Frises*, Movement 2, mm. 1-12.

### Impact In Low-Agency Contexts

While the live processing's impact on performance may not be apparent to the performers, it still affects the performer's sense of control over details such as spaciousness, timbre, and ensemble balance, and how consistent performances may be. My experience performing *Nymphéa*, *Frises*, and other electroacoustic works by Saariaho supported my interview findings, which suggested that posthuman musical contexts create musical relationships that are not necessarily interactive. In *Nymphéa*, the electronics did not play any significant role in my interpretive decisions. My colleagues and I focused primarily on ensemble coordination, not the electronics. Focusing on the electronics too closely hindered our ability to play together, by obscuring entrances and lengthening otherwise short articulations. This was particularly the case in relation to reverberation or delay effects. In *Frises*, because the electronics also included prerecorded sound, delay, and other effects that required more precise synchronization, I was more aware of the electronics and relied on monitoring; but in many instances, I would

still not characterize relationships in the piece as an interactive, “active-reactive reciprocal relationship.”<sup>81</sup>

“Playing one’s part and not worrying too much about the electronics” is the essence of coexisting; collectively, the performers’ acoustic sound and the resonance and textural enrichment provided by the electronics create a novel environment for the listener, that may not always reflect the creative process of the performers on stage. As the performers coexist, the engineer operating electronics and the composer and software designer conceiving of and implementing the electronics possess a significant role in determining the sound the audience hears. This new performance environment invites questions when performing the work, including how much agency is worth exercising over spaciousness, timbre, and ensemble balance within such a context, and how these specific aspects of performance might be prioritized differently. I will discuss the posthuman impact on performance practice, and apply terminology concerning these factors of performance. These same concerns are shared with later discussion of OWEL.

While performers on stage possess all the agency over their sound in an acoustic context, the presence of electronics and amplification distribute agency over the sound heard by the audience to the engineer and electronic elements. A disconnect results, as performers can not realistically attend to the details of a mix or processing while they are on stage performing. This disconnect must be

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<sup>81</sup> Julieanne Klein, “Live and Interactive Electronic Vocal Compositions: Trends and Techniques for the Art of Performance” (DM diss., McGill University, 2007), 27.

mitigated for performers to make certain that they have control they have over how a performance of *Nymphéa* sounds, particularly with regard to issues like timbre, and ensemble balance. This need for mitigation assumes that the musicians on stage desire consistency and comprehensive awareness of how performance instructions and interpretive decisions are made to happen by the performing ensemble (including the engineer.)

Many valid options are possible in a distributed system, and choices depend on the experience and comfort of individual members of the group, and the resources and time available for rehearsal. Performers on stage, as with Cikada Quartet and Kronos Quartet, may choose to trust the engineer to mix according to their preferences and skill, and focus on executing the performance instructions for the instrument. This option, however, may become problematic if the engineer does not choose to mix in a way that the performers on stage envision, especially in rehearsal scenarios with limited time in a performance space. A “hands off” approach such as this contradicts suggestions that performers should consider the electronic sound, and be familiar with how the electronics work. An approach more in line with suggestions by McNutt, Pestova, and Klein is a more collaborative relationship with the engineer, such as that employed by Ensemble Gelber Klang, in which musicians on stage actively attend to processing and communicated expectations to the engineer in rehearsal. This collaborative relationship requires time and resources to consistently engage the same performers on stage and engineer, but may make it easier for performers on

stage to trust that their intended sound is heard in the house. A third approach is to regain agency through the use of speakers or headphones; I employ this approach in my performances of *Frises* through the use of a pair of small bookshelf speakers and keeping the laptop by me. This way, it is possible to personally adjust monitoring and levels. The engineer may maintain their own levels in the house, while performers on stage are able to obtain the information needed to comfortably play their own part.

As many of Saariaho's electroacoustic works contain a blend of live processing and prerecorded material, I advocate for gaining familiarity with the types of electronics at each point in the piece, and then making a choice, based on consideration of their musical function and their impact in rehearsals, about the benefit of attending to them in performance, and if their presence should cause any detail of performance practice to be prioritized more or less. Performers may also consider the electronic sound through review of performances using recordings, videos, and feedback from the engineer and audience members, and use this information to adjust parameters within the patch.

In *Nymphéa*, reverberation and echo effects create a virtual performance space with increased reverberance. In a typical unamplified context, performers are expected to perform with the hall's acoustic in mind, and may adjust tone production, articulation, and note lengths to compensate for how the acoustic response of a space is perceived from their point of view, or in response to

feedback they may have received from peers listening in the audience.<sup>82</sup> When acoustics are simulated, this complicates a performer's process of evaluating their space. Depending on monitoring, performers may play as if they are in the space simulated by the live processing. If there is no monitoring on stage, or no reverberation played back in the monitors, a disconnect may result in which the performer's experience on stage is of a dry acoustic, while the audience's experience is that of a more reverberant acoustic. The choice to utilize monitoring and the volume levels of monitor output to mitigate the disconnect between the sound on stage and in the house depends on the preferences of the performers and engineer.

The degree of spatialization is adjusted automatically at points in *Nymphéa*, and an additional reverberation effect is applied at certain scenes in the piece. The levels of instrument signal sent to effects as well as the levels of output by all effects played by the patch are adjustable (Figure 12). The audience hears a complex blend of the performer's unamplified sound from acoustic instruments, and a mix of amplified instruments and effects output routed through spatialization.

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<sup>82</sup> Pestova, "Models of Interaction," 115.

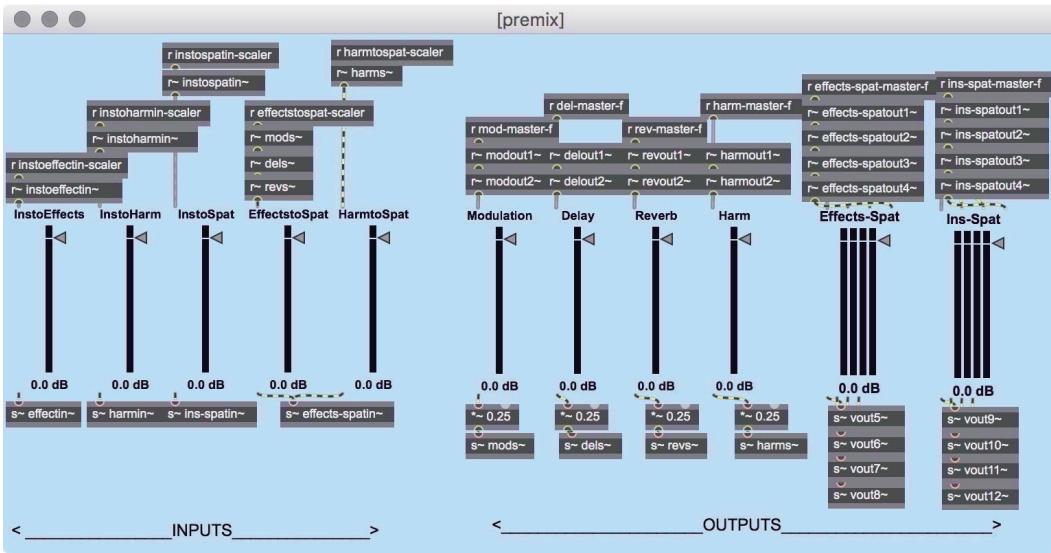


Figure 12. The mixing window for effects and spatialization in *Nymphéa* (patch version 5.3). Each slider specifies which parameter is adjusted.

Many choices regarding mixing spatial reverberation are possible, all of which have implications for the listener. An engineer may determine, based on what equipment is available, whether a performance will have stereo or quadraphonic reverberation. For both settings, the level of spatial reverberation played back to the audience (labeled as “spat” in the patch) is adjustable during the performance. These levels are adjustable according to personal preferences, and to navigate issues like feedback. The level of spatial reverberation is also constrained by the performance instruction specifying a “clear and rich ‘close’ sound,” though that instruction is vague and could justify many different levels. There are also constraints built into the patch as most parameters for the live processing aside from volume levels are not adjustable.

The same modifications to the space’s acoustic occur in *Frises* and several other works for solo instrument and electronics by Saariaho. All parameters for

the type of reverberation are preset except for the volume level of the reverberation output, and the monitoring used depends on the preferences of the performer. Similar instructions are given by Saariaho for mixing throughout most of her works for electronics; she recommends that the electronic sound not cover the acoustic sound of the instruments, the same “close” sound, and for the general level to be “rather loud, but not painfully so.”<sup>83</sup>

Live processing in *Nymphéa* and *Frises* are transformative to tone quality, mutating the stringed instruments’ sound and creating new hybrid textures of electronic and acoustic sound. There is very little that can be done to control tone quality past modifications at the level of the instrument, as one might do in an acoustic context. String players may still alter their tone quality by modifying their contact point, bow pressure, bow speed, and left hand finger pressure. Performers devote a significant amount of practice time to gaining fine control over their tone quality; as music by Saariaho provides very specific instructions regarding contact point, bow pressure, and left hand finger pressure, this control is certainly required. Performers may consider how specific timbres might affect the live processing effects.

Live processing effects like reverberation, harmonization, and modulation effects are all preset, and only allow the possibility of modifying the volume of an effect, and the extent to which that processing’s output is sent to the spatial reverberation. Because the parameters of the effects are fixed, there are not many

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<sup>83</sup> “Electronics for Kaija Saariaho’s Pieces,” petals.org, accessed Dec 17 2018, <http://www.petals.org/Saariaho/Electronics.html>

choices available to make at the level of the electronics or engineer in this context, except to perhaps modify levels of an effect in performance. Similar modifications occur in *Frises* and her other works for solo instrumentalist and electronics.

The engineer potentially has far greater control over ensemble balance in work by Saariaho. In unamplified contexts, performers manage ensemble balance by adjusting individual levels to suit a space and consider the loudness of particular instruments over others, often with assistance from peers listening in the hall. With amplification, the engineer working at a mixing console (or in the case of *Nymphéa* and *Frises*, at a mixer within the patch) has the ability to adjust each performer's input. Performers might still adjust their individual volume while levels are adjusted at the mixing board, so discussing how balance will be managed is recommended.

In a more collaborative relationship between performers on stage and the engineer, an engineer may field requests from performers to be louder or softer, if performers are able to state that a specific part is important. Levy Lorenzo, a colleague acting as engineer for International Contemporary Ensemble reported “riding” levels in performance, giving an extra boost in loudness to performers when necessary. This does, however, require that the engineer be familiar with the repertoire performed, or be able to read scores. It also necessitates a longer span of time spent rehearsing and deciding on levels. Daniel Neumann, the engineer for chamber orchestra Alarm Will Sound, is present for all group rehearsals, and

begins to determine sound design from the first rehearsal, in which performers rehearse with electronics.

Performers may also request that the engineer not ride levels in performance, and modify dynamics and balance at the level of their instrument. This ability to boost and selectively ride levels has implications for the group's overall sound. Through amplification, if desired, it is less necessary to force one's sound to be extremely loud, or extremely quiet. In works like *Nymphéa*, instructions for timbre and volume often coincide; riding levels may impact how certain gestures are performed at the level of the instrument. As an example, in the overpressure gesture below, performers are to reach a fortissimo dynamic at the same time as they apply pressure to the string with their bows (mm. 152-161, Figure 13). Different types of string instrument overpressure timbres are possible, depending on bow speed, weight applied, and contact point used; some types of overpressure, however, are louder than others. If an engineer agrees to boost loudness for everyone at that point, they could potentially make it possible for performers to use timbres too soft to use normally. The same approach to amplification may also be used in *Frises*, especially as the violinist is paired with prerecorded sound, or as their part is layered in sections using delay.

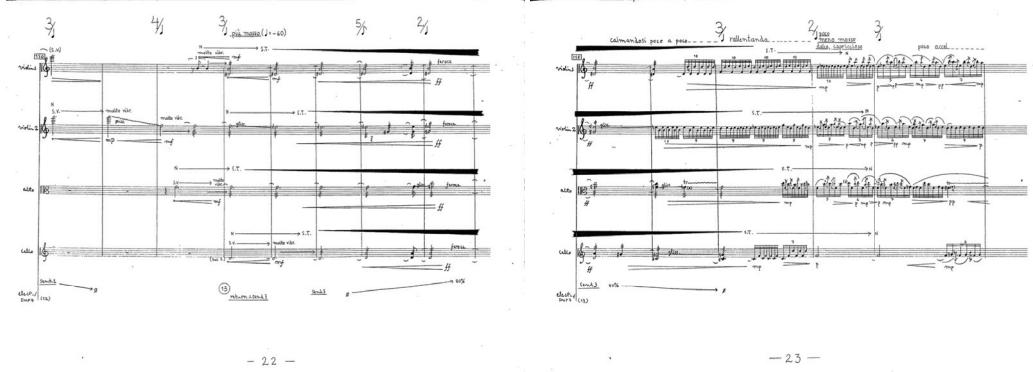


Figure 13. *Nymphéa*, mm. 152-161. Strings collectively have an overpressure gesture, which might sound different depending on sound design.

While the interview data concerning *Nymphéa* do not show this level of attention to detail between quartet and engineer, incorporating an engineer in this manner might lead to new ways to interpret the notation and perform in a chamber ensemble musical context, as performers would not need to worry as much about covering other performers, or producing sound in a way that projects.

### Networks and Agency

In *Nymphéa* and *Frises*, similar live processing elements have a different impact depending on the musical context. Due to the dense and technically demanding quartet writing, the electronic sound does not impact the performers' musical decisions in *Nymphéa*. Human performers and electronics instead coexist in the musical environment so that the audience hears acoustic and electronic sound, and no interaction occurs between performers and electronics. In *Frises*, many of the same electronics exist, yet the simpler solo instrumentation and a more prominent electronic part increases the electronic sound's impact, as the

performer is more aware of how their playing impacts the electronic sound. The musical contexts in both works are defined as low-agency environments in which the performer has little direct control over the electronics. Both contexts also feature posthuman hybridity through blending acoustic and electronic sound, virtuality as the electronics alter the space's acoustic and create new ensemble configurations, and disembodiment as the source of sound is, at times, less localized to the performer's position on stage. Posthuman processes used include mutation through the use of sampling electronics and live processing, and the simulation of spaces through reverberation. The engineer also plays an essential role in operating the electronics and managing balance between the acoustic and electronic sound.

A larger issue of when and how to exercise agency as a performer emerges in this complex musical context, which now contains electronic elements (the computer, the mixer), and additional human elements (the engineer, potentially also a computer operator, though one individual does both in works by Saariaho). Each juncture represents an opportunity for a performer to control their sound through personal adjustment at the instrument and electronic element level, or through communication with other individuals like the engineer. A unique network of interactions of human and electronic elements forms, which may be may be one-sided, reciprocal and forming a feedback loop, or non-existent. Through inspection of these networks, ways to employ direct control and secondary control emerge.

Pestova has already advocated for networks through her “models of interaction,” but encourages interactivity at every possible point.<sup>84</sup> The interviews suggested that interactive relationships among electronics and human performers are not always the case, and may not be appropriate or possible depending on factors ranging from the density of musical textures, to the role of the electronics, to logistical constraints like available rehearsal time with the engineer. In music by Saariaho, choosing to interact or coexist with the electronic element depends on the musical role the electronics had at that point in the piece. Instead, a coexistence relationship indicating one-sided interaction, or no interaction seems more true to practice.

While *Nymphéa* has several points of mediation between the instrumentalists and the audience, few reciprocal relationships emerge among electronic element and performers. In *Nymphéa*, the only feedback loop that exists between a human element and electronics is one between the engineer and computer, as the engineer is primarily responsible for managing the electronics and adjusting levels (Figure 14). The existence of a feedback loop between engineers and performers depends on the extent to which communication occurs. Ensemble Gelber Klang’s performers had a communicative relationship with their engineer Bryan Wolf, creating a reciprocal relationship; but in more passive relationships, this loop would not emerge. In the case of ensembles with more long-term collaborative relationships with their engineers such as Ensemble

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<sup>84</sup> Pestova, “Models of Interaction,” 115.

Gelber Klang, a feedback loop may also form over the span of several performances, as engineers, acting as both a listener and collaborator, are in a position to provide insight regarding ensemble balance, tone quality, and how the performers are heard within the virtual space. As the pedal use in *Nymphéa* has no significant impact on the sound performers perceive on stage, only a tenuous relationship exists between the quartet and computer, indicated by dotted lines from the quartet to computer, and from the monitor to the quartet.

The context and network differs in *Frises* as electronic sound has more potential to impact the instrumentalist's performance decisions, creating an additional feedback loop. Because the violinist synchronizes with electronics in the piece and hears the electronic output more clearly at points in the work, pedal use at those moments may be construed as a substantive interaction the performer engages in with the electronics. This is represented by a solid arrow in the *Frises* diagram from violinist to computer. The electronics' increased impact creates a consistent reciprocal relationship exists between violin soloist and engineer in this context as well.

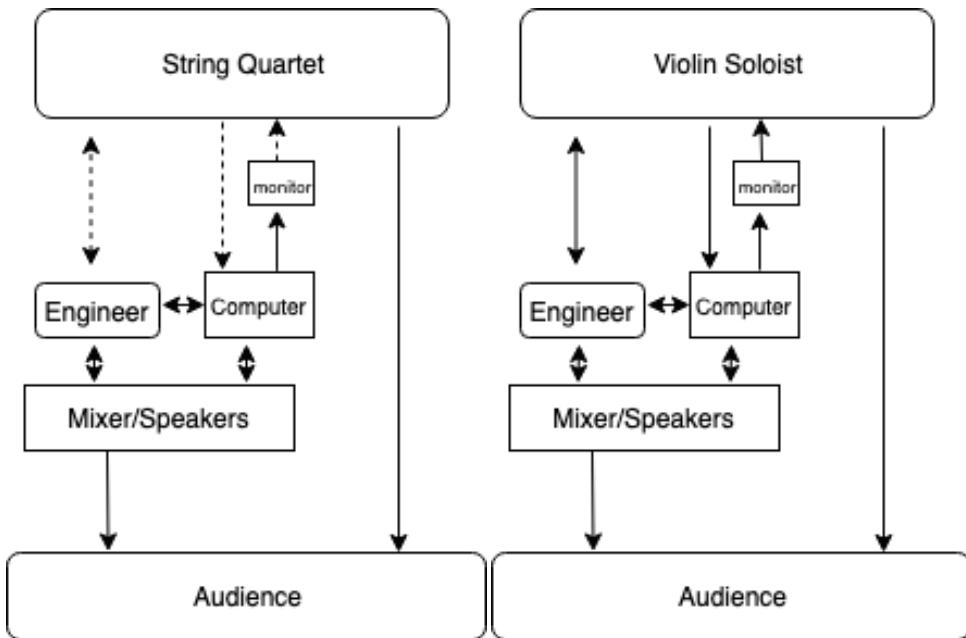


Figure 14. Feedback loops in *Nymphéa* and *Frises*. Each arrow denotes a relationship between elements within a context, that are either reciprocal, one-sided, or absent. The dotted lines suggest tenuous relationships that might not exist, depending on the performers and engineers involved.

In addition to examining the types of relationships present within a context, recognizing the action's impact on the sound reaching the audience is also helpful in deciding the extent to which musical decisions should be prioritized. Human actors exercising agency may have either a direct or indirect impact on the sound that reaches the audience. Actions that result in an indirect impact are actions mediated by a human or electronic element between the actor and the audience. One common example in music by Saariaho is when instrumentalists vary their dynamic levels; this might always be further modified by an engineer, therefore, the impact of this action on the sound heard by the audience is mediated and not direct. In *Nymphéa*, the string quartet has direct control over their acoustic sound, which is heard by the audience without

processing. The string quartet indirectly controls the electronic output by communicating with the engineer, or potentially through adjusting their dynamics, timbre, and ensemble balance to the electronics, though no quartets in this study did so. The engineer has direct control over the electronics, and the ability to partially override any indirect control employed by the string quartet, especially over ensemble balance. In *Frises*, similar methods of direct and indirect control exist as options through which a violinist may have agency, and the engineer possesses similar direct control over the electronics. However, the more exposed solo instrument texture and the differences in processing make it more apparent when the violinist makes adjustments in their playing, and because the violinist's pedal triggering often starts delays or prerecorded samples, changes in timing have a more obvious impact on the performance.

Networks articulate the source and impact of posthuman processes and features. Hybridity, disembodiment, and virtuality in Saariaho's music may be expressed in terms of their impact on the human performers, engineers, and the audience, and through description of their source, which is usually one or more electronic elements present within the context. Processes such as mutation and simulation exist within networks as products of electronic elements, or agency utilized by human actors through electronic elements.

Posthuman virtuality occurs in Saariaho's work as electronics simulate a more reverberant performance space. A generalized network applicable to both *Nymphéa* and solo work by Saariaho show the source, impact, and ways to control

the extent to which virtuality exists in this musical context (Figure 15). The source of reverberation and virtuality is the computer electronics. The audience is primarily impacted by the virtual space, as they hear the spatialized sound mixed with the acoustic sound of the instruments. Engineers control the loudness of the computer's sound from the vantage point of the audience and have direct control over how loudly the reverberation of the virtual space is heard, but not the decay time or any other parameters of the reverberation. Performers are only minimally impacted by the virtual space, but have the opportunity to have indirect control over posthuman virtuality by communicating with the engineer about their preferences for reverberation volume, or by changing their playing.

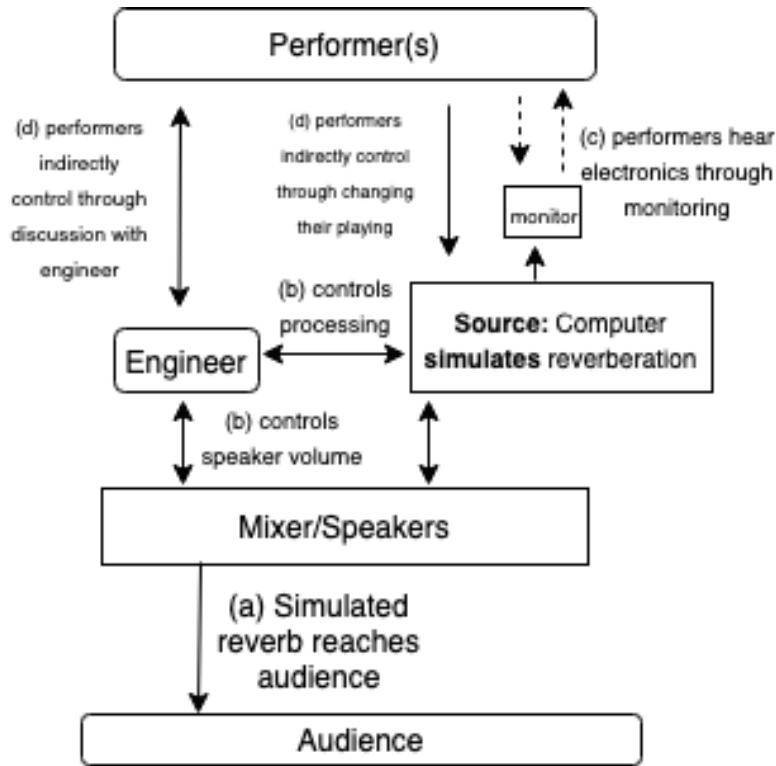


Figure 15. Network diagram discussing the source, impact, and ways to control virtuality.

Many of the above practices, particularly those that could be employed by the performer, are not used. The above diagram, however, offers more detail regarding potential performer actions that are more specific and applicable than a simple directive toward interactivity, which is not an appropriate choice between performers and a single electronic element in this context. Instead, this diagram depicts a complex process based in navigation of a network through communication and occasionally indirect action.

The diagram illustrating hybridity is structured similarly to the diagram on virtuality (Figure 16). The audience hears a hybrid of electronic and acoustic sound, mixed by the engineer. The computer mutates the output of the performers, and also mutates and plays back prerecorded samples in Saariaho's solo work. In both cases, the electronic sound is disembodied from its source, creating a hybrid ensemble. Performers within solo contexts like *Frises* are impacted more by live processing. Ensemble hybridity may cause the performer to accommodate the musical properties of samples played back, matching timbre, articulation, or decay. Performers control how hybridity is perceived by altering timing of scene changes, their own output, and communicating with the engineer regarding balance.

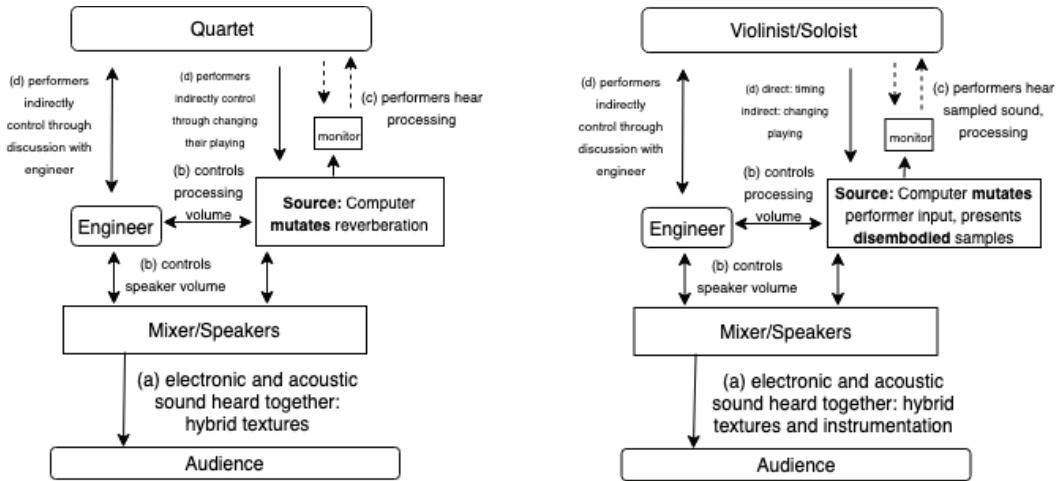


Figure 16. Posthuman hybridity in *Nymphéa* and solo electroacoustic works, illustrated through networks.

Clarifying the roles of humans and electronics functioning within these complex networks and identifying where relationships potentially occur provides insight regarding where it may be appropriate or feasible to exercise agency as a performer. It is apparent from the interview data that the performer does not necessarily need to control the sound at every point. It may even be counterproductive if a performer tries to have control at points when the task is best handled by an engineer, such as managing levels, and mixing electronic and acoustic sound.

Due to the variety of approaches present, it is unlikely that a coherent set of practices will form to create an oral performance tradition in low-agency musical contexts with live processing. Even a subset limited to Saariaho's music yields many practices based in navigating a complex network of human and electronic elements. Recordings of Saariaho's work by close collaborators such as the Kronos Quartet, Anssi Kartunnen, Camilla Hoitenga, Garth Knox, and

Jennifer Koh collectively offer a reference for the interpretation of dynamic, rhythmic, and timbral details. Though practices may differ, there already is an oral tradition surrounding the “basic sound” of Saariaho’s work with electronics, guided by her performance directions and precedent set by recordings. This basic sound includes a virtual reverberant space simulated by the electronics, and musical material frequently oriented around textures and timbral variety created through mutation of material on stage, and the incorporation of additional disembodied sounds. Posthuman processes and features in this music are indispensable in realizing this aural signature of Saariaho’s music. In the following chapter, I examine how the posthuman emerges and impacts performers and how performers exercise agency within a context that allows performers more direct control over the electronics, through my own work as an instrumentalist with OWEL.

## CHAPTER IV

### THE POSTHUMAN IN MUSIC BY OWEL

OWEL is an independent rock band based in New Jersey formed in 2013, consisting of singer-songwriter and guitarist Jay Sakong, guitarist Seamus O'Connor, bass player Nunzio Moudatsos, and drum set player Ryan Vargas. I was invited to perform with the group in September 2017, and officially joined January 2018 after three concerts and a short tour. I play violin in the band, and occasionally play keyboard and sing background vocals. Prior to January 2018, I learned songs from the first two albums, and since January, songs composed for their new album *Paris*.<sup>85</sup>

Unlike the performers in *Nymphéa and Frises*, musicians in OWEL choose and configure their electronics themselves. This creates a rich opportunity for me to experiment with amplified violin electronics in a different kind of creative environment, applying and observing the applicability of skills I have learned in the contemporary classical context. Pop and rock music, stylistically wide-ranging genres within which bands and artists choose to identify themselves, have long depended on amplification and loudspeakers, and therefore have a longer and widespread history of engaging with the posthuman than contemporary

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<sup>85</sup> OWEL, *Paris*, released March 29, 2019, <https://owel.bandcamp.com/album/paris-2>.

classical music.<sup>86</sup> Practices may differ in a context in which the majority of actors are more accustomed to using electronics in a self-directed way, in which amplification and live processing is the norm. Members of OWEL also differ in their approach to learning and rehearsing music, learning by rote imitation and consultation of recordings and rehearsing once weekly, instead of using notation and rehearsing in a concentrated period prior to a performance. Rehearsals are often spent working with new equipment and creating new songs, as individual performers determine the material they will play through trial and error. As a researcher with a background primarily in contemporary classical music, working with OWEL has been an opportunity to observe practices developed newly for this context in an environment that necessitates the use of oral practices, consultation of recordings, a longer rehearsal period, and performances within many different acoustic settings.

Live processing electronics are continually present in popular music, particularly in amplified groups like OWEL, in which most musicians on stage utilize amplifiers, effect pedals, and keyboard electronics. As a result, the level of noise in popular music venues is often much louder than typical contemporary classical settings. It is necessary to choose and utilize equipment that enables performers to hear contexts and make musical decisions, in a way that is possible to replicate in different rehearsal and performance spaces. Some approaches to

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<sup>86</sup> Paul Théberge, “‘Plugged in’: Technology and Popular Music,” in *The Cambridge Companion to Pop and Rock*, ed., Simon Frith, Will Straw, and John Street (New York: Cambridge University Press, 2011), 4.

navigating this environment may be found in the fieldwork of sociologist H. Stith Bennett, who observed local musicians in the state of Colorado in the early 1970s, documenting the challenges they regularly faced while performing, including working with venues, venue personnel, and equipment that vary widely in quality.<sup>87</sup>

As a string player, many options exist for amplification on stage; OWEL's former violinist used a piezoelectric pickup, reverberation, and on-stage monitors. I currently use a similar pickup, laptop processing run through the digital audio workstation (DAW) Ableton Live. Digital audio workstations possess a broad range of features related to audio production, including audio recording, mixing, editing, and playback.<sup>88</sup> Ableton, in particular, is suited to live performance and the production of electronic music. Functions within Ableton are controlled using a Keith McMillen Softstep 2 foot-operated MIDI controller, and a wireless monitoring setup plays back my violin's processed sound through headphones. The electronics in OWEL affect the instrument's timbre and sense of space as in music by Saariaho, but performers have much more agency over the effects in comparison to a work by Saariaho. My practices and equipment were developed over the course of several months of rehearsals and testing in performance, and were informed by my prior experience working in amplified settings on a short-term basis. I will discuss the process of determining my setup in detail and the

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<sup>87</sup> H. Stith Bennett, *On Becoming a Rock Musician* (New York: Columbia University Press, 2017).

<sup>88</sup> "What is a Digital Audio Workstation?," Practical Music Production, accessed May 15, 2019, <https://www.practical-music-production.com/digital-audio-workstation/>

rationale behind choices in the following section.

Distributed cognition is a common characteristic found within amplified settings. Performers, each performer's electronics, venue equipment, and engineers create a complex network in which the performer's actions may be amplified or superseded by other elements. Engineers, stage quality, and equipment conditions vary widely from venue to venue and significantly impact what is heard in the house and on stage. Similar posthuman tropes found in work by Saariaho emerge in OWEL's context, including processes like mutation, and features like virtuality, cyborg, disembodiment, and feedback loops. Interfaces of electronics on stage, a dependence on monitoring and the engineer, the mutation of performers' sounds on stage significantly impact details of performance like intonation, dynamics, and ensemble balance. The cyborg trope emerges as more prominent within this context, due to the widespread incorporation of external interfaces throughout the group. My study of my work with OWEL discusses two processes: determining which electronics to use and the parameters for those electronics, and adapting to the challenges encountered while rehearsing and performing with the band. Both processes are addressed separately, but they occurred concurrently and are interconnected.

### Developing the Electronics

Choosing live electronics for amplified violin involves more trial-and-error than the equivalent process with commonly amplified instruments such as

electric guitar. Demos for electronics are widely available via YouTube and other streaming audio resources, but are not always applicable to amplified violin, as violin pickup input often has more noise artifacts in comparison to guitar input, complicating the use of live processing. Live electronics exist in a variety of forms, including stompbox pedals, multi-effects processors, software found in a DAW, and software implemented in languages like Max/MSP and Supercollider. All options possess their own individual advantages and disadvantages, and the setup chosen depends on a performer's preference for sound and interface.

Memos demonstrate a process based in trial-and-error, online research, and comparison to other bands. Electronics in OWEL were adapted as needs became apparent and equipment became available. They were tested in small rehearsal spaces with the band, via headphones or small speakers in my home workspace, and during sound checks and performances at venues. The electronic hardware was changed four times from when I began performing with the band in October 2017 to the beginning of the May 2018 tour; equipment changes were centered around determining the best way to hear and be heard in an environment with significantly louder stage noise, and on developing a performer-electronics interface that allowed for sufficient control on stage.

Human performers in OWEL act as posthuman cyborgs, as they work with both their instruments and electronic devices that transform the output of their acoustic instruments or voices. Amplification and monitoring are essential to being heard and hearing adequately in this environment. The performer, their

personal equipment, and the other actors in the space engage in a complex network that influences later choices about equipment and settings. These equipment choices affected the way the violin's sound was mutated in performance, and the distribution of agency throughout the ensemble. This process contrasts with the experience found in music by Saariaho, in which electronics parameters are predetermined with only limited control over levels, and specific recommendations for microphones and hardware are provided by the composer.<sup>89</sup>

For rehearsals and shows in October 2017, a Rave electric violin with a BOSS GT-8 multi-effects pedal was used. Electric violins are less susceptible to feedback and send a “clean” signal relatively free of noise artifacts to the effects pedal. The Boss GT-8 pedal contains many different live processing effects, including reverberation, delay, chorus, and preset preamp and speaker settings modeled after popular hardware.<sup>90</sup> Each of these effects mutates the violin sound in different ways. Each configuration is saved into a “patch,” and the GT-8 contains hundreds of preset patches, and limitless options for customization. Patches are recalled by pressing on one of the numbered buttons at the bottom of the pedal (Figure 17). Patches were devised for *arco* and *pizzicato* playing, and for extended techniques. The extended techniques patch contained significantly

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<sup>89</sup> “General Technical Notes,” [petals.org](http://www.petals.org/Saariaho/Electronics-general-notes.html), accessed February 5, 2019, <http://www.petals.org/Saariaho/Electronics-general-notes.html>.

<sup>90</sup> More information regarding functionality of the GT8 may be found in the manual: “Chapter 4: Introduction to Effects and Parameters,” in *GT-8 Owner’s Manual*, 26-52. Recommended demo videos include: Johnny DeMarco, “Boss GT-8 Guitar Multi Effects Processor,” video, March 13, 2007, <https://youtu.be/3sXIXtWC050>; Tian Jay, “BOSS GT8 The Basics,” video, July 2, 2018, <https://youtu.be/fL3nFkTpYdQ>.

more reverberation and timbral effects, and was used with improvised glissandi and timbral trills to create transitional material between songs. Potentiometers on the pedal make it simple to intuitively adjust settings, and patches are assigned to foot switches and recalled during performance. Volume is controlled by the expression pedal. Earbud headphones with relatively high noise isolation were used to monitor the pedal's output, plugged into the pedal. Monitoring through headphones makes it possible to manage monitoring without relying on the engineer and is essential in louder settings; in quieter settings like works by Saariaho, headphone monitoring was only used in rehearsals of *Frises* when speakers were not available.



Figure 17. Initial setup for OWEL: a Rave 4-string electric violin, and Boss GT-8 multi-effects pedal

For a louder signal and a more familiar performance experience, the instrument was changed to an acoustic violin with an LR Baggs piezoelectric pickup for rehearsals in December 2017 (Figure 18). While piezoelectric pickups are “noisier” and hollow-bodied instruments are more susceptible to feedback, the pickup provides clearer articulations and more dynamic variety in comparison to

the Rave electric violin.<sup>91</sup> A filter was applied that cut high frequencies, reducing the scratchiness the pickup's tone quality. The GT-8 and headphone monitoring remained the same, though patches were adjusted to suit the signal sent by the new instrument.

After the acoustic violin's incorporation, laptop electronics in Ableton Live replaced the GT-8.<sup>92</sup> A new audio interface and foot controller were also incorporated (Figure 18). Using Ableton instead of a pedalboard setup allowed for more overall functionality and flexibility: it is possible to record and play back audio, and use processing effects (called “objects”) in a live setting. Ableton provides a visually rich, intuitive interface, within which almost any parameter may be mapped to a MIDI controller. The Keith McMillen Instruments Softstep 2 foot controller possesses more functionality than the GT-8, as the message sent to the computer from each button is customizable.<sup>93</sup>

Settings in Ableton were initially rudimentary and limited to EQ and reverberation, and were continually adjusted over the December 2017 tour to suit the sound of the band. Delay and pitch shifting were incorporated in late January. Like the multi-effects pedal, individual tracks with appropriate settings were designed for *arco* and *pizzicato* playing. EQ settings included a low-pass filter to

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<sup>91</sup> “Violin Pickup,” LR Baggs (website), accessed March 29, 2019, <https://www.lrbaggs.com/pickups/violin-pickup>.

<sup>92</sup> Ableton (channel), “What is Ableton Live?” YouTube, June 18 2018, <https://youtu.be/o-UWByeunSs>; InspirAspir (channel), “Ableton for Beginners - (An Introduction to Ableton Live),” YouTube, March 25, 2017, <https://youtu.be/iLHovADrV-Q>.

<sup>93</sup> Keith McMillen Instruments (channel), “Introducing SoftStep 2,” YouTube, Jan 22, 2015, <https://youtu.be/oW1b0LlzgQE>; Trevor New, “My Ableton Rig - Softstep 2 by Keith McMillen Instruments,” YouTube, Jan 6, 2018, <https://youtu.be/jf8NW75vIa0>.

reduce the pickup's scratchiness. Reverberation reduces the noisiness of piezoelectric violin pickups, if configured appropriately; too much reverberation causes the violin to sound separate from the actual space and not match the context around it, and too little makes the violin's sound noisy, scratchy, and disconcerting to listen to in headphone monitors. A major task was to determine appropriate parameters, including the amount of processed signal versus unprocessed signal sent to the mixer, and settings for room size and decay time. Reverberation settings were tested through review of recorded rehearsals and performances, tests at venues during rehearsals and sound checks, and through application to recorded input from the violin while using headphones. The use of live recording creates additional feedback loops through which performers may review their performance, adjust their playing, and test new effects as desired.



Figure 18. LR Baggs Violin Pickup, Resident Audio Thunderbolt T4 Audio Interface, KeithMcMillen Instruments SoftStep 2.

A wireless pickup and monitoring system were incorporated into the electronics in January 2018 to reduce cables used and facilitate movement (Figure

19). Though both devices increase the points at which the violin sound is mediated, their interfaces provide few controls. The Shure PSM300 monitoring system has volume control settings that make it possible to adjust the monitoring level. The Line 6 Relay G10 wireless pick up, used to transmit the violin's sound to the laptop, has no options for volume control. Both devices were tested in rehearsal and used during the May 2018 tour, in which they performed without significant issues. In-ear monitor volume was adjusted at each show during sound checks to suit the size of the stage and monitoring used, but otherwise impacted performers minimally.



Figure 19. Wireless monitoring system (Shure PSM 300) and wireless pickup (Line 6 Relay G10).

From October 2017 until the conclusion of the May 2017 tour, equipment used in OWEL underwent four changes in hardware that significantly impacted my experience as a performer on stage. The assortment of hardware available to choose from illustrate the high amount of agency performers possess over electronics in this context, and contrasts with the limited equipment options and low agency performers have over electronics in work by Saariaho. Iterations

illustrate the range of ways an acoustic violin's sound may be mutated in performance.

Without amplification and monitoring elements, it is impossible to hear and be heard. This contrasts with works by Saariaho, in which unamplified string instruments are audible on stage. Live processing effects determine the tone quality of amplified sound; control over those effects is necessary to accommodate the surrounding context in contexts like OWEL that incorporate performers' individual collection of equipment based on preferences and available resources. Feedback loops between performers and their individual electronics, therefore, play a more significant role. Multiple streams of feedback occur in performance and upon reflection of performances that impact the use of electronics in future sets (Figure 20).

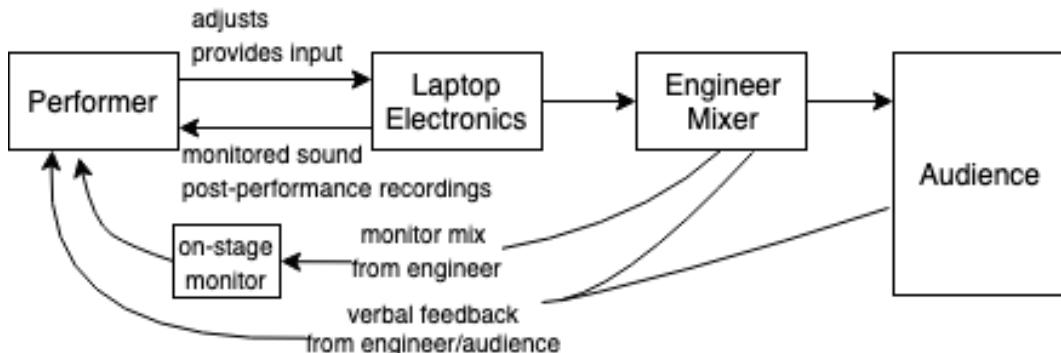


Figure 20. Feedback loop between performer and electronics in OWEL. Feedback loops exist and influence later input and settings on multiple levels.

In OWEL, the primary source of feedback comes from the headphone monitors. Secondary sources of feedback include monitoring via the on-stage wedge speakers playing back the sound of the entire band, and verbal feedback from the engineer, audience, or other band members. Post-performance,

additional verbal feedback, recordings of tracks recorded via Ableton, and recordings made in the house are also valuable sources of information. The precedent set by the previous violinist regarding equipment and tone quality was also considered through consultation of studio recordings. As equipment and settings developed, practices were devised to navigate issues like monitoring, managing tone quality, and moving comfortably around the stage. The following section will discuss these specific thematic posthuman features encountered and their impact on performance practice.

### Practices in OWEL

Learning to perform in OWEL's specific posthuman musical context occurred concurrently as new equipment were adapted and issues emerged, over several weeks of rehearsals and performances. Mutation from live processing electronics and amplification necessitated different approaches to performance, as performers adjust their playing to suit live processing, impacting timbre, articulation, vibrato, and dynamics. The physicality of musical gestures is also impacted, as performers use an individualized cyborg assemblage of equipment to perform. The overall loudness on stage and directionality of speaker output also make the engineer essential in OWEL and similar heavily amplified ensembles. The engineer hears and controls the band's sound in the house, including ensemble balance and timbre. As all output is routed through the venue's sound system, the engineer determines a customized mix for the audience and

performers.

By incorporating instruments like violin that are not traditionally amplified, virtuality is created as a softer sound associated with acoustic settings is mixed alongside electronic instruments. Samples and electronic track also create virtuality through the incorporation of instruments not on stage; additional string, guitar, and vocal tracks are used to create a denser texture.<sup>94</sup> In *Nymphéa* and *Frises*, similar virtuality occurs through the simulation of different acoustics and use of prerecorded samples. In the following section, this complex interplay of the posthuman will be shown through examination of issues that emerged as thematic during the May 2018 tour.

#### Mediation Causing Disconnection and Disembodiment:

##### “Weather Report” and “Snowglobe”

Intonation as a string instrumentalist is always dependent on context; performers of fretless instruments must adjust to less flexible instruments, especially if pitches are doubled or form perfect intervals with other instruments, or if one specific instrument is prominent in the texture. Disembodiment caused by headphone monitoring, the relative inaudibility of the acoustic violin sound coming from the instrument, and the directionality of venue speakers further complicated the process of playing in tune with the surrounding context. Awareness of instrument levels is made possible through monitoring, but since

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<sup>94</sup> OWEL, “No Parachutes,” Big Room Bar, Columbus, OH, May 19, 2018, 23:35-24:11, <https://youtu.be/3AGvz9lvCsw?t=1415>. See Appendix G.

monitor mix might differ from house mix, making appropriate choices regarding intonation is more complicated. A lack of connection to the house mix created chronic discrepancies in pitch between instruments at points in the set that were only apparent from later inspection of recordings (Appendix G).

The song “Weather Report” was most problematic for intonation in the May tour. Memos, made while reflecting on recorded performances the following day, continually reported the violin and lead guitar as out of tune with one another; disembodiment, as the violin is monitored through headphones and the guitar’s sound primarily comes from an amplifier in the back of the stage, played a large role in this mismatch. The song has several sections in which the lead guitar and violin are both sustained, and in these sections, intonation was the worst (Figure 21). In the Chicago show (May 13), the violin was sharp in relation to the guitar in Weather Report, especially when mixed equally or higher than the guitar. The mismatch is exacerbated by use of perfect intervals, and the difference in timbre between instruments due to mutation. Intonation, already highly dependent on ensemble balance and timbre, is further complicated by the quirks inherent in guitar intonation, in which strings are easily knocked out of tune or played loudly enough to distort pitch.<sup>95</sup> Inconsistent monitoring and stage sound make it difficult to know how to adjust intonation, even if the guitar is audible on stage. Intonation issues persisted in St. Louis (May 14) and Oklahoma City (May 16); while reviewing the recordings, it was difficult to know which instrument

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<sup>95</sup> A short description of how straight-fretted guitar is problematic for intonation can be found at <http://truetemperament.com/faq>.

should adjust. Because my instrument is fretless, I attempt to accommodate instruments with more limited choices for pitch, as I would in an acoustic context.

Section	Description	Show (Sections C, D)	Intonation
A	Quiet dynamic, voice, clean guitar	Indianapolis (24:34-25:54)	Violin mixed low, less apparent
B	Quiet dynamic, lead guitar joins, piano joins vocal line with melody, vocal harmony joins lead vocal	Chicago (18:20-19:41)	Violin mixed equally, very sharp
C	Louder dynamic, Drums and bass join, sustained violin and guitar. Dynamic is louder over the section. Intonation between violin and guitar problematic.	St. Louis (21:44-23:14)	Violin mixed low, less apparent
D	Loudest section. Guitars distorted, violin is still sustained (but same timbre). Intonation between violin and guitar problematic.	Oklahoma City (12:52-14:11)	[Very distorted] Violin mixed equally, pitch very sharp
B'	Short section, keyboard bell sound, same as section B with different lyrics	Springfield (21:22-22:41)	Violin low, less apparent, sharp at end
A'	Same as A, but louder guitar.	Nashville (17:16-18:36)	Violin prominent, guitar mixed low, sharp at end
E	Similar to D, different pitch and melodic content. Intonation between violin and guitar problematic.	Columbus (11:50-13:08)	Violin mixed lower, sharp but not as problematic
E'	Outro. Different melodic material. Intonation between violin and guitar problematic.		

Figure 21. Form chart for “Weather Report,” with comments about instrumentation and intonation with timepoints in sections C and D.

Because it was not always possible to hear the guitar clearly and make correct choices in the moment on stage, I decided to play pitches higher or lower for the next show, regardless of context. In Nashville (May 18th), the recording sounded more in tune. There were, however, several factors in the Nashville performance that could have also led to improved intonation, including

significantly louder stage noise that might have obscured intonation issues and dissuaded performers from overplaying. Mixing also impacts intonation. In the final show in Columbus (May 19th), the violin is mixed low in relation to the guitar, resulting in a balance that sounded more in tune, even though the violin was sharp. Pitch choices were less sharp in the Columbus recording, but in the second louder section of the piece (E, timepoints 14:11-14:53), pitch choices were still sharp, yet not as problematic because of way the band was mixed.

Intonation issues were also common in the first half of the song “Snowglobe.” They were almost always due to discrepancies between pitches played by guitars, keyboards, and a toy glockenspiel, particularly as an arpeggiated chord in the keyboard is replaced by guitar in the second interlude section (Figure 22). The assortment of timbres was due to mutation (effects and amplification) and ensemble virtuality created through the Fender Rhodes keyboard patch used. Violinists are flexible and trained to match inflexible instruments, but in this song, it was not clear while live if it was better to match the keyboard or electric bass. This becomes apparent in section C’, when the keyboard drops out and is replaced by guitar. Often, if the violin sounded sharp in relation to the keyboard, it sounded significantly less sharp in relation to the guitar playing similar pitch content. The Rhodes keyboard patch also sounded lower in pitch than the context around it. This is supported by feedback from band members at points throughout the tour about how the keyboard patch felt lower in pitch than the rest of the band, in spite of the guitars being “in-tune” according to

the electric tuners on their pedalboards. The guitars also varied unpredictably in pitch: in the second C section, the violin sounds, most notably in Nashville, in tune with the keyboards, yet sharp when the bass enters. At that point, pitch was lowered after reviewing recordings, but a mismatch still occurred. By the end of the tour, I matched the keyboard, but began matching the bass as it became more prominent. Intonation, as in “Weather Report,” depended on the instrumental mix.

Section	Instruments and roles	Show (C, B')	Intonation
A	Intro ostinato by keyboard with Rhodes-like patch. Electric guitar fades in and out.	Indianapolis (42:33-43:24)	Pitch shifter applied. Violin mixed low, and occasionally sharp.
B	Verse, lead vocal entrance. Keyboard ostinato continues. Violin and bass fade in and out.	Chicago (38:04-38:55)	Pitch shifter occasionally sharp, especially in relation to glockenspiel at 38:30
C	Interlude. Keyboard ostinato continues, joined by toy glockenspiel. Violin plays melody, sometimes with octaver. Voice has secondary melody.	St. Louis (38:42-39:33)	Pitch shifter applied. Very sharp throughout.
B'	Verse 2. Keyboard ostinato continues with toy glockenspiel. Lead vocal enters, with second harmony. Violin has secondary melody at end.	Oklahoma City (28:33-29:23)	No more pitch shifter. Intonation in tune until glockenspiel and guitar entrance.
C'	Interlude. Violin melody repeats, more drums and bass. Keyboard drops out and is replaced by arpeggiating guitar chords.	Springfield (37:05-37:57)	No more pitch shifter. Tends sharp at ends of phrases.
D	Change to F# minor key. Violin out, keyboard strings patch used. Bass solo at end.	Nashville (32:53-33:44)	No more pitch shifter. Tends sharp at ends of phrases.
B''	Verse 3. Vocal entrance, minor key version of B. Keyboard strings and bowed guitar fade in and out. Rhythmic bass accompaniment.	Columbus (27:37-28:28)	No more pitch shifter. Often sharp, violin mixed very prominently
E	Loud dynamic, keyboard strings, all instruments.		
A''	Outro. keyboard ostinato with Rhodes patch resumes.		

Figure 22. Form chart for “Snowglobe,” with comments about intonation with timepoints in sections C and B’.

Intonation is also affected by live processing. The Pitchproof VST used to transpose pitches an octave down negatively impacted intonation; it was necessary to change the timbre of the instrument and limit vibrato so the pitch shifter did not malfunction and create unintentional abrupt changes in pitch, which I referred to as “warbling.” When pitch shifters warble, a long sustained pitch may be broken up by pitches in addition to the fundamental pitch that are detected by the pitch tracking algorithm. Intonation improved after disabling the pitch shifter, making it possible to play with more vibrato and timbral variety. Certain parameters of Ableton’s Reverb object (which provides reverberation) also affect intonation (Figure 23). The Spin and Chorus parameters caused pitch to sound sharp. These settings are now disabled, but initially, I did not notice intonation issues with headphone monitoring, but only after sets when reviewing recordings.



Figure 23. Ableton Reverb object, with settings for “spin” and “chorus” enabled.

Ensemble Balance and Dynamics: “Burning House,”  
“Weather Report,” and Engineers

Memos consistently noted a lack of connection to the ensemble balance in the house; levels perceived on stage during a set were often different from levels heard in the set recordings. Performers, because of mediation, frequently experienced a lack of connection between their actions, the stage sound, and the house sound. Violin, backing vocals, and keyboard parts were often too loud or too soft in relation to other instruments. Balance issues were mentioned most frequently in Springfield (May 17), especially with regard to vocal and violin levels. I depend exclusively on stage monitoring while singing, and was surprised to find that vocal levels were significantly louder in the house than I perceived onstage, especially in “Weather Report” and “Paper Hands.”<sup>96</sup> Sakong’s vocal microphone, as the lead singer, is mixed louder than backing vocals (O’Connor and myself), but it is apparent from the recording that the engineer did not prioritize levels. The preferred mix for vocal levels is always communicated to the engineer during sound check, but if the engineer misunderstands or ignores directions, there is little that performers on stage are able to do, if they notice at all.

In-ear monitoring compounded the difficulty of inferring violin levels in the house. In the same set in Springfield (May 17), the violin level was too low in

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<sup>96</sup> OWEL, “Paper Hands,” FOH Lounge, Springfield, MO, May 17, 2018, 27:33-27:56, <https://youtu.be/pTG2AQKvrzw?t=1568>

the songs “Burning House” and “Weather Report.” In “Burning House,” the violin is prominent in two sections; the first section contains a violin melody with strummed guitar chords and light bass and drums, and the second section has louder, more forceful accompaniment. The violin level is low in the first section (10:56), and inaudible in the second section (12:53), which contrasts with comments in notes about in-ear monitors being too loud throughout.<sup>97</sup> The loudness of in-ear monitors caused softer playing and exacerbated the low level in the house. Violin is also inaudible in “Weather Report.” This balance issue was not the case for other sets on the tour, and could have been due to the preferences of the engineer, the space’s acoustic, or the guitarists turning up their amplifier volume during the show.

The loudness of the monitors in Nashville (May 18) and overwhelmed the small space. The electronic track, vocals, and keyboard were so loud in the monitor mix that performers could not assess ensemble balance while on stage; during and after the show, performers noted that the monitors were disruptively loud. In spite of this, levels in the recording seemed closer to ideal upon later review.<sup>98</sup> The engineer mentioned that he used album recordings as a reference, but his unorthodox practices for monitoring were detrimental to the band’s performance. In amplified music, performers are dependent on monitoring to hear themselves and others due to the amount of noise in the house, as the stage noise

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<sup>97</sup> OWEL, “Burning House,” FOH Lounge, Springfield, MO, May 17, 2018, 9:37-14:52, <https://youtu.be/pTG2AQKvrzw?t=656>

<sup>98</sup> OWEL, performance at Cafe Coco, Nashville, TN, May 18, 2018, <https://youtu.be/340CTYFxGoY>

and directionality of house speakers make it impossible to know the ensemble balance in the house while on stage. This differs significantly from the context encountered while performing music with Saariaho, in which the stage sound is far lower, acoustic sound is a significant portion of the sound the audience hears, and levels are much easier to infer as a performer on stage.

### Agency and Improvement

Distributed agency frequently confounded attempted adjustments to address issues apparent from recordings. Intonation issues varied with different mixing by the engineer, adjustments by other performers, or venue sound systems. The ability to hear and be heard changed with each engineer. This experience differs from performances of works like *Nymphéa*, in which performers are amplified but have more control over levels and hearing themselves in the space. Paradoxically, while performers have more control over parameters in contexts like OWEL, this control is negated by the increased control at the level of the engineer. Therefore, performers have less control overall.

A lack of agency is especially apparent in “Snowglobe.” Memos, which were coded and then given a positive and negative weight, showed no net improvement in this song over the span of the tour (Figure 24). Intonation varied without any marked improvement; the violin was sharp to the guitar and keyboard, but any efforts to adjust intonation were thwarted by variability in the house levels, since having the violin too loud in the mix would cause it to sound

more out of tune. Issues with ensemble balance also occurred in Snowglobe with little improvement over the tour. Balance issues in this song are caused in part by the many musical roles performers possess: both O'Connor and I play our primary instruments (guitar and violin, respectively), keyboard, and sing background vocals. Songs in which instruments are frequently switched may be challenging to mix, especially if the engineer is accustomed to instrumentations limited to guitar, bass, drums, and vocalists, or bands with unchanging performer roles. Performers' roles also changed from song to song, creating a wider range timbres and volume levels. As a result, the sound of the band varied significantly among shows because of the high amount of agency engineers possess over ensemble balance and timbre. Ideally, the band would address this through the designation of an engineer familiar with the sound of the band and the sound (mixing and EQ) for each song.

Show	Quality	Category	Comment
5/11 Lakewood	Bad	Intonation	Unsure, of monitoring and if matching the vocals/keyboard
5/11 Lakewood	Good	Octaver effect	Routing for octaver
5/12 Indianapolis	Good	Intonation	octaver intonation
5/12 Indianapolis	Good	Balance	tremolo mixed well
5/12 Indianapolis	Good	Intonation	Non-octaver intonation good, noted the smaller stage.
5/13 Chicago	Good	Intonation	Octaver intonation
5/13 Chicago	Bad	Intonation	Sharp in relation to bass.
5/13 Chicago	Bad	Balance	Keyboard too soft
5/13 Chicago	Bad	Balance	Voice too low
5/15 St. Louis	Bad	Balance	Violin mixed too high
5/15 St. Louis	Bad	Balance	Can't hear violin
5/15 St. Louis	Bad	Timbre	Octaver doesn't sound great. This may also have been microphone placement.
5/15 St. Louis	Good	Intonation	Violin with octaver in tune and mixed well
5/16 OKC	Bad	Intonation	Violin is sharp
5/16 OKC	Bad	Timbre	Definitely getting rid of octaver.after this one.
5/17 Springfield	Bad	Intonation	Increasingly more sharp over set.
5/18 Nashville	Bad	Intonation	Intonation sharp, but an improvement from last set.
5/18 Nashville	Bad	Balance	Too loud in mix
5/19 Columbus	Bad	Intonation	Intonation sharp
5/19 Columbus	Good	Intonation	Intonation better after consciously making pitches lower
5/19 Columbus	Bad	Balance	Violin effects do not blend
5/19 Columbus	Bad	Balance	Inconsistent keyboard level

Figure 24. Overview of performance issues in “Snowglobe.”

Developing solutions to the above scenarios involved a mixture of adjusting to playing, managing equipment parameters, choosing what to attend to in performance, and communicating with the engineer. Monitoring equipment, particularly headphone monitoring, has no precedent in acoustic contexts. OWEL's context is complicated further by partial in-ear use; only Sakong and I use in-ear monitors. To improve my ability to hear the other instruments and vocalists in OWEL, I partially remove one earphone to hear sound from monitor speakers and amplifiers on stage. With the right equipment and engineers to operate it, a performer may conceivably hear as much or as little as they want of any amplified element on stage. While this makes it easier to hear and blend with other instruments on stage, customized monitoring might also exacerbate the lack of connection to the sound played in the house.

The lack of control over ensemble balance in performance is also unique to heavily amplified contexts; the customization of stage and house mixes significantly impacts performance. Effective communication with the engineer about what the band wants to hear and how they want to be heard by the audience is essential, especially as engineers change with the venue. Working with different engineers is common in live popular music, when resources are often not available to hire a dedicated engineer. To navigate this, Sakong and other members of the band give specific instructions regarding their preferences for monitoring during sound checks or line checks, focusing on levels and on reverberation applied by the engineer to the entire band.

The adjustments to violin intonation in Weather Report were made without considering the surrounding context, and decisions about what to attend to in performance were often informed by review of recordings after performance, rather than in-the-moment evaluation of the sound on stage. Disregarding contexts, particularly for intonation, is not a practice I have utilized in acoustic contexts. In contrast, I have always been encouraged to listen to the context and match specific instrument levels, timbres, and pitch choices, or discuss with colleagues if I had something different in mind. Because violinists often play pitches in the higher registers within a harmony, they are almost always expected to defer to lower, foundational pitches, and remain flexible. Adopting the opposite practice, though not ideal, is necessary in amplified contexts with monitoring, due to the disembodiment of sound from its human source and the electronic mediation inherent in acting as a cyborg performer.

Adjustments differ depending on every monitoring scenario; in an ideal scenario everyone hears well, and choosing correct pitches, timbres, and dynamic levels feels as it would in an acoustic context. The final show in Columbus, which had a long sound check with the opportunity to check individual levels in context, felt closest to this. In the majority of contexts, there is not enough time for checking sound, and monitoring is not ideal. This reality influenced equipment choices and practices employed.

### Impact in High-Agency Contexts

In OWEL, posthuman musical contexts created a complex network of musical relationships, but not quite an “active-reactive, reciprocal relationship.” In contrast to the situation created through reverberation and live processing in *Nymphéa* and *Frises*, broad adjustments to playing were made to suit amplification, and monitoring did impact performance. This relationship, however, is still not comparable to that with an accompanist or chamber music partner in acoustic music. Therefore, this dynamic is still coexistence, in which performers interact with equipment on a broader timeframe as equipment is adjusted, but minimally attend to equipment in performance past adjusting rudimentary settings like volume or toggling effects. This finding suggests that coexistence, used in this study to suggest a non-interactive relationship, encompasses a range of activity in performance.

Performers’ playing is mediated by the live electronics and engineer in both contexts, creating a similar network of interaction. While the basic points remain the same, the type and amount of agency possible at these points differs in OWEL, due to the increased complexity of electronics used, the greater control possessed by the engineer, and the diversity of amplification and effects used throughout the ensemble. In the following section, I will discuss the posthuman’s impact on the performer’s sense of control from performance to performance, and their sense of space, timbre, and ensemble balance. The impact described may be comparable to other heavily amplified contexts, but since groups often differ

significantly in equipment used and musical content, approaches in this study may not be directly applicable to other scenarios.

The distribution of agency within this context must be navigated through a combination of communication and equipment choices. The mutation made through electronic elements on stage is controlled by performers, but the engineer controls the balance and timbre of the group overall and may supersede decisions made regarding tone quality and loudness. Because there are many points at which agency might be exercised and canceled out by other actors, awareness of points at which actions are most effective in influencing the final sound is valuable. Monitoring in a distributed context helps performers navigate a distributed system and remain aware of their surroundings in a heavily amplified context, and allows them to be informed of the group context while making decisions about intonation, articulation, timbre, and dynamics.

Two types of monitoring options are possible to reduce a sense of disconnect. Wedge speakers, the most common option, are controlled by the engineer. Because they are directional and only provide sound reliably to the area directly in front of them, wedge speakers cause feedback if too loud, especially in contexts incorporating hollow-bodied instruments and microphones. In-ear monitoring, in which sound is played back through headphones, is a quieter, but more expensive option not usually provided by venues. Mixes vary based on preferences and equipment available.

In OWEL, performers use a combination of in-ear monitoring and wedge

speaker monitoring. In-ear monitors in this context are used by myself and Sakong, and only play back what the performer connects to the monitoring system from their electronics. Lead singer and guitarist Sakong monitors his “dry” unprocessed vocals, and I monitor my processed violin sound. We both rely on wedge monitors to hear everything else, and while we require less of our own sound in the monitors using in-ears, both voice and violin are in the wedge monitor mix for other members. The voice and violin levels used are too low to rely on them exclusively in this scenario, especially in very loud portions of the set. Practices for making it possible to hear the wedge speakers differ among the ensemble. Since my in-ears only provide partial sound isolation, it is possible to hear the monitor speakers. I often pull out one of my earbuds slightly to hear more clearly if I require vocal monitoring, which is not in my in-ear monitor mix. Sakong and other vocalists perform with only one earphone on (though this practice leads to hearing damage and is not recommended).<sup>99</sup>

Exercising agency over monitoring as a performer is essential, whether this is done through controlling monitoring on-stage or by communicating with an engineer. While performers usually communicate with the engineer to adjust monitor levels, performers may also invest in equipment that allows them to control levels themselves. Metal band Circuitry does this; singer Joel Monet routes all instrument output through an audio interface and then to the mixing

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<sup>99</sup> The vocalist from the band Northern Faces also employs this practice. <http://northernfaces.com/>

board, at which point the engineer controls levels for the house.<sup>100</sup> Monet manages the monitor mix himself, which is sent to performers from his on-stage audio interface. Circuitry's monitoring practices are not typical. Engineers are mainly responsible for managing monitoring equipment, whether it is in-ear monitoring, or wedge speakers on stage. Specific levels for each monitor are set by the engineer. In a line check or sound check, the engineer will ask the band what they would like to hear in each monitor. Monitor mixes needed may change as stage noise increases; to work around this, it is ideal to test monitor mix within the context of a louder song from the set, and ideally multiple examples from the set. While it is possible to adjust stage sound in a set, the ease of doing so depends on the availability and willingness of the engineer; particularly where there is no monitor engineer, requests for changes may need to be made across the room to the engineer, interrupting the set.

While monitoring may mitigate disconnects between a performer's own sound due to stage loudness, a disconnect may also exist between levels on stage and in the house. Determining a house mix almost exclusively involves communicating expectations clearly and concisely to the engineer. The mix for stage and house may differ; musicians in OWEL use the hi-hat cymbal as a click track by setting it in all monitors, and also include electronic track, vocal mics, and keyboard prominently. Violin, guitars, and other drums are also mixed in lightly depending on the sound on stage. The stage mix, in contrast, has less hi-

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<sup>100</sup> "Circuitry", Accessed September 6 2018, <https://circuitryband.net/about>

hat, and an even balance of vocals, guitars, violin, and keyboard. While on stage, it is not possible to know the balance in the house. Because of this inevitable disconnect, performers are best served by arriving at a monitor mix that allows everyone in the group to play comfortably by hearing themselves and others, even if that is not necessarily how sound is designed in the house. Through the use of equipment that allows for control of timbre and monitoring, performers are able to work within contexts continually in flux.

Electronics used also affected performers' ability to be aware of and exercise agency over their perception of space. In OWEL, reverberation simulates a space's acoustic, and may be applied by the performer at their own electronics, and by the engineer at the mixing board. In heavily amplified settings, performers are not working with the space's natural acoustic, and engineers might provide reverberation in the monitors to simulate the echoes of a space. How much reverberation is included in the monitor mix depends on the engineer and performers' preferences; in the May tour, reverberation was only lightly included in both wedges and in-ear monitors.

Unlike the preset reverberation in *Nymphéa*, parameters for house reverberation in shows by OWEL are left to the discretion of the engineer. Band members gave no input regarding timbral parameters for reverberation, but could specify a general amount of "wetness," which specifies the mix of processed and unprocessed sound sent from the reverberation processing. Otherwise, engineers apply reverberation and set parameters based on their experience of the space.

The reverberation processing object used in OWEL is more customizable than that found in the works by Saariaho. Finding appropriate parameters was largely done through trial and error, learning through tutorials on YouTube, feedback from other band members, and reviewing recorded sets.<sup>101</sup> Depending on parameters used, the processing operated at the level of performers' electronics had a larger impact on performance, since it was played back through the in-ear monitoring.

The reverberation used by performers also functioned as an important timbral device; live processing's main function in OWEL was to provide timbral variety. In comparison to what is provided through the limited interface in electronics used Saariaho's music, performers have more opportunities for exercising agency over timbre due to the performer's increased control over specific parameters. Processing may also make it necessary to modify instrumental technique to suit the equipment used. Depending on the settings of the performer's electronics and the board settings created by the engineer, amplification makes it possible to hear sounds that were previously not audible in an acoustic context, including the impact noises of bow hair and fingers touching strings. Many of these normally quiet sounds are not desirable, so special care must be taken to place the bow and left hand fingers carefully. Bowing practices used in an acoustic context that cause a violin's sound to project may be too

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<sup>101</sup> KSHMR, "Lessons of KSHMR: Secret Reverb Tips," November 10, 2017, video, <https://youtu.be/ZcICh7UsPuU>; Beat Academy, "Ableton Tutorial: 3 Tips for using a Warm REVERB in your Mix.," December 7, 2016, video, <https://youtu.be/E8uFVZGyt6s>.

intense and cause clipping. Clipping may be avoided while amplified with a piezoelectric pickup by limiting the intensity of staccato articulations, and using less bow than what would be used in a acoustic setting. The noisier pickup sound also makes it preferable to play loud dynamics with faster bow speed, rather than by modifying contact point, as playing closer to the bridge while amplified creates a noisier tone quality.

Performers may still control their sound through changes at the level of the instrument by adjusting note articulations, contact point, and bow pressure used as they would in an acoustic context. In addition to this instrument-level control, agency over equalization (EQ) may be employed at the level of the performer's electronics. Adjusting parameters of the electronics is the most straightforward option; Ableton provides EQ devices that may be applied to individual channels or the complete mix sent to the engineer (Figure 25). Other live electronics devices, such as the Reverb object, also contain limited EQ settings; through adjusting the input filters, diffusion network, chorus, size, and density settings, a performer may change the timbre of the resulting sound. With no formal experience as an engineer, I relied on practical experience through trial-and-error, feedback from other engineers, and online and in-print resources to determine appropriate settings. While on tour in December, I recorded clips of my unmodified signal into Ableton and worked with the sound while in the car, using monitoring headphones to arrive at parameters to test in later sound checks.

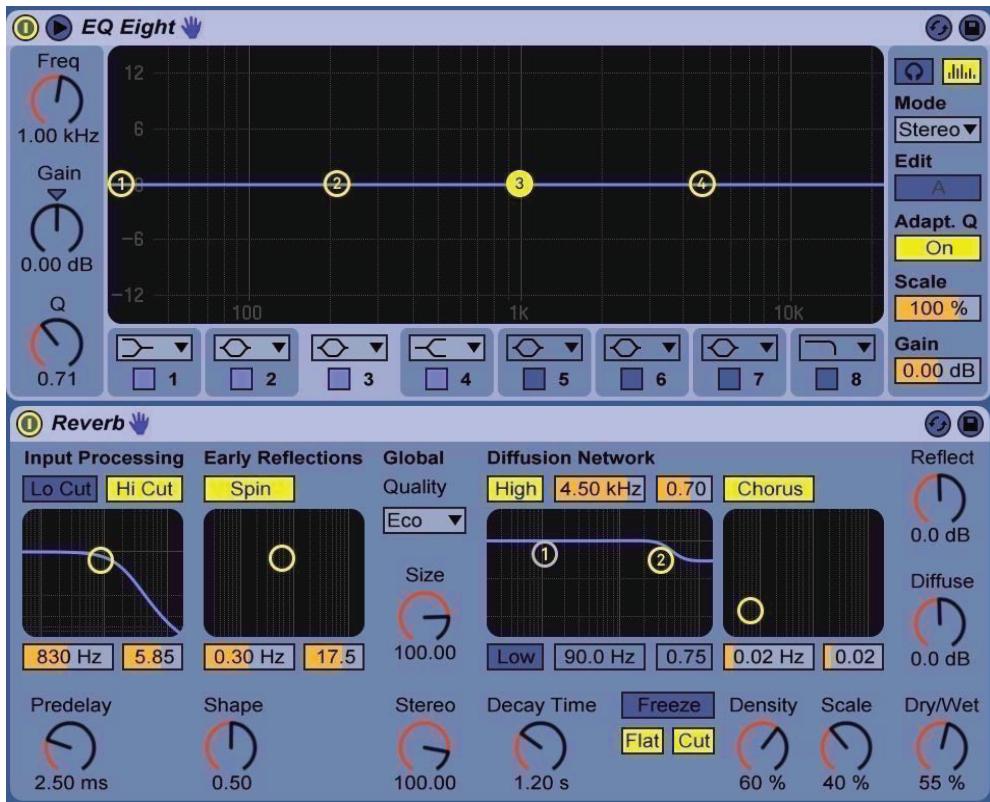


Figure 25. The EQ and Reverb objects in Ableton.

Another way to change tone quality via electronics is to adjust the physical position of the pickup, or change the pickup entirely. While the LR Baggs pickup used in OWEL is not adjustable, it is possible to position other piezoelectric pickups in different places to change the sound. Pickups like The Band may be placed closer to the left or right side of the instrument to create a “boomier” or “higher” sound, respectively (Figure 26). Fishman-style pickups, inserted into the wing of the bridge, vary in sound depending on how much the pickup element is in contact with the bridge.



Figure 26. Common pickups used in amplified settings - the ones chosen depend on the preferences of the individual player. From left to right: Headway The Band pickup, Fishman V-100 Classic Pickup, LR Baggs Violin Pickup.

The engineer at the mixing board also profoundly influences the tone quality heard by the audience. Engineers boost or cut frequencies in each performer's individual signal, and add live processing effects found within the mixer or via external devices or digital plugins. The engineer also controls the EQ settings for the monitor mix, which may negatively affect performers if a mix is uncomfortably loud, or too soft to hear.

In my work with OWEL, I have found that it is ideal to send audio with relatively “flat” EQ to most engineers. Like the members of Kronos Quartet, Cikada Quartet, and Ensemble Gelber Klang, I trust the engineer to handle EQ in a way that makes sense with the acoustics of the room and in the mix that they wish to hear. This results in a disconnect between the laptop’s output and what the audience hears. As the engineer is responsible for mixing everything on stage during the show and is usually unfamiliar with the band, members give basic directions to the engineer, and conduct a line check of instruments including all registers of the instrument and different articulations in use. With a different

engineer every day, different working styles and personalities emerge, especially as engineers work with less common instruments like violin. Some engineers have specifically asked how to EQ violin input, while other engineers were unreceptive to feedback. When able to provide advice for mixing violin, broad suggestions to cut very high frequencies and very low frequencies help reduce scratchiness and boominess, respectively. Depending on the situation, it may be more ideal to adjust EQ at the performer's electronics, or leave it to the engineer, so having the option to adjust either way is valuable. Particularly in situations with a stark disconnect between monitor and house sound, leaving the stage to check the tone quality sent to the venue hall may help inform decisions regarding EQ.

Ensemble balance in heavily amplified contexts is almost entirely determined by the engineer; acoustic instruments like violin, inaudible if unamplified, are routed through exclusively the venue's sound system. Electronic sound in works by Saariaho, in comparison, is never meant to cover the acoustic sound of instruments, giving performers on stage slightly more agency. To determine ensemble balance in these louder environments, sound checks are essential: the band almost always received a line check immediately before a set, in which levels for each instrument were determined and an excerpt of a piece was performed to test levels in context. In ideal situations such as Big Room Bar in Columbus, an extended soundcheck allowed for each instrument to test their full range of playing on stage in multiple songs, and make suggestions regarding what should be prominent in a mix.

While performers in an acoustic context might accommodate the stage's acoustic by playing louder or softer and moving closer to performers or audience members. To exercise agency over ensemble balance in an amplified context, performers may still play louder or softer as they would in an acoustic setting, but the approach to adjusting dynamics differs depending on the pickup and electronics used. A piezoelectric pickup requires a different approach to tone production: it is most effective to use more bow to create louder dynamics and avoid playing too close to the bridge, so that the signal sent to the preamplifier is not as noisy. When working with high-agency electronics, loudness is also adjusted through equipment like volume pedals, or controllers mapped to software like Ableton. In OWEL, I control volume using a single button on my Softstep foot controller configured to send MIDI continuous controller (CC) values. When the top of the button is pressed, the CC value sent increases, increasing volume, and when the bottom of the button is pressed, the CC value sent decreases, decreasing volume. The pedal displays a number that corresponds to loudness. Volume is controlled using both the pedal and adjustments at my instrument. If I do not have an opportunity to stop playing and adjust my volume using the controller, I will not use the controller and will instead adjust bow speed or contact point used.

Through my arrangement of equipment, I may exercise agency at either point on a small scale; but for arranging general dynamic level in relation to others, communication with the engineer and predetermining dynamics in

rehearsal is key. In an acoustic work, a performer will make decisions about dynamics in relation to other parts present. For example, if two parts share a melody, they will match dynamic levels. In an amplified context, matching dynamics on stage becomes more complicated, as the engineer acts as an intermediary between performers on stage through monitoring, and between performers in the house through control over levels. Because ensemble balance is largely dependent on the engineer the most effective way to determine relative volume levels is to give the engineer specific instructions about what should be more prominent or less prominent. In OWEL, Sakong gave instructions to the engineer regarding balance, emphasizing the balance of the band in relation to the prerecorded track that accompanies them. Otherwise, he lets the engineer decide what to mix higher and lower, based on a small excerpt played with track specifically composed for sound check. If there is extra time, the band plays a song that utilizes all members of the band. An engineer may have a go-to mix for guitar, bass, drums, and vocals. When non-standard instruments are incorporated, a variety of approaches exist, as is the case with EQ. Some engineers ask how to mix instruments they know less about as in St. Louis (May 14), some engineers will refer to a studio recording as they did in Nashville (May 18), and some will simply work toward a mix that intuitively sounds good to them during soundcheck. This intuition is based in a tacit understanding of how rock bands sound and is based in the engineer's experience listening to and mixing bands. An engineer with experience in one genre of amplified music (e.g. metal) may have

less knowledge about how to mix a band with more complicated textures and dynamics that vary widely within a set.

Because amplification and mixing in this context make it difficult to hear and be heard, it is difficult to respond to balance issues within the context of a performance. In OWEL, members determine in rehearsal how loud or soft members need to be in each section, and refer to that way of playing and parameters of electronics used at that moment, rather than attending to other performers' sound. While it would be more ideal to have the ability to precisely match one another, having at least a broad idea about what dynamic to play at a given point in terms of numerical volume levels on devices and physical effort within a song allows for small variations in dynamic, and comfort in knowing that the prominent parts are heard when they need to be heard. This broadly oriented approach to dynamic level is different than what is prioritized in *Nymphéa*, which frequently depends on highly individualized lines of timbrally similar material to create textures that often morph via processes that are more complex in comparison to processes in popular music.

### Networks and Agency

In OWEL, a distributed system exists in which much of the agency over performance details such as ensemble balance, timbre, and monitoring is redistributed from performers to the engineer. While performers have more control over electronics within this high-agency context, the engineer may

potentially override performers' decisions regarding volume and timbre at the mixing board. A partial loss of control over monitoring and ensemble balance may also affect performance details like intonation and articulation, as a disconnect limits a performer's ability to hear the surrounding musical context. Memos suggest that the live processing in OWEL, despite being similar in function, lead to a completely different experience from that had in works by Saariaho. Therefore, live electronic elements alone do not determine the experience that a performer has. Both human and posthuman elements create a different experience for the performer depending on the specific elements present, and the role that those elements play. Those elements collectively create a network of opportunities for interaction that differs from the network formed within *Nymphéa* and *Frises* (Figure 27).

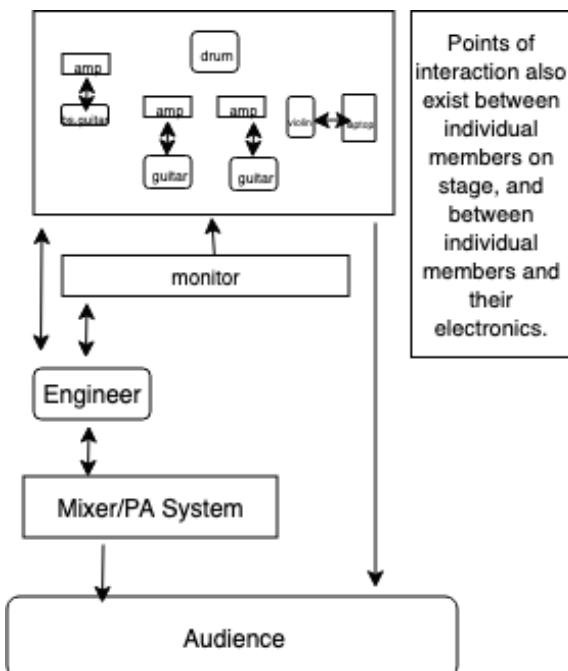


Figure 27. Model of Interaction showing points at which agency is exercised in OWEL.

Due to the increased control over electronic parameters, performers act as a cyborg, able to change and adjust electronic components as necessary to adjust to meet both musical and logistical demands of a heavily amplified ensemble. In comparison to the limited control afforded to the performer in work by Saariaho, control devices like the SoftStep or the GT-8 are extremely flexible in the way they may be incorporated into musical gestures. Performers may use the devices to dynamically shape musical gestures, particularly functions that might be mapped to expression pedal controls creating gradual change. This may include functions ranging from secondary volume control, to additional functions like increased reverberation at any given point, flexible pitch shifting, or timbral effects like wah, which boosts a narrow band of frequencies that, when the band is moved, creates a “crying” sound. Gear, as suggested by my process, is also quite interchangeable, as many different types of devices exist that provide the same functionality. This dynamism and interchangeability result in equipment use that requires more direct attention from the performer while playing, beyond simply stepping through presets. A cyborg is more likely to emerge in these high-agency contexts.

In both high-agency and low-agency contexts, multiple points exist at which a performer might exercise agency over performance details. In OWEL, a performer may adjust their loudness within an ensemble by simply playing louder as they would on a unamplified instrument, by adjusting the output of their electronics, or by communicating with the engineer. In Saariaho, a performer can

not control the electronics, and may only adjust ensemble balance at the level of their instrument or by communicating with the engineer. In works by Saariaho, performers have less control over the electronics, but are also less dependent on an engineer for finding an appropriate ensemble balance because of the relatively low level of stage noise. In OWEL, agency exercised at any point might also be superseded by points later in the network: for example, a performer adjusts volume at the level of their electronics, but an engineer always manages the performer's volume at the board. Considering the increased agency engineers possess, it makes more sense to communicate directly with them about what monitoring and balance is desired so that the band may perform comfortably, and sound like they intend to sound.

The engineer's potential impact on the set suggests the importance and indispensability of competent engineers; bands with the budget to do so hire an engineer to travel with them, so that the sound remains consistent among shows. In the May 2018 and December 2017 tours, engineers employed a wide range of practices, not surprising in a field in which many practitioners receive little formal training in live sound. A range of levels of experience emerged: some inexperienced engineers' practices were detrimental, while experienced engineers enabled band members to hear comfortably on stage and feel confident that sound was mixed appropriately. What "appropriate" mixing means varies with each band; as many of OWEL's fans have the band's recordings as their main point of reference, and backing tracks are used to replicate sounds not performed live on

stage, a mix comparable to that found in the album is ideal. With many different engineers, a range of mixes is still inevitable, even with very clear direction. If it is very important to have a specific mix, groups would need to use one or a few engineers that are familiar with the band's expectations regarding how they wish to sound.

In OWEL and other heavily amplified contexts, the task of performing parts accurately and collectively creating the band's envisioned sound requires performers to navigate a complex network of cyborg performers and continually changing venue equipment and engineers. To do this, a combination of equipment, communication, and approaches to playing that may not be utilized in an acoustic context are used. Mutation occurs throughout the environment, as amplification and live processing transform the acoustic violin into an instrument that may play loudly enough to not be covered by electric guitars, drums, keyboards, and amplified vocals. Electronics available to use in this context enable the violin to simulate many different roles within amplified settings, utilizing a unlimited array of timbres and means by which to manipulate sound. Like in Saariaho, processing and amplification exist to expand the palette of sounds available for music-making. While OWEL does not utilize any processing that challenges the listener's ability to identify the violin as such, the electronics do play a fundamental part in refining the sound so that it blends with the sound of other musicians on stage.

Given the copious options that exist in available equipment, and that

practices are necessarily influenced by equipment as interfaces and equipment behavior change, it is unlikely any coherent practice will emerge that is generalizable to heavily amplified popular music, or other high-agency posthuman contexts. Yet documented practices in OWEL have wide potential as inspiration for other amplified setups, already suggested by my application of prior experience gained from short-term amplified settings to my initial setup in OWEL. Since stringed instruments have less of a history of amplification, insight gained from documentation may allow performers to mitigate issues encountered within contexts they may be faced with, and may also lead to the development of improved equipment for amplification and processing based in the needs dictated by current practice.

## CHAPTER V

### CONCLUSION

I began my inquiry with three research questions in mind: What features of performance practice are affected by live processing in electroacoustic music? How might live processing impact how a performance tradition forms? How do tropes from the literature on the posthuman describe currently employed practices and processes in this music? I wished to address the lack of representation of performers and popular music in the discourse on electroacoustic music, and document current practice. The dearth of literature concerned with performance in contemporary electroacoustic music and the lack of representation of current popular music practice is symptomatic of how difficult it is to represent music practice in writing. But the lack of representation also arises from a lack of terminology to describe characteristics without a non-electronic precedent. The literature on posthumanism and the posthuman in music provide a new set of terms with rich potential for application to non-generative elements like live processing, as found in *Nymphéa*, *Frises*, and music in OWEL.

It is important to acknowledge again that these two contexts are very different: while they use similar non-generative effects, they come from dissimilar genres, in which music is learned and rehearsed differently. Performers of pieces by Saariaho consult notation, and individual parts are extensively prepared ahead

of time and rehearsed as a group within a relatively short period, in which electronics are incorporated mostly after musical gestures have been learned. Rehearsals with OWEL, on the other hand, occur over a longer span of time, involving minimal written references and continuous experimentation with electronics, and parts are determined, learned, and coordinated with other band members during rehearsal. Rehearsals also prioritize finding the appropriate sound for a given passage, and determining how that sound might be achieved through instrumental technique or electronics settings. In spite of these differences, both scenarios are instances within the same world, in which technology creates a staggering range of options for transformation in live performance, fundamentally shifting agency from the ensemble to new devices and engineers. Their documentation and side-by-side presentation illustrate the range of electronics used in music making, which is usually left undocumented and forgotten as technologies change. Documentation of practices with amplification and processing by stringed instruments may lead to a more cohesive set of conventions later, but at the moment, practices are varied and continually changing.

The two scenarios described in depth provide “snapshots” of what is possible within electroacoustic music; even its partial representation strongly suggests that electronics have changed music performance, through new means by which to modify sound and new distributions of agency, and the consequent development of new practices. Processing has infinite potential to transform an

instrument's timbre or perceived surroundings. Effects like reverberation, EQ, harmonization, and modulation effects adapt performers' instruments to previously unfeasible settings like OWEL's heavily amplified environment, or to less than ideal spaces such as the acoustically dry performance space Saariaho worked with at Sibelius Academy.<sup>102</sup> Delay and harmonization are used to create virtually enriched ensemble textures in *Nymphéa* and *Frises*, including the dense polyphonic and micropolyphonic textures in *Nymphéa*. In *Frises*, delay and reverberation create sustained backgrounds of sound, and also polyphonic textures built from repetition of the violinist's part.

New interfaces make it possible to control mutation and transformation of instrumental sound. A control device like the SoftStep used in OWEL may be mapped to any device parameter within Ableton. Foot controllers suit violinists unable to use their hands to operate potentiometers and faders, but many interfaces exist, with different functions and potential for customization. Determining which controller is best depends on performer preference and suitability for a particular task. A piece featuring many individually triggered samples, for example, would benefit from a device with many buttons, but a piece that requires gradual changes in parameters might be best served by a device with faders and potentiometers (Figure 28).

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<sup>102</sup> Nadia Sirota, "Kaija Saariaho, Ears Open," *New Sounds*, <https://www.newsounds.org/story/kaija-saariaho-mtc-ears-open/>



Figure 28. Types of MIDI control devices: Akai MPD 218 (with potentiometers and pads), Korg NanoKontrol 2 (with potentiometers and faders).

Interface design significantly impacts practice. Though electronics are a significant identifying characteristic of both *Nymphéa* and *Frises*, performers have limited control over the electronics, only able to trigger changes with a single foot pedal. The limited interface contrasts with the richer interface used in OWEL, in which more attention is given to adjusting electronics parameters. As electronics were determined in OWEL, more in-the-moment customizability was arranged using laptop electronics. Interfaces in high-agency settings enable performers to manage parameters and exercise agency over their sound while on stage. While the limited interface in Saariaho restricts performers to adjusting their playing to change their timbre and dynamic level, interfaces used in OWEL allow for both adjustment at the level of instruments and electronics through Ableton. Even in *Nymphéa* and *Frises*, in which agency is limited to the instrument, accommodations are made to suit microphones and processing. In both contexts, actions on stage might be superseded by the engineer, or by processing not controlled by the performer. A new approach to performance, therefore, is necessary, in which performers consider how their sound is mediated,

and determine points at which agency may be exercised effectively. Performers may need to make decisions regarding how volume, equalization, and monitoring is managed, all of which significantly impact experience on stage and the resulting sound heard by an audience. Networks of interaction may be used to determine a context's individual distribution of agency. (Figure 29).

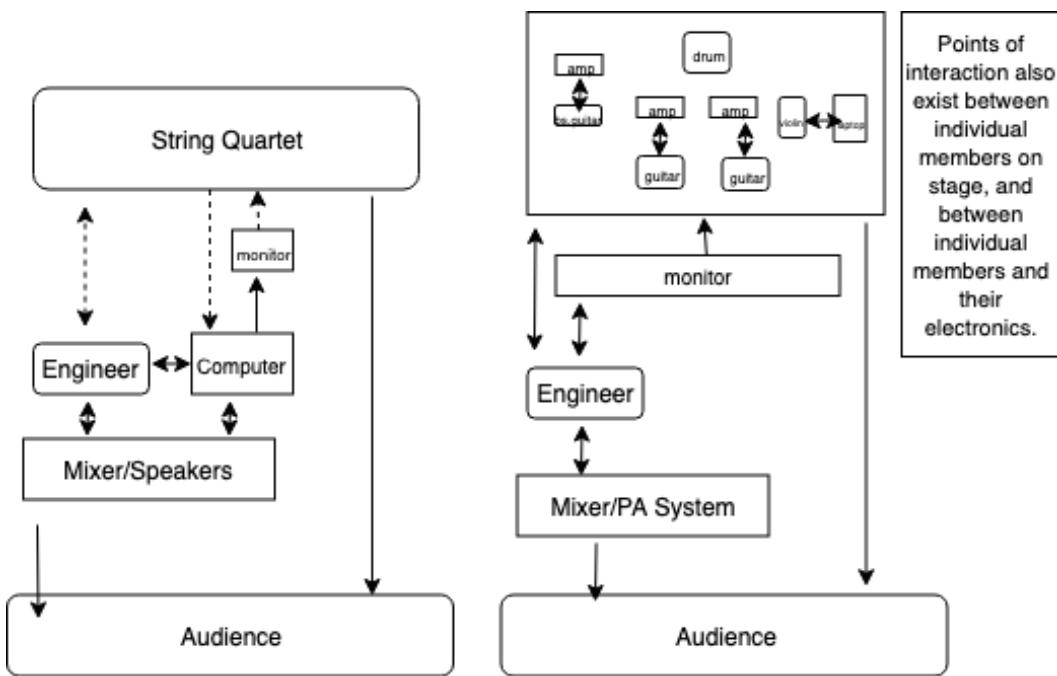


Figure 29. Networks of interaction for *Nymphéa* and OWEL.

As electroacoustic music assumes many forms stylistically and in practice, it is unlikely that a coherent single set of performance conventions will emerge, if the development of a performance tradition suggests that it is necessary to utilize one manner of playing or way of realizing notation. Both contemporary classical and popular music are too diverse to accommodate broad generalizations. Development of cohesive practice is further confounded by the presence of popular music like OWEL, in which sophisticated practices emerge yet no

notation is consulted. Instead of one singular approach, many different manners of acting within posthuman contexts may develop and exist concurrently; performers could consult this multivalent practice tradition and choose actions according to their skill sets and resources available to them, while keeping in mind that other practices may exist as options.

### Emergent Themes

While it is unlikely that a cohesive set of generalizable conventions will form, three broad takeaways emerge from this study that provide a foundation through which to discuss practice, framing future study. They include the viability of tropes as descriptive terminology, customizability and adaptability as main features of practice, and the re-conception of practice as network-oriented rather than realization-oriented. These general themes may focus future discourse, especially as technology continues to develop and diversify rapidly.

Posthuman tropes used in the study were initially very broad and used flexibly; their use in describing features and processes in *Nymphéa*, *Frises*, and OWEL suggest that they provide singular terms for which no appropriate name existed previously, but more refinement and specification is needed. My own studies here are a beginning to this refinement, providing further clarity regarding the meaning of terms, and setting a precedent for later use. Further organization also resulted from the tropes' application, as the terms were categorized into features and processes, and subcategories were created for broad terms like

hybridity and mutation (Figure 30). Continued use of tropes and concepts will result in further clarification, and more subcategories may be developed as needed to suit current practice.

Trope	Definition	Subsets/Distinctions Made
Mutation	Process. Input of a performer is modified.	Mutation of Scale Mutation of Identity Mutation of Function
Hybridity	Feature. The commingling of acoustic and electronic sound.	Ensemble Hybridity Timbral Hybridity
Cyborg	Feature. The commingling of acoustic and electronic sound, through use of additional control devices.	Distinguished from hybridity, interface driven.
Simulation	Process. Technology mimics a phenomenon not present in the space.	
Virtuality	Feature. The impression of a presence or environment not physically in the space.	

Figure 30. Posthuman tropes, definitions, and subsets and distinctions made over the course of study.

A sense of customizability and adaptability permeates current practices in electroacoustic music across genres. Many options exist for amplification and effects, and previously static factors like room acoustic are now changeable. Elements like tone quality, ensemble balance, and loudness may also be managed in new ways. Certain reverberation allows performers to change the type of reverberation used by adjusting parameters like room size, early reflections, decay time, and delay time. Performers, based on preference, may opt for different

degrees of interface customization. With reverberation, a richer interface may provide control over the aforementioned parameters, but simpler interfaces may package certain configurations under one setting, such as “hall” or “spring” reverberation, limiting choice. A performer may choose a simpler interface if access to those parameters is not a priority, especially if that access necessitates sacrifices elsewhere, such as in sound quality, latency, or time spent adjusting more important details. Even if performers do not have access to specific parameters as in the case with predetermined electronics in *Nymphéa* and *Frises*, microphones and audio interfaces may be chosen according to a performer or engineer’s preference, and performers might consider how the input they send affects the computer’s output.

The potential for customizability is greatest in high-agency contexts like OWEL, in which many solutions are possible for managing balance, monitoring, and tone quality. Effects are not necessarily limited to their named function, and may have multiple functions in a context; reverberation simulates a space, but is frequently also utilized as a way to mutate tone quality so that instrumental sound is compatible with its’ surroundings. Amplification and effects may also behave differently in response to specific types of input; violin input, for example, often causes pedals to respond very differently than they might respond to guitar input. In low-agency contexts, much of this customization is determined by the engineer, but exists nonetheless. In all cases, one or more human actors within the context must be familiar with the electronics and able to manage parameters. As

adaptability and customization emerge as central characteristics of practice, it is evident that one single realization with regard to technology is unlikely, but also impractical.

The most prominent theme emerging from documented practices is the new importance of networks in performance. Distributed cognition causes performers to have less agency over their sound, as details of performance are managed by the engineer. A key task includes regaining enough agency so that a performer may be comfortable on stage. Agency is redistributed to the performer through monitoring, the incorporation of control devices, or by learning to communicate with individuals mediating the sound. As suggested by adjustments made in OWEL, communication with the engineer is a vital way to exercise agency. Performers may be best served by reorienting practice around the identification of and navigation within networks created by human and electronic elements. Realization of individual parts within these networks is only a part of a performer's creative process.

In addition to performing an individual part accurately, performers and engineers are now responsible for attending to the larger environment. Engineers are increasingly essential within these contexts, functioning as both listener and contributor. In contemporary classical contexts in which electronics are often their own discrete part, engineers manage and may sometimes operate electronics. In popular and classical contexts alike, engineers manage the balance of electronic and instrumental sound. As the only individual within either context possessing a

dual role, they may act as a valuable source of feedback, or a means by which to enhance the group's sound through precise management of levels and timbres. In the scenarios studied, engineers spent only minimal time working with the performing ensemble. While this dissertation has avoided comparisons to human-only scenarios, last-minute incorporation of engineers is analogous in many ways to a violinist meeting for one rehearsal with a collaborative pianist prior to a performance, except the engineer also has control over the violinist's dynamic, tone quality, and occasionally, their ability to hear themselves. A network-oriented approach might consider the relationship between ensemble and engineer as more collaborative, in which they both jointly arrive at an agreement regarding how instruments will be mixed over a longer span of time.

### Future Study

Studying additional posthuman settings would refine tropes further and incorporate tropes not used so far, particularly if future studies addressed the impact of electronics different from those addressed here, including generative electronics, or those using control devices other than foot-controlled pedals. As practice is not determined by only one practitioner, terminology should not be determined by the perspective of just one person; like the general literature on the posthuman, the discussion is more likely to reflect current practice if it too remains multifaceted and in flux. An in-depth case study approach taken here would serve to highlight the idiosyncrasies of practice caused by a performer's

musical preferences, equipment choices, and their surroundings, but data collected en masse through the use of surveys would also provide valuable insight.

The following examples, all proposals for how tropes might be applied in the future, illustrate the breadth of potential in music incorporating technology. Encoding, a trope not used in this study, indicates conversion from one form to another, and could include projects in which musical gestures are converted to phenomena other than sound, or through which a non-musical action is converted to music. The Kosmologym project in Copenhagen included a component called “The Algorithmic Animal,” in which a musical instrument’s activity was determined via one participant’s heartbeat, and manipulation by four other participants. The periodicity of a heartbeat, in this case, was encoded into musical and visual information.<sup>103</sup> Another example incorporating this is the project “Force Feedback,” a group in which I collaborate with sound artist and software engineer Ranjit Bhatnagar and pianist Kathleen Supové. Devices will be created and used to hinder Kathleen’s and my ability to play our instruments. Force used as we play while encumbered by objects like weights will be encoded as visual or additional aural output, through programming determined by Bhatnagar. The information created by our movement may also be used to mutate the sound of our instruments if translated to live processing. The correlation between our physical action and the resulting converted output may also be discussed through the disembodiment trope.

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<sup>103</sup> Kosmologym, YouTube, accessed February 13, 2019, <https://youtu.be/-8wSIQbdULw?t=47>.

The programming trope could be incorporated into music-making as a specific type of encoding in which performance gestures construct a basis for tasks by a computer or group of individuals. The piece “Zero Waste” for sight-reading pianist and computer by Nick Didkovsky is an example of the performer programming their next music for themselves in real-time, through their sight-reading errors. Gestures by the performer, in this case, sight-read material for piano, are reincorporated into a set of instructions for the performer, as the pianist’s playing is transcribed and displayed for the pianist to read again.<sup>104</sup> In live coding, the act of programming itself is made into performance. Using live coding environments like Sonic Pi or TidalCycles, performers write code that sequences and manipulates sound in real-time, often featured at events like “algoraves,” in which live visualizations or the code itself are displayed as accompaniment to the resulting music.<sup>105</sup> Tropes such as control, transcendence, communication, infection, regeneration, and simulation may also be applied to future scenarios.

Documenting practices in other projects may also illuminate new ways in which concepts from the posthuman may be applied as descriptive tools. Audio engineer and sound artist Daniel Neumann organized a modular collaboration in May 2017 at Knockdown Center in Ridgewood, Queens, to develop a piece based on sonic exchange between individual performers, in which none of the

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<sup>104</sup> Zero Waste, performed by Kathleen Supové <https://youtu.be/-8wSIQbdULw?t=47>

<sup>105</sup> Peter Kirn, “Inside the live coding algorave movement, and what it says about music” <http://cdm.link/2018/05/inside-the-livecoding-algorave-movement-and-what-it-says-about-music/>

participants possessed direct agency over their own output.<sup>106</sup> Performers were part of a complex network, consisting of three groups; each group possessed their own quadraphonic set of speakers, and each performer chose a role to play in the context. Performers could choose from generating material (PLAY), which I did, capturing and manipulating material (CAPTURE), or passing material to another group (PASS). Performers in the PLAY role have almost no control over what they sound like, as their sound is either manipulated by a musician in the CAPTURE role, or routed another group by a musician in the PASS role (Figure 31).

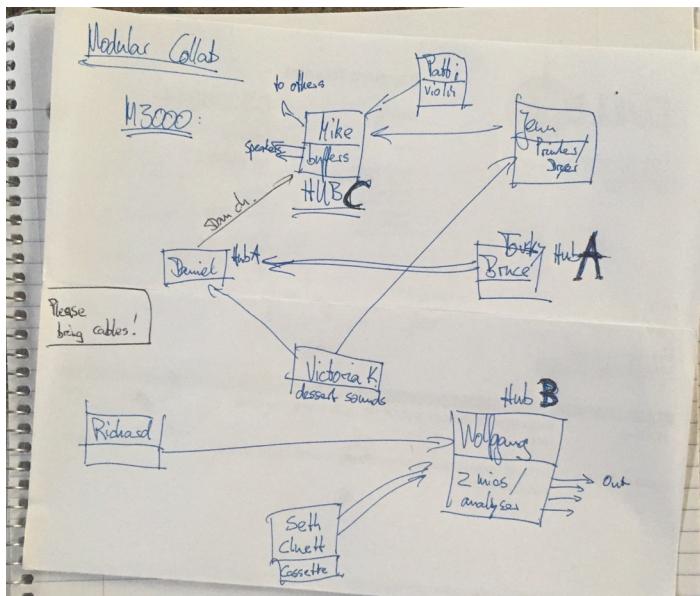


Figure 31. Modular Collaboration routing diagram, designed after rehearsal in May 2017.

Performers were disembodied from their sound as material was passed among groups, which were located in different corners of the space. The resulting

<sup>106</sup> Daniel Neumann, “CT::SWAM: [5] A Spatial Sound Session for the 5th Anniversary,” Contemporary Temporary:: Sound Works and Music, last modified May 25, 2017, <https://ctswam.org/2017/05/25/ctswam-5-a-spatial-sound-session-for-the-5th-anniversary/>

experience for both performers and listeners varied based on location in the space and the decisions of the other collaborators; how a network of interaction might be articulated in this context would itself be a substantial question to address. The effect of complex spatialization on performer and audience perceptions of disembodiment would also be a rich starting point for discussion.

The cyborg trope, currently framed through this study as a mixture of acoustic and electronic sound determined specifically through the use of external devices and interfaces, especially merits further study due to the diversity found in available interfaces. Even subtle differences, such as the incorporation of a pressure-sensitive volume control versus a more “standard” expression pedal control significantly impact over the performer’s experience. Discussing external devices other than foot controllers would enrich the trope’s meaning, particularly by noting differences in experiences resulting from interface choices. Many types of interfaces are already in use. Violist Trevor New incorporates the Myo armband, which detects electrical signals gathered from muscle movement; New maps the device’s output to parameters in Ableton and creates musical gestures through precise movements of his arm.<sup>107</sup> The JACK Quartet, through collaborations with composers and neuroscientists at University of Washington’s DXARTS program, uses the input of an electroencephalogram (EEG) to integrate brain and body signals into performance.<sup>108</sup> Some starting points for future

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<sup>107</sup> Trevor New, “MYO Armband - controlling sound through movement,” February 5, 2019, video, 22:14, <https://youtu.be/PXuIaFit5K0>

<sup>108</sup> “Meany Center for the Performing Arts: Jack Quartet,” accessed February 14, 2019, <https://meanycenter.org/jack-quartet>

discussion of the cyborg trope might include the differences in practice resulting from interfaces with controls seamlessly integrated into a performer's natural movement, or discussions of effective interface design for string performers.

The integral role of the engineer within posthuman musical contexts may be described more through the tropes of distributed cognition, feedback loops, virtuality and simulation (particularly as they utilize mixing and spatialization), and disembodiment. Their presence and the use of live processing and sampling impact which features of performance practice are prioritized, as suggested by my study, but also may have a broader impact on how virtuosity and "accurate" performance are perceived in the long run, as live performance depends increasingly on multiple contributions within a network, rather than the decisions of a single performer.

Technology's impact on music-making has been wide ranging, impacting diversity within genres, accessibility, and practices developed. Amplification, in particular, enables instrumentalists to perform in venues not ideal for acoustic instruments, and have more timbral options, as the need to create a loud sound is deprioritized. Live processing effects transform the performer's sound, leading to new timbral and ensemble combinations, and a more network-oriented approach to music-making. Descriptions of practice need continued development to build a foundation, which might not lead to one cohesive tradition, but rather a set of practices in which many solutions may exist. This collection of methods to work within a context incorporating technology should remain in flux as new devices

and practices are developed, and serve as a resource through which future practices might be informed.

## BIBLIOGRAPHY

- Andersen, Ole-Einar. Trondheim kammermusikk festival. “Interview with the Festival Composer: Kaija Saariaho.” Accessed October 17, 2015.  
<http://www.kamfest.no/en-GB/Nyheter/interview+with+the+festival+composer+kaija+saariaho.html>.
- Anderson, Julian and Kaija Saariaho. “Seductive Solitary. Julian Anderson Introduces the Work of Kaija Saariaho.” *The Musical Times* 133 (1992), no. 1798: 616-619.
- Appleton, Jon H., Ronald Perera, and Otto Luening. *The Development and Practice of Electronic Music*. Englewood Cliffs: Prentice-Hall, 1975.
- Auner, Joseph. “Sing it for me: Posthuman Ventriloquism in Recent Popular Music.” *Journal of the Royal Music Association* 128, no. 1 (2003): 98-122.
- Auslander, Philip. *Liveness: Performance in a Mediatized Culture*. New York: Routledge, 2008.
- Badmington, Neil, editor. *Posthumanism*. London: Palgrave, 2000.
- Bassingthwaite, Sarah Louise. “Electroacoustic Music for Flute.” DMA diss., University of Washington, 2002.
- Bennett, H. Stith. *On Becoming a Rock Musician*. New York: Columbia University Press, 2017.
- Boulez, Pierre. “Creating the Spirit - Pierre Boulez.” in *Composer to Composer: Conversations about Contemporary Music*, edited by Andrew Ford, Australia: Allen and Unwin, 1993.
- Blum, David. *The Art of Quartet Playing: The Guarneri Quartet in Conversation with David Blum*. New York: Alfred A. Knopf, 1986.
- Bowen, José Antonio. “Performance Practice versus Performance Analysis: Why Should Performers Study Performance.” *Performance Practice Review* 9 (1996), no. 1, Article 3. DOI:10.5642/perfpr.199609.01.03.

- Brant, Henry. "Space as an Essential Aspect of Musical Composition." In *Contemporary Composers on Contemporary Music*, edited by Elliott Schwartz, and Barney Childs, 221-242. New York: Da Capo Press, 1978.
- Brett, J. Thomas. "Minds and Machines: Creativity, Technology, and the Posthuman in Electronic Musical Idioms." PhD diss., New York University, 2006.
- Brinkmann, Svend. "Unstructured and Semi-Structured Interviewing." In *The Oxford Handbook of Qualitative Research* (New York: Oxford University Press, 2014), 277-299.
- Bryant, Anthony, and Kathy Charmaz. *The SAGE Handbook of Grounded Theory*. London: SAGE Publications, 2007.
- Bullock, Jamie, et al. "Live Electronics in Practice: Approaches to Training Professional Performers." *Organised Sound* 18 (2013), no. 2: 170-177.
- Burton, Justin Adams. *Posthuman Rap*. New York: Oxford University Press, 2017.
- Chadabe, Joel. *Electric Sound: The Past and Promise of Electroacoustic Music*. New Jersey: Prentice-Hall, 1997.
- Charmaz, Kathy. *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. London: SAGE Publications, 2006.
- Collins, Nick, Margaret Schedel, and Scott Wilson. *Electronic Music*. New York: Cambridge University Press, 2013.
- Corbin, Juliet, and Anselm Strauss. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. Los Angeles: SAGE Publications, 2008.
- Davis-Von Atta, Taylor, and Daniel Medin, eds. "Kaija Saariaho, Stig Saeterbakken, Can Xue." Special Issue, *Music and Literature* 5, 2014.
- Ding, Shiau-uen. "Developing a rhythmic performance practice in music for piano and tape," *Organised Sound* 11 (2006) 255-272.
- Ding, Shiau-uen. "Sitting at the Piano, Cradled by Speakers: Developing a Rhythmic Performance Practice in Music for Piano and Tape." DMA diss., University of Cincinnati, 2007.

- Emmerson, Simon. "Acoustic/electroacoustic: The Relationship with Instruments." *Journal of New Music Research* 27 (1998), nos. 1-2: 146-164.
- Emmerson, Simon. *The Language of Electroacoustic Music*. New York: Harwood Academic Publishers, 1986.
- "Expressing Personality in New Works: Kaija Saariaho and Anssi Kartunnen Workshop." YouTube video, 6:48. October 16, 2012.  
<https://youtu.be/FRp5nAP5P1s>
- Ford, Andrew. "Just a Composer - Kaija Saariaho." In *Composer to Composer, Conversations about Contemporary Music*. Australia: Allen and Unwin, 1993.
- Glaser, Barney, and Anselm Strauss. *The Discovery of Grounded Theory; Strategies for Qualitative Research*. Chicago: Aldine Publishing Co., 1967.
- Griffiths, Paul. "Since 1940." In *Performance Practice: Music after 1600*, edited by Stanley Sadie and Howard Mayer Brown, 483-491. New York: W.W. Norton and Company, 1989.
- Harrington, David. "The Blossom from the Darkness: Reflections on Kaija Saariaho's *Nymphéa*." *Music and Literature* 5 (2014): 106-107.
- Harvey, Jonathan. *In Quest of Spirit: Thoughts on Music*. Berkeley: University of California Press, 1999.
- Havelock, Eric Alfred. *Origins of Western Literacy*. Toronto: Ontario Institute for Studies in Education, 1978.
- Havelock, Eric Alfred. *Preface to Plato*. Cambridge: Harvard University Press, 1963.
- Havelock, Eric Alfred. *The Muse Learns to Write: Reflections on Orality and Literacy from Antiquity to the Present*. New Haven: Yale University Press, 1986.
- Hayles, Katherine. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: University of Chicago Press, 1999.
- Hoffman, Elizabeth. "On Performing Electroacoustic Musics: A Non-Idiomatic Case Study for Adorno's Theory of Musical Reproduction." *Organised Sound* 18 (2013), no. 1: 60-70.

- Howell, Tim. "Kaija Saariaho - The French Connection." In *After Sibelius: Studies in Finnish Music*, 203-230. Burlington: Ashgate Publishing Company, 2006.
- Howell, Tim, Jon Hargreaves and Michael Rofe, eds. *Kaija Saariaho: Visions, Narratives, Dialogues*. Burlington: Ashgate, 2011.
- Ionarts. "Interview with Kaija Saariaho." Last modified December 1, 2012. <http://ionarts.blogspot.com/2012/12/interview-with-kaija-saariaho.html>
- "Kaija Saariaho and Magnus Lindberg interviewed about working in New York." YouTube video, 4:21. May 5, 2012. <https://youtu.be/iBHW9IN1q-s>
- "Kaija Saariaho interviewed before her 60th birthday." YouTube video, 4:54. October 12, 2012. <https://youtu.be/0Rv7jBMw3Io>
- "Kaija Saariaho on Composing Using a Computer in the Past." YouTube video, 2:02. February 24, 2012. <https://youtu.be/nKlcC4YrrY0>
- Kellogg, Virginia K. "A New Repertoire: Music for Solo Violin and Tape." DMA diss., University of Rochester, Eastman School of Music, 1975.
- Kimura, Mari. "Creative Process and Performance Practice of Interactive Computer Music: A Performer's Tale." *Organised Sound* 8 (2003), 289-296.
- Kimura, Mari. "Performance Practice in Computer Music." *Computer Music Journal* 19 (1995), no. 1: 64-75.
- Klein, Julieanne. "Live and Interactive Electronic Vocal Compositions: Trends and Techniques for the Art of Performance." DM diss., McGill University, 2007.
- Kuijken, Barthold. *The Notation is Not the Music: Reflections on Early Music Practice and Performance*. Bloomington: Indiana University Press, 2013
- Mahon, Peter. *Posthumanism: A Guide for the Perplexed*. New York: Bloomsbury Academic, 2017.
- Manning, Peter. *Electronic and Computer Music*. Revised and Expanded Edition. New York: Oxford University Press, 2004.
- Macdonald, Alistair. "Performance Practice in the Presentation of Electroacoustic Music." *Computer Music Journal* 19 (1995): 88-92.

Magnusson, Eva. *Doing Interview-Based Qualitative Research: A Learner's Guide*. Cambridge: Cambridge University Press, 2015.

Mahon, Peter. *Posthumanism: A Guide for the Perplexed*. New York: Bloomsbury Academic, 2017.

Martin, Robert. "The Quartets in Performance: A Player's Perspective." In *The Beethoven Quartet Companion*, edited by Robert S. Winter and Robert L. Martin (Berkeley: University of California Press, 1994), 111-142.

McNutt, Elizabeth. "Performing Electroacoustic Music: A Wider View of Interactivity." *Organised Sound* 8 (2003): 297-304.

McNutt, Elizabeth. "*pipe wrench*: A Recording of Music for Flute and Computer." DMA diss., University of California, San Diego, 2000.

Moisala, Pirkko. *Kaija Saariaho*. Chicago: University of Illinois Press, 2009.

Montanaro, Larisa. "A Singer's Guide for Performing Works for Voice and Electronics." DMA diss., University of Texas at Austin, 2004.

Morrill, Dexter. "Loudspeakers and Performers: Some Problems and Proposals." *Computer Music Journal* 5 (1981): 25-29.

Nonken, Marilyn. *The Spectral Piano: from Liszt, Scriabin, and Debussy to the Digital Age*. New York: Cambridge University Press, 2014.

Ong, Walter. *Orality and Literacy: 30th Anniversary Edition*. New York: Routledge, 2012.

Pace, Ian. "Notation, Time and the Performer's Relationship to the Score in Contemporary Music." In *Unfolding Time*, edited by Darla Crispin, 149-191. Leuven: Leuven University Press, 2009.

Perea, Andrew Rafael. "Electro-Acoustic Music: An Historical Overview, with an In-Depth Study of Preparatory Techniques for Mario Davidovsky's Synchronisms No. 9 for Violin and Tape." DMA diss., University of Texas at Austin, 1998.

Parry, Milman. *The Making of Homeric Verse: The Collected Papers of Milman Parry*. Oxford: Clarendon Press, 1971.

“Performing with Electronics: Kaija Saariaho and Anssi Kartunen Workshop.”  
YouTube video, 5:08. October 16, 2012.  
<https://youtu.be/4RxXcQAGWWM>

Pestova, Xenia. “Models of Interaction in Works for Piano and Live Electronics.”  
DM diss., McGill University, 2008.

Pestova, Xenia. “Models of Interaction: Performance Strategies in Works for  
Piano and Live Electronics.” *Journal of Music, Technology and Education*  
2 (2009): 113-126.

Porter, James. “The Old, the New and the Postmodern: Kronos and the  
Transformation of the String Quartet.” *Altes im Neuen: Festschrift  
Theodor Göllner zum 65. Geburtstag*, edited by Bernd Edelmann and  
Manfred Hermann Schmidt, 424. Germany: Hans Schnieder, 1995.

Riikonen, Tania. “Shaken or Stirred - Virtual Reverberation Spaces and  
Transformative Gender Identites in Kaija Saariaho’s *NoaNoa* (1992) for  
Flute and Electronics.” *Organised Sound* 8 (April 2003), No. 1: 109-115.

Rodgers, Tara. *Pink Noises: Women on Electronic Music and Sound*. London:  
Duke University Press, 2010.

Rofe, Michael. “Capturing Time and Giving it Form: *Nymphéa*.” In *Kaija  
Saariaho: Visions, Narratives, Dialogues*, edited by Tim Howell, Jon  
Hargreaves, and Michael Rofe, 81-105. Burlington: Ashgate Publishing  
Company, 2011.

Saariaho, Kaija. “Timbre and Harmony: Interpolations of Timbral Structures.”  
*Contemporary Music Review* 2 (1987), no. 1: 93-133.

Saariaho, Kaija. “Meet the Composer: Kaija Saariaho: Ears Open” By Nadia  
Sirota. *WQXR* audio interview. July 30, 2015.  
<http://www.wqxr.org/#/story/kaija-saariaho-mtc-ears-open/>

Saariaho, Kaija. *Nymphéa*. Copenhagen: Edition Wilhelm Hansen, 1987.

Saldaña, Johnny. *The Coding Manual for Qualitative Researchers*. Los Angeles:  
SAGE Publications, 2013.

Sanden, Paul. *Liveness in Modern Music: Musicians, Technology, and the  
Perception of Performance*. New York: Routledge, 2013.

- Stockhausen, Karlheinz and Jerome Kohl. "Electroacoustic Performance Practice." *Perspectives of New Music* 34 (Winter 1996): 74-105.
- Strange, Allen, and Patricia Strange. *The Contemporary Violin: Extended Performance Techniques*. Berkeley: University of California Press, 2001.
- Smalley, Denis. "Spectromorphology: Explaining Sound-shapes." *Organised Sound* 2 (1997): 107-126.
- Susser, Peter M. "Attack, Sustain and Decay: An Analysis of *Synchronisms* No. 3 for Cello and Electronic Sounds by Mario Davidovsky." DMA diss., Columbia University, 1994.
- Tao, Jie. "An Annotated List of Compositions for Solo Violin with Electroacoustic Sounds." DMA diss., University of Illinois at Urbana-Champaign, 2004.
- Warfield, Nancy. "Performing with Tape: Problems and Solutions." *The Double Reed* 8 (Winter. 1985):  
[http://www.idrs.org/publications/controlled/dr/DR8.3/DR8\\_3Warf.html](http://www.idrs.org/publications/controlled/dr/DR8.3/DR8_3Warf.html).
- Winkler, Todd. *Composing Interactive Music: Techniques and Ideas using Max*. Cambridge: MIT Press, 1998.
- Wishart, Trevor. *On Sonic Art*. Amsterdam: Harwood Academic, 1996.
- Yoder, Rachel. "Performance Practice of Interactive Music for Clarinet and Computer with an Examination of Five Works by American Composers." DMA diss., University of North Texas, 2010.

## APPENDIX A

### INTERVIEW CORRESPONDENCE

The documents below are templates for initial correspondence with the performers. The exact content of the inquiry letters and questions vary, depending on the individual contacted, and if any other information was worth mentioning. As an example, only one of the members that recorded *Nymphéa* with the Cikada String Quartet remains, so the inquiry email directed to the contact form acknowledged this fact and asked to be put in touch with any members possible. The initial interview questions were also customized to reflect any prior knowledge I possessed of the group's activities.

#### A1. Letter of Inquiry

Dear [performer],  
My name is Patti Kilroy, and I am a Ph.D student in violin performance at New York University. As part of my dissertation work, I am studying studio recordings of Kaija Saariaho's *Nymphéa*, exploring how these recordings can document performance practices of chamber music with live electronics in relation to this work. (If contacting directly: One of these recordings, is the recording [insert recording information].)

In order to document early performance practices as completely as possible, I would like to present my observations of recordings with input from the performers themselves, gathered primarily over email (or whatever resource the performer finds most convenient.) Interviews with the performers would serve to answer questions on topics that can not be addressed easily using recorded media, including the learning and rehearsal process, and technical details that are not apparent from only a recording. Writing incorporating their interviews, of course, would be sent to them for their review before I submitted it to any publication.

[If contacting the individual directly]

If you are willing and available, I would love to ask you some questions about your learning and rehearsal processes with regard to *Nymphéa*. I am aiming to gather as many perspectives as possible at this early point in my research.

[If trying a non-direct source, like an ensemble contact form]

I would be so grateful if you could put me in touch with any of the performers involved with your recording of *Nymphéa* from the album [*Album Name*], released in [Album Year.] I would be excited to speak with any or all of them.

Thank you very much for your time, and please let me know if you have any questions. I hope to hear from you soon!

Sincerely,

Patti Kilroy  
patti.kilroy@nyu.edu

#### A2. Initial Questions

- 1) The parts can be very dense, to the point that an individual new to the score or this style of writing would be overwhelmed. Could you tell me about how you approached learning the individual part? Were there any particular aspects of playing that you focused on (e.g. gesture, pulse, rhythm, timbre)?
- 2) When you were rehearsing the piece, at what point did you incorporate the electronics and engineer into your rehearsal process? Approximately how much rehearsal took place with electronics? Did you feel that you or the group had to adjust their playing in any way while the live electronics were being used?
- 3) In a performance of *Nymphéa*, the engineer is responsible for a great deal, including mixing individual levels of the quartet, and managing the processed sound. Did the members of the quartet have any input in deciding on levels, or was this handled primarily by the engineer at his or her discretion? How aware were you of the effects being used at any given point?

A3. Interview Transcripts  
Cikada String Quartet

2016/01/17, Email Inquiry

Hello,

My name is Patti Kilroy, and I am a Ph.D student in violin performance at New York University. As part of my dissertation work, I am studying studio recordings of Kaija Saariaho's *Nymphéa*, exploring how these recordings can document performance practices of chamber music with live electronics in relation to this work.

In order to document early performance practices as completely as possible, I would like to present my observations of recordings with input from the performers themselves, gathered primarily over email (or whatever resource the performer finds most convenient.) Interviews with the performers would serve to answer questions on topics that can not be addressed easily using recorded media, including the learning and rehearsal process, and technical details that are not apparent from only a recording. Writing incorporating their interviews, of course, would be sent to them for their review before I submitted it to any publication.

I would be so grateful if you could put me in touch with any of the performers involved with your recording of *Nymphéa* from the album *In due tempi*, released in 2001. I see that three of the quartet members credited for the recording (Henrik Hannisdal, Marek Konstantynowicz, and Morten Hannisdal) are no longer listed as members of Cikada, but if I could even just have contact information for Odd Hannisdal, that would be great. I would be excited to speak with any or all of them.

Thank you very much for your time, and please let me know if you have any questions. I hope to hear from you soon!

Sincerely,

Patti Kilroy  
patti.kilroy@nyu.edu

2016/01/19, 11:38 AM, Odd Hannisdal

January 19, 11:38 AM, Email.

Dear Patti

I would be glad to try to answer your questions about our recording of *Nymphéa*. The quartet was recorded entirely without electronics, Kaija worked with the tape afterwards together with Manfred Eicher and sound engineer Jan Erik Kongshaug

(I think, I was not there)

We had of course performed the quartet many times in concert, and were familiar with the effects of the live electronics.

Saariaho's score is very accurate, and we have always tried to be true to the score, whatever piece we play. In a way, this means we take little consideration the influence of the live electronics while playing.

Nymphéa is a brilliant piece with so many colours and nuances already written for the strings, in my taste, it is not a piece that needs to be covered with too much "special effects".

Please come back with more questions, and good luck with your work.

Best regards Odd

Sorry for my terrible English....

2016/01/20, Email Response #1

1) The score is often densely notated. Could you tell me a little about how you learned the individual part? For example, did you prioritize any particular aspect of playing above others to start, like pitch, or rhythm, or timbre?

1) We almost always focus on pulse, meaning we try to hit the right tempo and then filling in with all the difficult notes. Focus on the pulse gives the music a flow, a special movement. Then we tried to give meaning to all phrases, in fact focusing on beauty, especially the noise parts. I remember we talked about creating both a light and a dark "grey" sound. Looking for beauty in quartertones, dissonances, scratch effects and so on.

2) When you were rehearsing the piece with your group, at what point did you incorporate the electronics and engineer into your rehearsal process?

Approximately how much rehearsal took place with electronics, and did you feel that the group had to adjust in any way while live electronics were used?

2) We had little possibilities to work extensively with electronics, we had very few rehearsals with electronics. We often used composers to take responsibility over the electronics together with a sound engineer (who often do not read scores well or at all)

Our quartet was rather used to play with PA and close microphones, it is a good thing to get used to. But in Nymphéa, the electronics has little influence on our playing.

3) In a performance of *Nymphéa*, the engineer is responsible for a great deal, including mixing individual levels of the quartet, and managing the processed sound. Did the members of the quartet have any input in deciding on levels, or

was this handled primarily by the engineer at his discretion?

3) A good sound engineer is priceless, but even the not so good needs to be trusted, is my experience. You need them to take responsibility and create something interesting for the audience. Too many inputs from us can create more confusion than help.

With Nymphéa, we always had a skilled composer sitting next to the sound engineer.

#### Ensemble Gelber Klang

[Ulrike Stortz, Ensemble Gelber Klang](#)

[Inquiry, Ulrike Stortz, Email Inquiry](#)

Send to: [ulrike@open-music.eu](mailto:ulrike@open-music.eu)

Dear Ms. Stortz,

My name is Patti Kilroy, and I am a Ph.D student in violin performance at New York University. As part of my dissertation work, I am studying studio recordings of Kaija Saariaho's *Nymphéa*, exploring how these recordings can document performance practices of chamber music with live electronics in relation to this work. I have enjoyed listening to the recording of *Nymphéa* that you made with Ensemble Gelber Klang!

In order to document early performance practices as completely as possible, I would like to present my observations of recordings alongside input from those that performed the recordings, gathered primarily over email (or whatever resource you find most convenient.) My interviews with the performers would serve to answer questions on topics that can not be addressed easily using recorded media, including the learning and rehearsal process, and technical details that are not apparent from only a recording. Writing incorporating your input, of course, would be sent to you for review before I submit it to any publication.

If you are willing and available, I would love to ask you some questions about your learning and rehearsal processes with regard to *Nymphéa*.

Thank you very much for your time, and please let me know if you have any questions. I hope to hear from you soon!

Sincerely,  
Patti Kilroy  
[patti.kilroy@nyu.edu](mailto:patti.kilroy@nyu.edu)  
+1 786 564 5891

Received 10:53AM 2/1

Hiya Patti,

thanks for asking - maybe you can talk to my american colleague who played the Cello in the recording - it's probably easier to communicate and my time is very rare these days. So if you want to talk to me, we need to look for a date after 22nd of February.

Here you can ask : Scott Roller <[scott@scottroller.de](mailto:scott@scottroller.de)>

All the best

Ulrike

2/1 Ulrike Stortz

2/2 from Ulrike

okay!

So I'll hear from you

All the best

Ulrike

Sent 10:54AM 2/2

Hi Ulrike,

Thanks for your response! I also reached out to Scott at that address - thank you for confirming his email for me.

If you are willing, I am happy to wait until after the 22nd of February to send questions. At this stage of my research, I trying to just collect as many perspectives as possible, and I have no strict timeline to do so.

I can send another email about speaking then!

Thank you for your time,

Patti

2/29

1) The parts can be very dense, to the point that an individual new to the score or this style of writing would be overwhelmed. Could you tell me about how you approached learning the individual part? Were there any particular aspects of playing that you focused on (e.g. gesture, pulse, rhythm, timbre)?

I have to say, it's quite a long time ago since I learned the piece... I remember, that I had this feeling of chaos and I needed a long time with phases of individual practising in change with rehearsals with the string-quartet until I could recognize the form, development and characters/timbres of the piece. As the primaria I tried to lead the ensemble through the score, so I practised also a lot to conduct while

playing.

2) When you were rehearsing the piece, at what point did you incorporate the electronics and engineer into your rehearsal process? Approximately how much rehearsal took place with electronics? Did you feel that you or the group had to adjust their playing in any way while the live electronics were being used? we had also a lot of rehearsal time together with the live-electronics after we were able to play the piece more or less by ourselves (I hardly can tell how much, but we took our time without counting hours...). Of course we had to adjust some places and it was a process of getting used to the new sounds.

3) In a performance of *Nymphéa*, the engineer is responsible for a great deal, including mixing individual levels of the quartet, and managing the processed sound. Did the members of the quartet have any input in deciding on levels, or was this handled primarily by the engineer at his or her discretion? How aware were you of the effects being used at any given point?

We were lucky because our engineer was very good in handling all this material. We discussed at some points the mixture or special levels, but then we need to trust him and his ears because we could never hear the real sound in the performance or during the recording.

Our sound engineer for the CD-production was also very capable and so we had two people who gave us feedback.

Please excuse my english - I hope, this is useful for your work and don't hesitate to ask further questions.

If it is possible I would like to read your dissertation...

Scott Roller

Inquiry, Scott Roller

Send to: scott@scottroller.de

Dear Mr. Roller,

My name is Patti Kilroy, and I am a Ph.D student studying violin performance at New York University. As part of my dissertation work, I am studying studio recordings of Kaija Saariaho's *Nymphéa*, exploring how these recordings can document performance practices of chamber music with live electronics in relation to this work. I have enjoyed listening to the recording of *Nymphéa* that you made with Ensemble Gelber Klang!

In order to document early performance practices as completely as possible, I would like to present my observations of recordings alongside input from those that performed the recordings, gathered primarily over email (or whatever resource you find most convenient.) My interviews with the performers would serve to answer questions on topics that can not be addressed easily using recorded media, including the learning and rehearsal process, and technical details

that are not apparent from only a recording. Writing incorporating your input, of course, would be sent to you for review before I submit it to any publication.

If you are willing and available, I would love to ask you some questions about your learning and rehearsal processes with regard to *Nymphéa*. I am aiming to gather as many perspectives as possible at this early point in my research.

Thank you very much for your time, and please let me know if you have any questions. I hope to hear from you soon!

Sincerely,  
Patti Kilroy  
[patti.kilroy@nyu.edu](mailto:patti.kilroy@nyu.edu)  
+1 786 564 5891

Telephone Conversation Transcript:  
Scott Roller Interview, February 23, 2016

S: I don't have anything against anyone, I just like to have very exact notes, [laughs]

P: Of course, of course, okay.

S: [laughs] ... so just offering that.

P: So as of now, it's recording, I'm using note-taking apps.

S: Okay. I just wanted to give you permission for that, right off. Um, I wrote these [???] when we first knew we wanted to do the piece, because I had done *Cloud Trio* [?], like I wrote you, with the trio with her, so I got in contact with her. And then this quartet Helios, or Ensemble Gelber Klang, actually turned into an independent string quartet after that, called Helios.

P: Helios, okay.

S. And so I, I knew Victor as Kaija's representative at Chester Music in London, and so I kind of took up contact with Ethan [?] and said, "Okay, *Nymphéa* with string quartet and electronics, so, where are the electronics, how do I get those?" and she said "Oh, tell the truth, they are kind of on these cartridges" – from these old Yamaha, first-generation digital mixing boards where they did all the effects and stuff, and I said "Boo, who wants one of those?" uh, and I have lots of those kind of cartridges too but they're kind of like in the cellar because they're like shit [laughs], and she's like "Yeah, I know, we only have a few left too and we're kind of reticent about letting them out." And I said, "Okay, well, uh, you know,

well, what do we do?"

And, uh, she didn't have any answer, because publishing people aren't especially bright in my experience. They're just concerned with one aspect of the process. And, but, uh, since I knew about Jean-Baptiste, then I got to think about this, and I thought, you know, just plug the fucking thing into a board or write the values down and put it in a Max patch and give it to me back. And, Jean-Baptiste did that.

P: Yeah, I think he may have sent me that.

S: ...the first email sent, I'm not sure of the status of the Max patches, and that was, at that point, that Jean-Baptiste at some point said, "You know, I really should put these on a Max patch so somebody, you know, person, can do this" and you know, [laugh], you know he never did. So I kind of got on him and said, "We'd love to do the piece and we have sort of a timeline for it, but I need some reliable electronics" – and he came up with it right off. First, he came up with sort of a buggy version, and which you can see in the email, and we kind of, yeah, said "Well, that was kind, but didn't work," and, he fixed it, and then we were cool.

P: Okay.

S: Okay, so end of my first prologue. But then we had real Max patches and our electronics person, because we did the piece as basically a quintet. Um, that's my primary message – the relationship to the electronics is that of a fifth person in the quartet.

P: Sure, yeah. Actually, I was kind of refreshed to see that, 'cause I've been reaching out to, like, well everybody I can basically get in touch with which a lot of people don't respond but there are quite a few people that have said "Oh, we don't really consider the electronics at all, we don't really, like, take them into consideration in our interpretation"

S: Yeah, most of the, for string players that just kind of, you know, they couldn't tell you how to spell a D major chord

P: [laughs]

S: [laughs].. but, they can play Wieniawski, you know. So.. and you're a fiddle player, right?

P: Yes, yes, I play the violin.

S: Yes, a violinist, okay. Yes, so that's kind of the other approach. Certain people, they tend to [unclear] I'm an indigenous electronic composer uh, performer. I saw

my first computer when I was in first grade in 1966, and my father was working on new music. And that's the way I see electronics, and do electronics myself. I see it as a lively part, and that's why I knew, if we had a real Max patch – we had Bryan Wolf working with us, who is a really cool, uh, [??] from a chaotic American sound man who was, who worked for Stockhausen for the last fifteen years, for Stockhausen while he was here doing sound projection. And so, I knew he was real picky, and, and, at the point that we were doing this we all had shoulder-length hair and were very much the same generation. And I knew that Bryan would do it well if we could get him on board. We did, uh, sort of, a series of project that were string quartet and electronics, that's how we started our existence. Interestingly enough, as a direct result of 9/11, as a political act.

P: Oh, interesting.

S: Because, well, with *Different Trains*, and a program that Roger Reynolds, and Steve Reich, and several different people with music – we started of specifically as string quartet and electronics. And, and, so that was uh a seminal part of that from the begin. And so Bryan just read the scores with us, once we had the Max patches – he just read the scores with us. And just as we were - we were very centered, like a lot of pieces we did, we were very centered on our primaria, on our first violinist, who provided at some points, visual pulses for these complex sort of, you know, sort of sequences. And, and she was my lover for twelve years, so this was a person that I could read well. And, um, she would give an internal sort of pulse. And Bryan, was, was, you know, however far away from us in the room, but was really the fifth player in the quartet, and had the task to trigger precisely, and to control his mix in the same way we were controlling our mix, and paying attention to dynamics and time, so it was really a chamber music approach to the electronics, of really integrating a lot with the electronics. Which is what I learned from Kaija too, that she experienced it that way. She's [a] cool lady, she's very weird.

P: Huh.

S: The very first time I met Kaija was in a restaurant in Germany, where we had agreed on permission for the trio. And I remembered thinking, after the evening with her, she came in with a cape and lovely red hair and everything, and I remember thinking after the evening that must be what it was like to go out with Emily Dickinson. Like, an intensely private person, who though was brilliant and had lots to say, but was just... incredibly shy and incredibly closed, and, compared to most Americans.

P: Yeah, I heard is she very quiet.

S: Yeah, very cool woman. Very rich, but very special, very much on her own

terms, which is, you know to be respected. I mean, She's a fine woman. Okay?

P: That's great! So yeah, I mean..

S: And our performances, we did the piece maybe, five, six times, or something, in big surroundings, and maybe another few in smaller. And, um, you know, it was always very impressive, and people enjoyed it. It's very sensual; and really, fills you up, if, you know, if you do the sound projection right and really have the balance right so the strings and electronics are on... in my mail, I talk about that, you know the Kronos recording, you know they never came back on that, really. I felt like the Kronos recording, as much as I love Kronos and are forever indebted to them for, Christ knows how much, um, I kind of felt like the electronics were a little shy, and it kind of pushed back, just a little bit further than I would have done it, or, did it you know [mumbling.] Because in our recording I had, I was the producer of that recording and kind of wanted them to have, be very present. Our recording was also in SCSD, or SASCD, or whatever it was, and it was basically Dolby, and so it was in five channel audio, at least in one version, you can read from the – it's really cool, this label is really big on that. And so I really wanted it to be this thing, you know, you – uh, *Nymphéa*, you know, Kaija associates with Renoir – no, Monet, the lilies...

P: Yeah, the paintings, yeah, the series of ...

S: Right, and I, and I studied in Paris and experienced that and wanted that recording to have that kind of character, and have this thing be a little bit, just, totally immersive, and, uh, totally, uh, yeah, captivating – in the sense of, you know, the electronics and strings. And I listened to it the other day, when I knew I was going to talk to you, and thought "God damn, that's a great piece" – it really does work, you know. And it's incredibly not like Kaija later on, but incredibly typical of that period and time, and it's a little, all, would hang out and – what's his name- Lindberg, Magnus Lindberg, would hang out in this summer house and make wild electronic music, and it was very free, and – yeah – very real. And really cool. I like this stuff. Okay, I haven't let you talked at all!

P: Oh no, this is amazing, it's really...

S: I've been kind of saving up for this, I think I'm almost done.. okay, talk to me.

P: No, this is all, like, really, really great. Because, I mean, you know, with my dissertation project, I'm, I'm like learning the piece myself this semester, I'm putting a performance of it together for my doctoral recital on April 10...

S: Are you first violin?

P: Yes.

S: Okay.

P: And, I'm actually putting a lot of electroacoustic pieces by Saariaho together, because I want to familiarize myself with the process of working with electronics, and, you know, actually, I'm probably going to run electronics on other piece, I'm going to put a concert together in May where I run the electronics, so I get a impression of, that side

S: That's very cool. I do it more and more – my stuff is shifting more and more that way, and the electronics have gotten friendlier and friendlier over the years, too. You can do really cool stuff with, like, a Macbook and a good sound system, and the right software, you know, whatever.

P: So, I mean, I find that text can only, you know, textual documents like, you know, dissertation in just textual form and like articles, they only show so much. And when it comes to performance practice, I am exploring how recordings and interviews can, like, precisely document this particular process.

S: Yeah, the possibilities are so rich now. We can Skype and make a video recording, and I mean, it's just ridicul.. I, I work in education a lot, and it's ridiculous to not use the materials that are available, because as much bad news as there is in the world, also because of the internet, this is an incredibly cool aspect that we can work in real time world wide, and really access these things, and really have personal, you know, experience, with things that are outside of our sphere.

P: But, I am really refreshed to hear you speak about the electronics as this fifth entity, because I haven't...

S: It's the only way to do it, in my opinion. I mean, what's the other option, as Bernie would say, what's the other option? There is none. If there's one musical experience, it's one musical composition, it has to be felt in one impulse. And, you can, of course, artificially generate the impulse and have some sort of weird click track, or Christ knows what, but in our case, it was, you know, a woman, probably not all unlike yourself, in the way you say, giving physical impulses and leading us as a string quartet through the piece, but who was also Brian's reference for where are we on the time line. You know, here comes the downbeat, take it – bam. And if he shifts the electronics too late, you know, you stop the same way, same way as if the violist didn't leave, and said "Sorry, sweetheart, it doesn't work that way; when I come down on this thing, I want you there - "and, do it again. And that's how it works. And the results are very organic, lively, electroacoustic music.

P: Yeah, definitely.

S. It makes sense, I mean, what the hell else. It ‘s just an instrument. He’s playing a computer, and we’re playing, you know, our respective pieces of wood. But the orientation and the purpose is the same, to make lively chamber music, and, yeah.

P: That’s great. Yeah, even in her words, she says, and I mean she is talking about this with regard to the mixing, the electronics and the acoustic instruments have to create, like this “one sound image,” so I feel to be completely integrated with the electronics you have to be aware of them. But I imagine there are some challenges to the performer like, in that there isn’t a whole lot of information given in the core.

S: In the case of *Nymphéa*, the electronics are static, so it’s not like you have to react to them. I mean, Bryan fires this thing off, and we’re back to Ulrike being fixated on, where are we as a string quartet. But that scope changes then, you know, when we get to a program change, a patch change. And we think, “okay, Brian’s with us, okay, let’s go. We have liftoff.”

P: Sure.

S: And I guess, we focus on Bryan, but just to make, “Okay, we got him, we’re in part five, let’s go.” And then the string quartet is back with themselves, back to their own task, because it is very dense. Um, but it is sort of this opening and closing of one’s attention field to include Bryan, but mostly to know, are we on task now, you know. I just did at the end of November, at the end of the year, a cool piece by Hans Tutschku, if you know him.

P: I’ve heard of him, but I haven’t listened to his music.

S: Yeah, he is at Harvard. And I’m known him from over here too, I’ve known him since he was a wee lad, and, uh, he’s been the director of Harvard Electronic Studio for twelve years. And he does electroacoustic music too – and that’s his big thing. In fact, he has a very similar approach to Kaija through Jean-Baptiste, I mean, as is the case. Kaija was never electronic enough to do the electronic parts entirely, you know, independently. She always had someone, kind of, she could work with on that, I mean, whether, that’s pedals or, you know, whatever, you know, other pieces. Um, and *Nymphéa* is very much Jean-Baptiste and IRCAM and the possibilities that were... right there, right then. Okay, that’s probably lots of stuff.

P: Yeah, yeah, I’m going to think on what you said, and maybe we can set another time to talk, and I’ll ask more specific questions. But this is like, great. At this point, my idea was that if I, like, heard back from everyone and everyone was

like, very uniformly “We don’t really think of the electronics in any concrete way or anything like that,” I was going to advocate in my dissertation for this, but this gives me some grounding, and I think that it would, like, be wonderful to speak more.

S: Well, in that respect, then, the answer that I was just giving that one doesn’t think of the electronics like another player, but the person that is running the electronics is definitely orienting to the live music and to the impulse of the primaria, in our case, which I can say very honestly, a lot of people wouldn’t say that. But people like Arditti and stuff, they live from this common pulse, uh, you know, coming from the usual hierarchical position of primarius/primaria, and uh, well if that person is strong, then that gives a very common, very organic pulse to work with. And, it’s a cool piece, I’ve enjoyed thinking about it, and just sitting talking to you, and just finding those old mails. I changed to Gmail around 2004-5, so this is all slightly beforehand, so I couldn’t really reconstruct the other side of the emails very well, but getting back into the old mail program.

P: Well, don’t worry too much about that. I mean, I’m really just going for, I love how very detailed your descriptions are and everything, but a lot of what I want to do is kind of, see your approaches to working with electronics, in any capacity you are willing to answer. And also, I think it would be interesting to unpack these terms you use for describing the electronics, as you experience them, like “immersive,” and “captivating,” I think that there would be practical parameters we could assign to those that would be interesting.

S: Well, of course. I can describe those very precisely.

P: I think that, uh, like the discussion – the stuff that I’ve read with specifically these sort of electronics, that, you know, are technically live because they change as triggered by the engineer or someone operating the pedal, they go from stage to stage, but they are not reacting to any material that the ensemble is giving to them. So they are not creating – generating material either.

S: They’re reacting to material the ensemble is giving, but once they get to – [unclear] the difference between live and fixed electronics you know?

P: Yeah, I think it occupies this middle..

S: Like, whoever the sound man starts off part 5 of Kaija’s *Nymphéa*, that just goes on, you know. And so, you don’t have to react to him, because he’s sure as hell not reacting to you. He’s just doing his thing, to the end of part 5. But it’s different if it’s live electronics, you know. I think in general, it’s been a real kick for me, as an older person, to go from working with large computer systems and very complex sound arrangements, because I’ve always been an electroacoustic

freak, to self-contained little things, that I can put in a car and take with me, and triggering the stuff myself, with an iPad, a foot pedal, with a loop pedal, or an effects machine, but it's all on the floor. And suddenly instead of me needing whole rooms of equipment, and, you know, seventy thousand dollars and a truck and another technique, I'm putting it in the back of an Opal sedan and driving to a gig and triggering it myself. And most of it is live, because it is so much more convenient to do that live, we have the computing power and stuff. And just the iPad alone, is just mind-boggling. Like what's possible for Hans Tutchku at Harvard, we did a new quartet of his, which we're playing a lot, which is not a string quartet, but is a violin-cello-piano-percussion, which I can send you that if you want to, which is, um, really an iPad app. And I have a Bluetooth pedal. And when we get to the next part, I stomp on the pedal. And so there's no more paying attention to – they need to remove that middle man, of having him be part of the group. We suddenly have all of the electronics being run by one of the players, who is the new primarius. Who not only gives impulses to the group but also triggers the electronics. And so, it's incredibly compact, and easy, which is an enormous change in the amount of effort and coordination and equipment and everything else, you know, to do electronic – electroacoustic music. I think we're in the golden age of potential electroacoustic music, because, you know, it's very responsive. God damn, I talk a lot.

P: No, no, it's great, it's totally great.

Followup to phone conversation in a email left by Scott:

When I woke up I realised that at the moment of our conversation I seemed at times to assume that Nymphaea had a FIXED electronics track and was not live electronics, which is of course stupid. I actually remember several situations where the string players noticed that Bryan (our electronics guy) had the wrong patch running... In that case we had assimilated the right electronics enough to notice something was wrong...

#### Phone Conversation Followup Questions, 2/23

Questions from me

-At what point in the rehearsal process (e.g. early, middle, late) did Gelberklang begin incorporating electronics into rehearsal? We talked a lot about using rehearsal to coordinate with Bryan, the engineer in our conversation, and having the engineer become familiar enough with the piece to make precise scene changes for the processing. I imagine this is also a time for the ensemble to familiarize themselves with the processing. Are there any activities, vague or specific, that you feel are worth adding to this?

-To what extent did the instrumentalists have any input in deciding on levels? I imagine this was primarily handled by Bryan, but am wondering if there were any particular instances you can remember of input from the instrumentalists.

-Did Gelberklang use any monitoring in performance, particularly if it played the processed sound? Just want to get a sense of how the ensemble experienced the processing.

What does it mean to be aware/familiarized with the effects of the electronics?

The group was aware of coordination with the engineer, but was the group aware of the resultant effects of the processing? Do you feel like you could qualitatively describe the processing from scene to scene, however general?

Scott's Replies 2/23

Hey Patti!

Nice to hear from you.

Just to jump right to your questions:

Obviously we had to get a basic handle on the fairly challenging string quartet parts before it made much sense to work with Brian and it would have been fairly pointless to get all that gear together when we are still trying to make it through sections intact, but I would choose "middle" as a description of when Bryan joined us for some sessions. I have also been involved with electronics a lot ever since my youth, so I had a lot of opinions about that right off – and because of my contact with Kaija and indirectly with Jean-Baptiste, the porting of the electronics from the old Yamaha desk cartridges to Max MSP was done at my urging (because that seemed like the most universal way to solve it). But the music is challenging enough that there were always dry quartet rehearsals right up to the end.

From the very beginning I had the idea, too – which I shared with Kaija without getting any clear response – that even on the wonderful Kronos recording I found the electronics a little shy and wanted them further forward in the mix, both live and on the SACD. Obviously Bryan was controlling the levels in real time, but we all had some input on that. Ingo Schmidt-Lukas, the engineer and producer of the disk, also wound up playing a big role in the final mixes on the recording.

I don't remember our using monitors in any way, but the levels were hot enough that when we did sound checks for a performance we all had a say in how we felt. I don't really see the point in monitoring, because it would not be advantageous (would be counterproductive) to have the wet mix going back into the instrument mics – rather more important is the accurate projection for the audience. As I mentioned, though, we knew the wet sound well enough to actually correct Bryan in some rehearsals, if he missed a program change or something. We knew what

to expect and if the effects were significantly at variance, we noticed.

Speaking of microphones: We were using really nice high-end Schoeps microphones at first (like the P series of the CCMs) -

- <http://www.schoeps.de/en/products/categories/overview-compac>  
[http://www.schoeps.de/en/products/categories/special\\_speech](http://www.schoeps.de/en/products/categories/special_speech)

and there were on-instrument mounts that got them close to avoid bleeding between instruments - but they were really heavy and in general clumsy to use. We wound up basically using dpa 4061s, though they even have a sexier version now that is probably even better - the 4099.

- <http://www.dpamicrophones.com/articles/microphone-university/how-to-mic-a-violin>

The ones we used are shown at the bottom of this link. The Schoeps solution was fairly similar to what is shown at the top of the page.

One other thing - Ensemble >gelberklang< was a large ensemble (whose legacy website unfortunately got virally fucked and I had to take down) which worked from about 92-2009 but the string quartet projects led us off on our own under the name Helios Quartet, which existed in 3 evolving formations between 2001-2006. There are also other groups and even a string quartet which used the name after that...

The coolest version of that quartet could improvise really well, like in the following video:

<https://vimeo.com/109362879>

Interesting to note that the 2nd violinist on the recording you have of Kaija's piece (Gareth Lubbe) became a great violist, was asst principle of the Gewandhaus Orchestra in Leipzig (left Helios to do that) and is now professor for viola at the Folkwang University of the Arts in Essen these days. He is also a great overtone singer and pianist (and one of my very best friends)...

Google him for a good time ;-)

Hope that helps you out.

[Kronos Quartet](#)

[Joan Jeanrenaud](#)

Dear Ms. Jeanrenaud,

My name is Patti Kilroy, and I am a Ph.D student in violin performance at New York University. As part of my dissertation work, I am studying studio recordings of Kaija Saariaho's *Nymphéa*, exploring how these recordings can document performance practices of chamber music with live electronics in relation to this important work. One of these recordings, of course, is the recording Kronos Quartet made of *Nymphéa* that was released in 1993.

In order to document early performance practices as completely as possible, I would like to present my observations of recordings alongside input from the performers themselves. Interviews would be conducted over email (or the most convenient medium for you) and would serve to answer questions on topics that can not be addressed easily using recorded media, including the learning and rehearsal process, and technical details that are not apparent from the recording. Anything I write that incorporates material from our interviews would, of course, be sent back to you for final approval.

If you are interested and available, I would be honored to correspond with you over the next few months to gain your perspective regarding learning and performing this music, especially because Kronos was the first ensemble to perform and record the work. Please let me know if this would be a possibility!

Thank you very much for your time, and please let me know if you have any questions. I hope to hear from you soon!

Sincerely,  
Patti Kilroy  
[patti.kilroy@nyu.edu](mailto:patti.kilroy@nyu.edu)  
786 564 5891

2/1

Sent 2/2 11:16 AM:

Hi Joan,

Thank you for your response! My questions to you are drawn from my own learning process for the piece - I am putting the piece together for a recital this semester.) I ultimately want to create a practical resource for performers that are learning music by Saariaho, or music with live electronics, for the first time. So, the first group of questions are fairly general:

- 1) The parts can be very dense, to the point that an individual new to the score or this style of writing would be overwhelmed. Could you tell me a little about how you approached learning the individual part? Were there any particular aspects of playing that you focused on (e.g. gesture, pulse, rhythm, timbre)?
- 2) When you were rehearsing the piece with Kronos, at what point did you incorporate the electronics and engineer into your rehearsal process?

Approximately how much rehearsal took place with electronics? Did you feel that you or the group had to adjust their playing in any way while the live electronics were being used?

3) In a performance of *Nymphéa*, the engineer is responsible for a great deal, including mixing individual levels of the quartet, and managing the processed sound. Did the members of the quartet have any input in deciding on levels, or was this handled primarily by the engineer at his or her discretion? How aware were you of the effects being used at any given point?

Thank you again for your time! I look forward to seeing your responses.

2/8

Response with one more question, sent 2/10:

For now, just one more question: When performing *Nymphéa*, did Kronos use a monitor playing the processed sound, or did the processed sound just go into the hall? I just want to get a sense of how the ensemble experienced the processing in performance as completely as I can.

---

1) The parts can be very dense, to the point that an individual new to the score or this style of writing would be overwhelmed. Could you tell me a little about how you approached learning the individual part? Were there any particular aspects of playing that you focused on (e.g. gesture, pulse, rhythm, timbre)?

Well, we focused on all those aspects-gesture, pulse, rhythm, timbre (and more--pitch, dynamics, ect). Of course you can practice concentrating on one effect at a time, if that makes it easier. So you can practice a passage thinking of one aspect at a time and then keep incorporating another aspect as you repeat the passage. But one should always study a score first to become familiar with the key (instructions provided by composer for the effects and symbols used). Then I would suggest practicing just a few bars at a time and you can always have three members play a passage with the fourth member listening. Then it might be clearer to hear and get suggestions from one another.

At one point you need to play everything as written of course.

Using a metronome can always help or again have one member count while listening to the other three....and always take turns so everyone gets a chance to listen and count.

And certain things like the heavy line that denotes heavy pressure with the bow, should be thought of just as you would for the marking for sul pont or sul tasto. It will become second nature after a bit of practice. A lot of it is just becoming familiar with it....so it requires repetition like any practice.

2) When you were rehearsing the piece with Kronos, at what point did you incorporate the electronics and engineer into your rehearsal process?

Approximately how much rehearsal took place with electronics? Did you feel that

you or the group had to adjust their playing in any way while the live electronics were being used?

We started incorporating the electronics after the quartet had rehearsed a good deal without them first. Once the quartet feels consistent, it would help the engineer to follow the score while you rehearse so they can become familiar with it too. Then I would have them add the electronics when everyone feels comfortable.

How much rehearsal just depends on what people feel comfortable with.

Definitely the quartet rehearsed more on their own but we also did quite a bit with the engineer after we had our parts down. We did not feel we had to adjust our playing while the live electronics were being used

3) In a performance of *Nymphéa*, the engineer is responsible for a great deal, including mixing individual levels of the quartet, and managing the processed sound. Did the members of the quartet have any input in deciding on levels, or was this handled primarily by the engineer at his or her discretion? How aware were you of the effects being used at any given point?

We would always take turns going out into the hall to check the balance and sound. So we could have input for the engineer as well. But we used an engineer we were very familiar with, so we trusted them as well. But it never hurts to listen and talk about things all together.

And while you'll be aware of the electronics, I don't think while we were performing we were that concerned with them. By that point I do think you trust the work you have all done together...and perform like you would any piece.

2/12

HI Patti,

I do believe KQ must have used monitors on stage to hear the processed sound. That is what we did generally with any kind of playback we needed to hear. Now KQ uses ear buds so each member can individually adjust the sound volume as they prefer.

Little more refined but same idea and just a cleaner look on stage.

Good luck with the piece!

cheers

## APPENDIX B

### DESCRIPTION OF EFFECTS IN NYMPHÉA AND FRISES

The descriptions of effects listed for *Nymphéa* are taken from inspection of the Max/MSP patch and from the original settings for the Yamaha DMP7 digital mixer and SPX90 digital processor. In the Max/MSP standalone patch, different effects (reverberation, modulation, harmonization, etc.) are toggled on or off from scene to scene.

Below is a list of effects that occur from scene to scene intended for performers who wish to make themselves aware of the specific types of processing from scene to scene. It is a combination of my observations from working with the standalone Max patch, and a list of settings for the original equipment, provided by Jean-Baptiste Barrière. Since the standalone Max patch is a software implementation of the effects used in the Yamaha equipment, it can be assumed that the effects described are equivalent. It is also important to note that the electronics, despite being having the same qualitative description as viewed in the settings, often do not sound like the stereotypical examples of that effect, can ultimately sound quite different from performance to performance depending on how they are mixed with the performers, and what material the performers are playing at that given point in the score.

1. Phasing, Reverberation, Spatial reverberation (value 3.1), Harmonization
2. Phasing (all but violin II), Reverberation, Spatial reverberation, Harmonization (all but violin II)
3. Phasing (violin I and cello only), Reverberation, Spatial reverberation (reduced to 2.6), harmonization (violin I and cello only)
4. Reverberation, Spatial reverberation
5. Reverberation (via p effect-selection, violin I only), Reverberation (via rev-scaler, to all), spatial reverberation
6. Flanger, Reverberation, spatial reverberation (increased to 3)
7. Flanger (violin I only), reverberation, spatial reverberation
8. Flanger (violin I only), reverberation, spatial reverberation (reduced to 2.6)
9. Reverberation, spatial reverberation, harmonization (violin I and II only)
10. Phasing, reverberation, spatial reverberation (increased to 3.2), harmonization (viola only)
11. Phasing, Reverberation, spatial reverberation (increased to 4.5)
12. Chorus, reverberation, spatial reverberation (reduced to 3.5)
13. Chorus, Reverberation, spatial reverberation (increased to 3.6), harmonization
14. Phasing, reverberation, spatial reverberation (decreased to 3.1), harmonization
15. Phasing, reverberation, spatial reverberation (increased to 3.6)
16. Reverberation, spatial reverberation (decreased to 3), harmonization
17. Delay (all but cello), reverberation, spatial reverberation (increased to 3.5), harmonization. Change in delay parameters.
18. Delay (all but cello), reverberation, spatial reverberation (decreased to 3). Change in delay parameters.
19. Delay (all but cello), reverberation, spatial reverberation. Change in delay parameters.
20. Delay, reverberation, spatial reverberation (increased to 13). Change in delay parameters.
21. Delay, reverberation, spatial reverberation
22. Reverberation, spatial reverberation
23. Phasing, reverberation, spatial reverberation (decreased to 4.6)
24. Phasing, reverberation, spatial reverberation (decreased to 4), harmonization. Delay, through p harmonization?
25. Phasing, reverberation, spatial reverberation (decreased to 7)
26. Phasing, Reverberation, spatial reverberation (decreased to 3.2), harmonization
27. Phasing, Reverberation, spatial reverberation (increased to 6), harmonization
28. Reverberation (through p effect-selection, change in rev-RT value to 30, violin I only), reverberation (via rev-scaler), spatial reverberation, harmonization (all but violin I)

29. Reverberation (through p effect-selection, change in rev-RT value to 20), reverberation (via rev-scaler), spatial reverberation (decreased to 4.9)
30. Echo, Reverberation (through p effect-selection, change in rev-RT value to 30), reverberation (via rev-scaler), spatial reverberation (decrease to 4.7)
31. Echo, Reverberation, spatial reverberation (decrease to 2.6), harmonization (all but cello)
32. Delay (violin I and violin II only), reverberation, spatial reverberation (increase to 3.5), harmonization (violin I and violin II only)
33. Reverberation, spatial reverberation (increase to 3.8)
34. Delay (via p del, all but cello), reverberation, spatial reverberation (increase to 4.4)
35. Reverberation, spatial reverberation (decrease to 4)
36. Phasing, reverberation, spatial reverberation (decrease to 3.5), harmonization (cello only)

The effects for *Frises* are apparent from description in the score, and are copied below. Spatial reverberation is applied throughout. Like in *Nymphéa*, performers toggle through effects using a foot pedal.

#### Movement 1 - “Frise jaune”

1. m. 1 - spatial reverberation
2. m. 5 - spatial reverberation, carillon sound fades in and out
3. m. 10 - spatial reverberation, carillon sound fades in and out
4. m. 14 - spatial reverberation, carillon sound fades in and out
5. m. 21 - spatial reverberation, carillon sound fades in and out
6. m. 32 - spatial reverberation, carillon sound fades in and out
7. m. 38 - spatial reverberation, carillon sound fades in and out
8. m. 45 - spatial reverberation, carillon sound fades in and out

#### Movement 2 - “Frise de fleurs” Reverberation applied throughout.

1. m. 1 - freeze effect
2. m. 29 - vibraphone-like sustained tone, two pitches
3. m. 31 - vibraphone-like sustained tone, two pitches
4. m. 33 - vibraphone-like sustained tone, two pitches
5. m. 35 - vibraphone-like sustained tone, two pitches
6. m. 37 - vibraphone-like sustained tone, one pitch
7. m. 39 - vibraphone-like sustained tone, three pitches
8. m. 40 - vibraphone-like sustained tone, three pitches
9. m. 41 - vibraphone-like sustained tone, three pitches
10. m. 42 - vibraphone-like sustained tone, three pitches
11. m. 43 - vibraphone-like sustained tone, three pitches
12. m. 44 - vibraphone-like sustained tone, three pitches

13. m. 46 - vibraphone-like sustained tone, four pitches
14. m. 48 - vibraphone-like sustained tone, four pitches
15. m. 50 - vibraphone-like sustained tone, five pitches
16. m 52 - vibraphone-like sustained tone, four pitches
17. m. 56 - vibraphone-like sustained tone, one pitch
18. m. 58 - vibraphone-like sustained tone, one pitch
19. m. 60 - vibraphone-like sustained tone, one pitch
20. m. 62 - vibraphone-like sustained tone, one pitch
21. m. 66 - vibraphone-like sustained tone, one pitch
22. m. 67 - vibraphone-like sustained tone, four pitches; low triplet accompaniment
23. m. 68 - vibraphone-like sustained tone, four pitches; low triplet accompaniment
24. m. 70 - vibraphone-like sustained tone, four pitches; low triplet accompaniment
25. m. 72 - vibraphone-like sustained tone, four pitches; low triplet accompaniment
26. m. 74 - vibraphone-like sustained tone, four pitches; low triplet accompaniment
27. m. 76 - vibraphone-like sustained tone, five pitches; low triplet accompaniment
28. m. 78 - vibraphone-like sustained tone, five pitches; low triplet accompaniment
29. m. 80 - vibraphone-like sustained tone, three pitches; low triplet accompaniment
30. m. 82 - vibraphone-like sustained tone, four pitches; low triplet accompaniment
31. m. 84 - vibraphone-like sustained tone, four pitches; low triplet accompaniment
32. m. 86 - vibraphone-like sustained tone, four pitches; low triplet accompaniment
33. m. 90 - vibraphone-like sustained tone, five pitches
34. m. 92 - vibraphone-like sustained tone, seven pitches
35. m. 94 - vibraphone-like sustained tone, six pitches
36. m. 96 - vibraphone-like sustained tone, eight pitches
37. m. 98 - vibraphone-like sustained tone, six pitches
38. m. 100 - vibraphone-like sustained tone, five pitches
39. ends piece, stops reverberation

#### Movement 3 - “Pavage”

1. m. 1 - repeats plucked A as eighth note, fades out m. 4
2. m. 9 - repeats arco A as eighth note, fades out m. 13
3. m. 16 - repeats arco A as eighth note, fades out m. 17
4. m. 28 - repeats arco E as eighth note, fades out m. 31

5. m. 40 - repeats arco E as eighth note, fades out m. 45
6. m. 50 - repeats arco A as eighth note, fades out m. 58
7. m. 68 - repeats plucked G as eighth note until end of m. 69
8. m. 69 - records and plays back m. 69
9. m. 73 - records and plays back m. 73
10. m. 77 - records and plays back m. 77
11. m. 81 - records and plays back m. 81
12. m. 87 - records and plays back m. 87
13. m. 93 - records and plays back m. 93
14. m. 98 - repeats plucked G as eighth note until end of m. 100
15. m. 102 - repeats arco C# and D as eighth note until end of m. 103
16. m. 104 - repeats arco D as eighth note, fades out m. 105
17. m. 107 - repeats arco D, B as randomized rhythm (dotted eighth or sixteenth), fades out m. 108
18. m. 110 - repeats arco D, C# as randomized rhythm (dotted eighth or sixteenth), fades out m. 114
19. m. 116 - repeats arco G#, A as eighth note until end of m. 117
20. m. 119 - repeats arco F#, F as randomized rhythm (dotted eighth or sixteenth), fades out m. 121
21. m. 123 - repeats arco F#, F as randomized rhythm until end of m. 124
22. m. 132 - repeats arco E, F as eighth note, fades out bar 135
23. m. 137 - repeats plucked G as randomized rhythm (dotted eighth or sixteenth), fades out m. 141
24. m. 195 - records and plays back violin part from mm. 195-205 in a canon of three parts; second part begins m. 195 beat 3, third part begins m. 196
25. m. 205 - pitch shifter and reverberation, fades out 209
26. m. 212 - repeats plucked A until end of m. 213
27. m. 213 - records and plays back violin part from mm. 213-232, one measure later than violinist
28. m. 233 - pitch shifter, transposed down a tritone
29. m. 245 - repeats plucked A until end of m. 246
39. m. 246 - repeats violin part from m. 246-254, one measure later than violinist

#### Movement 4 - “Frise grise”

1. m. 1 - pitch shifter, transposed down a semitone and three octaves
2. m. 50 - stops reverberation and pitch shifter

## APPENDIX C

### CHART OF TIME POINTS IN NYMPHÉA

This chart shows how changes in scene for the electronics and formal divisions coincide with measure numbers, as well as timepoints in all five recordings. This appendix is included for both ease of reference and to illustrate the stark differences between recordings with regard to timing (though timing is not the focus of this study.) The formal divisions are taken from Michael Rofe's analysis in "Capturing Time and Giving it Form: *Nymphéa*" in the edited volume *Kaija Saariaho: Visions, Narratives, Dialogues.*<sup>1</sup> Rofe refers to these formal divisions as "cycles." Occasionally, electronic scene changes coincide with formal sections. In the case that a scene change and formal division differ by a measure in duration, they have been consolidated.

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<sup>1</sup> Michael Rofe, "Capturing Time and Giving it Form: *Nymphéa*," in *Kaija Saariaho: Vision's Narratives, Dialogues*, ed. Tim Howell, Jon Hargreaves, and Michael Rofe (Burlington: Ashgate Publishing Company, 2011), 92.

Locators		Ens. Timepoints						
MM	Formal Cycle	Elect. Cue	Cikada	EGK	Krono s	Arditt i	Meta 4	
Part I								
1	1	1	0:00	0:00	0:00	0:00	0:00	0:00
7		2	0:27	0:30	0:21	0:21	0:24	
18		3	1:04	1:09	0:55	0:57	1:02	
25	2	4	1:28	1:36	1:17	1:21	1:29	
31		5	1:41	1:47	1:30	1:38	1:43	
40	3	6	2:00	2:03	1:53	2:03	2:02	
48		7	2:11	2:16	2:05	2:17	2:16	
56		8	2:23	2:25	2:14	2:31	2:30	
66		9	2:40	2:46	2:32	2:51	2:50	
77		10	3:02	3:07	2:54	3:17	3:11	
85		11	3:20	3:25	3:13	3:37	3:31	
102	4		3:55	4:04	3:53	4:23	4:18	
146		12	5:26	5:26	5:16	5:53	5:47	
150	5		5:36	5:33	5:27	6:04	6:01	
153		13	5:51	5:58	5:40	6:19	6:20	
182		14	7:20	7:10	6:48	7:32	7:46	
190		15	7:44	7:36	7:10	7:58	8:15	
195		16	7:56	7:48	7:22	8:08	8:29	
207	6	17	8:16	8:02	7:35	8:26	8:46	
219		18	8:49	8:31	8:07	9:05	9:26	
221		19	8:56	8:37	8:13	9:08	9:36	
235		20	9:41	9:15	8:56	9:52	10:23	
244	7	21	10:04	9:32	9:16	10:13	10:50	
251		22	10:35	10:11	9:46	10:45	11:26	

Locators		Ens Timepoints						
MM	Formal Cycle	Elect. Cue	Cikada	EGK	Krono s	Arditt i	Meta 4	
Part II								
262	8	23	11:03	10:43	10:15	11:20	12:12	
295	9	24	13:35	14:32	13:07	14:15	15:05	
310		25	14:06	15:06	13:43	14:50	15:46	
315	10	26	14:21	15:21	13:57	15:01	16:04	
326		27	14:50	15:50	14:27	15:28	16:38	
332		28	15:11	16:12	14:50	15:45	17:28	
335	11		15:28	16:29	15:10	15:53	17:35	
348		29	16:04	17:07	15:52	16:29	18:12	
355		30	16:26	17:28	16:07	16:52	18:35	
363	12	31	16:47	17:51	16:40	17:17	19:02	
371		32	17:12	18:18	17:02	17:43	19:30	
374		33	17:20	18:27	17:08	17:55	19:38	
376		34	17:27	18:33	17:14	18:01	19:45	
380		35	17:41	18:48	17:28	18:15	20:02	
384	13	36	17:52	19:03	17:38	18:27	20:15	
End		-	18:50	20:03	18:40	19:33	21:33	

## APPENDIX D

### SAARIAHO DISCOGRAPHY

The following recordings were used as resources throughout this study, and includes the five recordings of *Nymphéa*, and two recordings of *Frises*.

Ensemble	Recording	Year Rel.	Label and Catalogue	Members on Recording
<b>Nymphéa</b>				
Kronos Quartet	Du cristal...; Á la fumée; Nymphéa	1993	Ondine ODE804-2	David Harrington, vn; John Sherba, vn; Hank Dutt, va; Joan Jeanrenaud, vc.*
Arditti Quartet	From Scandinavia	1996 (recorded 1991)	Montaigne 782033	Irvine Arditti, vn; David Alberman, vn*; Garth Knox, va*; Rohan de Saram, vc.*
Cikada Quartet	In Due Tempi	2001	ECM Records 1799	Henrik Hannisdal, vn;* Odd Hannisdal, vn; Marek Konstantynowicz, va*; Morten Hannisdal, vc*
Ensemble Gelber Klang **	Farben der Stille	2003	Cybele 361201C D	Gareth Lubbe, vn; Ulrike Stortz, vn; Axel Porath, va; Scott Roller, vc
Meta4 String Quartet	Kaija Saariaho: Chamber Works for	2013	Ondine ODE 12222-2	Antti Tikkainen, vn; Minna Pensola, vn; Atte Kilpeläinen, va; Tomas Djupsjöbacka,

	Strings			vc
Frises				
Ensemble	Recording	Year	Label	Members
Jennifer Koh	Bach & Beyond, Part 2	2015	Cedille CDR 90000 154	Jennifer Koh, violin
Movses Pogossian	Inspired by Bach	2018	New Focus Recordings	Movses Pogossian, violin

APPENDIX E  
OWEL MAY 2018 TOUR SCHEDULE

Below is the tour schedule with venues and locations, along with a description of the stage and any outstanding features of that experience.

Date	City	Venue	Description	Highlights (if any)
5/11	Lakewood, OH	The Foundry	Medium-size venue, large stage.	
5/12	Indianapolis, IN	Hoosier Dome	Medium-size venue, large stage.	
5/13	Chicago, IL	Sub-T Downstairs	Bar venue, very small stage	Issues with equipment while on stage, very small stage with not much room to play, less monitoring required.
5/15	St. Louis, MO	FUBAR	Large venue, big stage.	Engineer asked about how to mix violin.
5/16	Oklahoma City, OK	89 <sup>th</sup> Street Collective	Medium venue, large stage.	Stopped using the pitch-shifter VST.
5/17	Springfield MO	FOH Lounge	Bar venue, small stage.	Issues with in-ear monitoring in this show.
5/18	Nashville, TN	Cafe Coco	Cafe venue, very small stage	Monitoring extremely loud.
5/19	Columbus, OH	Big Room Bar	Large venue, large stage.	Competent engineer and time for a sound check.

## APPENDIX F

### OWEL MEMOS

Twenty memos were made over the span of October 2017 to May 2018, documenting issues encountered in rehearsals and performance, setup and adjustments made to parameters in gear. They were written solely by me, generally within twenty-four hours following the rehearsal or performance they concern. Memos made in May 2018 are accompanied by recordings of the concert they concern, annotated in Appendix G.

#### 2017-10-21

##### White Eagle Hall reflections

-Not a bad set! It's a big stage and monitoring was set up ahead of time and we had about 15 minutes to sound check before doors opened. Equipment was set off to the side.

-The electric violin is really quiet - especially pizzicato. Not really sure what to do about this...

-Pretty annoying to be tripping on cables..

-Feedback didn't seem that much of an issue, so maybe it would be better to switch to a hollow-bodied violin.

-I found some video clips of the show on Instagram and the violin is really sharp in Snowglobe... I was very surprised at this.

#### 2017-11-30

##### Memo on OWEL rehearsal 11-29 (JC Studios, 7:30ish-9)

I brought my Ableton setup to rehearsal. Setup took kind of a long time, but I felt like it was more reliable. I really wish I had wireless setup but I am not sure if that is going to impact latency? I definitely, in this context, need as little latency as possible. It's also expensive. What would I prefer to have more/sooner? Probably wireless amplification, as that would mean I only have one cable connecting me to my setup for monitoring. But I think, ideally, I should save money for wireless

setups on both ends. Almost all the bands that seven)suns played with had wireless setups.

But anyway, the Ableton setup totally worked, signal went to the board. I only had a send going to a reverb object, and I added some compression. I actually think this was the best way to start, but I really had to go against my urges to have everything perfect, set up, ready to go. But this way, it's a little more open to input from people in the band (that definitely know more about live effects than I do, as guitarists/engineers in some cases...) They (Jay Nunzio Seamus Ryan) kept saying that the signal was really low, but I always thought that was interesting because then I would play and I could hear pretty well. I was also standing in front of the PA system. I think their hearing issues probably would be solved by proper monitoring/standing closer to the PA system. But maybe it is worth seeing how I can boost the signal going from my audio interface. Or maybe reading on the internet to see how certain parameters affect ultimate output from the audio interface.

On the topic of compression, I don't really know what the compression parameters do aside from threshold - Jay's advice was that the sound has to "breathe" a little bit. with high threshold, slow attack, long release. I think it would be cool to acquaint myself with compression. I always think it's a little difficult to learn about these live effects and wish it were easier. But there are so many different setups/interfaces/types of things to work with out there now that I think even if knowledge were a little more comprehensive, we would probably always be learning on the fly a little bit. I also thought it was interesting that Jay suggested adjusting the effects with headphones. So.. I bought some with imaginary money, because I'm an idiot.

Aesthetically, I wish there were fewer wires. I also need a laptop stand. I was thinking that the setup would look like a laptop on the top stand, the interface on a platform right below the laptop, and then the violin hangs from a hook below the laptop. Maybe I can reduce to a single wire somehow. But that would involve having the microphone always in an accessible place, which does not always happen, unfortunately. If I just had a microphone on my person that I routed through my setup, that would be a solution, but that would also involve buying a microphone. But then I would basically be Kate Bush, right? ... I guess there isn't anything wrong with that

For the MIDI pedal, things to consider adding to the setup are probably (1) a toggle button for total volume so that the violin doesn't pick up ambient noise when I am switching to keyboard. (2) some way to adjust phaser/chorus effects - maybe a X/Y button mapped to the chorus setting in the reverb send?

I wish I could just eliminate the Juno entirely and run the keyboard from Ableton.

That would remove one thing, Seamus could totally use it, we don't need the million settings on the Juno because none of us are keyboard players and they really so far only use the keyboard/strings/sometimes organ patches, we can just have stompbox settings per song that are triggered by keys or the foot pedal, depending on what Seamus is comfortable with because he uses the piano too..

2017-12-02

Troubleshooting Ableton Setup: Definitely an issue with the interface connecting to the computer causing the crashes. I emailed T4 support and might email Sweetwater? Also texted Trevor..

Once I identified that, I started working with EQ settings. I was thinking that for violin, it's kind of necessary to have different EQ settings for different things (like arco, or pizz.) Guitarists do a similar thing where they have a solo and not-solo (?) button.. so I made different EQ settings that sounded decent, and then mapped them to MIDI note connections on my controller.

I also started thinking about EQ and compression and the order that they should be in.. turns out, there is not really one correct way to do that..? But to me it does sound better for violin to have it after the EQ.

<https://online.berklee.edu/takenote/eq-before-or-after-compression/>

I also thought about it, and some of my violin signal is already being EQed using the pre-amp. I don't think it's a good idea to not use the preamp since the signal won't be strong enough. But EQing at both points seems kind of overly complicated, so at a later point it might be best to send an even signal to the audio interface and EQ from there.

I thought about the physical setup of my laptop and interface some more also, and wish there was some sort of two-layer table setup.. I drew one in my ableton setup journal (... yes I am keeping an ableton setup journal.)

For the Stevens show, I set up separate tracks for arco and pizz, and a simple looper track with some reverb/delay effects for layering/atmosphere... There are controls for track volume (6,7,8, Y-axis); arming the track (1,2,3) starting the loop (4) and clearing the loop (5). Volume control is always the large control to the right.

For EQ on all violin tracks, I was experiencing some hum from what seems to be the preamp (ugh.. I think this has happened before) so I have a notch filter for that frequency range, and then obviously a low-pass filter because violin is screechy. The low pass filter filters more for the arco because there is a lot of noise there.

Getting to Stevens, I should probably make sure that everything still works... maybe at some point I can write down a way to set up.

Jay figured out a really cool thing where he used the loop pedal with a very short sample to make a gesture in Snowglobe - it was coordinated with drums and bass

#### 2017-12-03

Issues from last night's show:

Unarming tracks not stopping sound. Solution: You had the input mix knob turned the wrong way...

When you get home, label it so that you always have it turned a certain way

New Issue: peaking in low double stops... keep track volume at 0 db.

Solutions for ground loop hum:

-gate object-so I'm not so sure if that should happen earlier or later in the signal chain

-I can get rid of the small hum that remains after notch EQ by setting a low threshold gate.

-I also set slightly different limiter settings for the arco and pizz settings.

- Unfortunately the arco gate causes a clicking sound when you start a note

Making a reverb piece with simple loop. I did it, it is kind of amorphous and boring but whatever.

Idea: grounding your chin rest with foil?

#### 2017-12-05

Reflecting on yesterday's work:

I made a small looping piece, am trying to get the scratchiness out of this pickup sound.

EQ through making pieces, testing out in "real" settings..

Swapping out individual settings - especially since reverb can have chorus effects that alter intonation... how does this clash or not clash with my priority as a performer to be in tune??

I literally grounded my pickup by putting tinfoil on my chinrest. If that's not ghetto, I don't know what is. I'll probably see if swapping out the XLR cable makes any difference, or buying a more shielded cable.

\*\*\* (12/20) the buzz is coming from the circuits in my room, because it wasn't really there when I went on tour.

#### 2017-12-14

Transcribed from voice memo I made on 12/14:

I adjusted some EQ settings, and it seems like the compressor just didn't need to be on the bowed sound at all, it sounds much better. At least through the Sony headphones.

One experience I've been kind of noticing is that when on bigger PAs, I don't get as much bass in my headphones, so when I go to bigger PAs, something that I thought sounded fine, it kind of too boomy for a typical/large PA system.

Something okay for my headphones is too boomy for a large PA system. Maybe I'll meet with Jay and adjust that some more, it's kind of his sound that he wants and he knows more than me about EQ settings. But really I'm just gathering a lot of information from reading Internet forums, googling "violin EQ settings" - it seems like there are a lot of opinions, and it's not there's any one right one, but it seems like at least there's a lot of options to try and it's not completely a shot in the dark that way.

...

And then I worked with some M4L effects, mostly the harmonizer effects, but the problem with the Max for Live patches is that they have a lot of latency.. so usually you can't have crisp attacks and expect it to be together

#### 2017-12-20

Learned a lot over this tour! I'm excited to have a working setup and lots of things to think about.

#### Adjusting Effects while in the van

During one of the earlier sets in the second half of the show, I recorded some violin tracks and then used them to adjust settings in my Ableton session in the van, with my headphones. I think this was as helpful as before, but especially helpful because I was adjusting to experiences between shows. Jay was also in the car, so I could hand the headphones over to him and have him listen/give notes. (He also gave notes about other stuff, like things that happened in the set, which I'm all about.)

#### Things I noticed in the set + things I adjusted in the car to fix it:

- The sound was still kind of thin and scratchy. I basically changed the channels in Ableton to only send to the reverb send, and then adjusted the wet/dry mix so the reverb was more present. Before that point, I think the reverb sound from the send was being mixed equally, which I didn't think was great. I think it's interesting that there isn't more control over the input channels and the sends - like the sends can't be any louder than where I have already set them.
- For the DC Songbyrd show, we adjusted it some more so that the reverb wasn't all the way up... it was, because I am me, turned all the way wet. We adjusted to like 2 o'clock on the wet/dry fader. We also adjusted the pizz track EQ so it didn't sound so boomy. In the PA system there it almost sounded like a kick drum.

- For the Boston show, we adjusted the EQ so that only the lows and highs were cut off. Otherwise, it is now basically flat. Jay and I agreed that maybe it is better if the engineer adjust this stuff, since they are familiar with the room. It might be worth flattening out the EQ on the DI as well at some point.

#### Troubleshooting after each show

- I'm kind of curious to listen to the audio I took from the final New haven show. I know there were some problems (i.e. my violin got knocked out of tune at the end) but I am always a little shocked about intonation issues that crop up. For example, I was so sharp in Snowglobe and I think it's just because I can't hear the piano... or maybe it's the keyboard sound itself that is so hard to match. Either way, I'm not sure what to do except pay more attention to the keyboard part and match the best that I can.

#### What to listen to?

In this context, there are so many moving elements that it is important to know what to listen to. But also, some of these effects (even EQ, reverb) can totally affect intonation - and I'm pretty convinced that if I want to do a good job in this band, I have to be relatively in tune. That being said, I am actually pretty terrified to listen to the recording, but feel like I have to.

engineers....

The engineer situation was totally different from place to place in a way that I was totally not prepared for. Sometimes, it was just horrible, particularly at the Knitting Factory and that Songbyrd place. They either were just kind of out of it/disrespectful (the Knitting Factory guy especially) or they had no idea what they were doing (thinking of Songbyrd, where the engineer couldn't get signal from the keyboard to the board and just blamed it on the cable.) I don't really understand why these guys work as sound engineers if they're not interested in doing their jobs.

In an average and relatively ideal situation, a soundcheck in this context involved line check (making sure everything is connected), the engineer hearing everything individually and EQing as necessary, and then setting monitor levels for the band. We all needed different things, based on what we were playing - in my case, I really needed anything I needed to play along with, just to feel like I am in tune. I really can't wait for the rest of the band to get it together and work on getting their own in-ears.. I really think that will fix a lot of the issues with poor engineers. It's one example of how retaining some control and not relying on the sound guy (something I noticed in Circuitry's rig especially, though their situation is far, far less complicated) help a band retain a consistent sound, prior to having their own individual sound guy (which is the ideal, it seems, in both pop and contemporary classical contexts).

This soundcheck process seems to differ from contemporary classical contexts in that less priority is given to monitor mix in a classical context - I think this is because you just assume you are not going to hear certain things? Not sure why monitor mix doesn't come up as much in amplified settings for contemporary classical music. Maybe it has to do with keeping the stage volume down since most of the time musicians are using these lavalier mics that feed back more often in comparison to instrument pickups.

#### Familiarizing myself with Ableton Objects

Adjusting things in the van helped. I feel like I know the Reverb object pretty well. I think I'm going to read more forums tonight and think about this object some more, and how I can be more familiar with the different settings. Might also be worth trying to swap out with other reverbs (? third party plugins??? what am I turning into)

#### 2017-12-24

I set a cellphone in the back of the Cafe Nine venue to see how the mix sounded, and finally had a chance to review it. I mostly wanted to check on my intonation, because I am often surprised when I hear cellphone recordings and I am out of tune - I honestly thought I was putting the pitches in the right place in those songs. my sense of whether or not the intonation was good or bad was largely affected by (1) if I was sharp (mostly always sharp) in relation to stuff, which is a matter of proper monitoring and (2) balance!

By the end of the set, the sound engineer had turned me down, and even though my violin had been knocked out of tune, and it didn't bother me so much. In chamber music contexts, intonation is a matter of pitch but also a matter of proper blending - if your sound is too different from the sounds around you, it will sound out of tune. And my impression, when the violin was turned up too hot, was that the violin itself sounded thin, piercing, and mostly... sharp. So maybe adjusting the reverb for a generally darker sound is warranted.

But it seems like the engineer EQed it that way himself, after a while. Which brings me back to how performers in any of these contexts are really subject to the engineer. They control if you can hear yourself (at least when it comes to monitor wedges..), they control how you are balanced... so the bad ones, like in Knitting Factory, Songbyrd... really can make things sound bad. It's really a shame. I was talking to Earl about it, and I guess those jobs really pay terribly, but those people really are essential, you know? Almost more essential than the players...

#### 2018-01-28

Spoke with Jay on the phone today about volume levels. I was originally controlling volume with a fader, but it seems like it would be better to have three

“levels” of volume instead. I can adjust volume to some extent myself by simply playing my instrument louder or softer. We discussed stuff in terms of decibel levels, but honestly, I don’t really know what that means, aside from the basic parts like decibel units are on a logarithmic scale.

The actual definition: “a unit used to measure the intensity of a sound or the power level of an electrical signal by comparing it with a given level on a logarithmic scale.” Looking at articles on the internet

(<http://www.animations.physics.unsw.edu.au/jw/dB.htm>), it seems like the best way to get used to relative decibel levels is to experience them yourself. So the three levels of volume that Jay suggested (that we talked about in rehearsal too) were my loudest, at 0 db, a slightly lower volume at -4 db, and a slightly lower volume again at -8 db. Jay also suggested soundchecking at the loudest volume.

It turns out it is more difficult than you would think to send specific CC messages to an object in Ableton that receives CC messages. So I have to spend some time working that out; though I’m really not sure if it’s necessary. I am not sure if it was because Jay wasn’t commenting on it because I haven’t worked it out yet, but I felt like I was managing volume pretty well. I still need to listen back to (a couple.. ugh) weeks of voice memos to see where I actually am on that.

\*Addendum, 1/1/2019: This solution was not implemented, but using Softstep Advanced Editor it is possible to send specific CC values.

2018-04-02

OWEL instrument level..

We have a show coming up on April 10, and I’ve been thinking more about how most of the things I can control happen really at the level of the instrument. It seems like the best thing is really to exercise control at the level where you feel comfortable - and while stompboxes probably feel good to a guitarist, I’m not so sure they make the most sense for me, who needs to balance a lot of stuff. Honestly, I’ve been down on the whole MIDI foot control thing lately anyway. I think at most, effects in blocks are fine, but fine control over volume should probably be at the level of my instrument. I think there is actually a lot of range (and maybe this is worth experimenting) even if the amplification level is kept at a constant level.

I’m not sure if this was just a phone placement thing, but it really did seem like my violin level was overall too low in relation to the rest of the group at rehearsal last week (3/30) but that might have also been (esp. because whenever I played between songs, it was quite loud)

Either way, I could hear myself fine in my headphones, so I think as long as I feel

like that is managed okay, the levels of myself in relation to the group are really out of my hands, until we arrive at some solution that gives the group control over the mix.

I guess it would be good to have more of an accompaniment level (probably 100 on my CC control) and then have solo level be 120 on my CC control or something like that. I'm going to try that today and see how it goes..

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I guess that worked.

#### 2018-04-26

I was feeling pretty sick last night and just barreled through. We worked on "A Message" which is a new song where I play lots of arpeggiated chords and sometimes melody. Seamus, mostly on keyboard or guitar in this piece, was here this week - he had to skip last week - and the keyboard definitely changes some stuff with intonation. Sucks.

My input kept clipping in Ableton, so I started fussing with the gain on my DI box and wonder if there's a way to boost the output from my audio interface. That way, I can send a grounded cable to the mixer and just plug directly in. It looks like the internet's saying an FX loop will work with a looper in it, so I'm going to try it tonight. But in the moment, I boosted the gain in the EQ object in Ableton.

Jay also started workshopping a new song - so he tried to give me a bass line - but it really worked much better when Nunzio was doing it, so I went back to paying random stuff. When playing random stuff, I've been using my wetter Ableton channel. I should record it sometime to see how it sounds.

Jay was also asking for an increase in reverb. I think it might be easier to have a pressure button with wet/dry mix for reverb in one channel. I also need to figure out a good system for adjusting delay - on/off worked okay, but it's getting more complicated now.

Things to try:

+/- reverb (in A Message)

+/- delay (in A Message)

from before: volume "stages"? I kind of left this alone.

I think it would be great to record memos of the upcoming tour. Since the experience of the posthuman is so heavily dependent on distributed cognition, it seems like having a random sound guy (where an entire element of a distributed system is replaced from venue to venue) every night would make a humongous

difference.

#### Pianos show reflections

I thought it went okay, but the guys kept talking about how it didn't go well. I'm not sure why they thought that. Mostly, they received feedback from friends and family and they were like "that sounds bad?" aside from the fact that this is rude, very rude, I'm kind of of the mind that really the only way to objectively know how he sounded is to get a mix from the board. I guess there's no way to get that without getting charged more money, or something like that. It's pretty weird! I feel like contemporary folks ALWAYS want a mix from the board. But I guess these bands aren't really looking at grant application materials, etc...

The band was also like, should we schedule more sessions? But.. what's the point, when you can't even hear the mix in the room? They were having a lot of trouble hearing in A Message and I feel like it's that way all the time.

2018-05-04

Rehearsal yesterday (5/3) went pretty well. I put my fx through the effects loop on ym audio interface - I'm not really sure if I can use it though. The FX loop blends the processed and dry signal, and there doesn't seem to be a way to adjust it. It is generally drier, and when I use things like the octaver effect, then it doesn't really work. I'll probably bring both sets of cables for the tour and adjust based on what I prefer.

Reviewing rehearsal voice memo:

:30 - burning house - seems okay, not a lot of reverb even though I thought it was a lot to me. This probably had a lot to do with using the effects loop.

5:30 - too young to fall in love - this is all keyboard, so... whatever, lol. I never really know how loud I am, and really don't know when I'm playing keyboard.  
19:00 Paper Hands - grabbed my violin pretty late. I'm always kind of amazed how I barely sound like I'm there in context, especially with the monitoring.

22:06 (actually 22:30) No parachutes - alone I guess I stick out. Wish I was in tune... not so bad though!

38:45 All I Ever Know - Blend is actually pretty good; I thought I was way out of tune when I was playing . I get a lot more reverb through my in-ears - hte sound from the FX loop/DI is a lot drier.

48:30 Snowglobe - tremolo bits not so bad. I think going "light" with bow weight really works! Octaver effects definitely is blendd. Definitely +1 for going back to old setup. So hard to not be sharp in this song...

58:00 A Message - Delay sounds pretty cool - maybe I'll learn my notes someday. Also balance may just be that my phone's getting blastd. The guitars are always so loud. My reverb +/- pressure works!

1:03:43 Funeral - why is the low C so buzzy? I'm starting to hear that fuzzy sound

that I never liked about Caleb's tone.

[from second memo]

4:00 downtempo version of weather report - used harmonics and they seemed a lot more blended in the room than they did in the recording. Hrmmm.  
8:00 did paper hands again -  
18:47 good night - seems a lot drier in the PA too.

I think the final verdict is that I should switch back to the old setup. At least I tried!

2018-05-12

Reflecting on Lakewood, OH show yesterday (2018-05-11).

We had the opportunity for a soundcheck where we could get monitor levels. I changed back to my old setup where my audio was coming out of the interface, and it seems fine. I need to secure the DI box to something inside of the interface, it's bumping around a lot in there.

The prep situation (with load in, where we could keep equipment and the amount of time we had to test sound) was pretty normal. We also didn't have to unplug our equipment which was nice.

During the set, I had plenty of time to get settled, but definitely reset my laptop because I heard clicking and stuff.. I should just take it off stage and not let it sleep. My wireless cut out occasionally too, but nothing crazy.

EQ wise, it's all sounding a little thin in my headphones. I think maybe some things got moved during the ride, so I'll take it out and see what's up. I should probably turn the gain down a little bit, too, but I was clipping a lot more than usual in the Ableton session.

I fixed the octaver issue in Snowglobe - the issue is that I'm sending to a different send with delay, and so I just dropped it in the arco channel. But maybe it should go in the Master channel instead? Maybe most of my global effects should go in the master channel. I like having the reverb in a send, though.. I used the octaver at the beginning at Snowglobe and it was pretty cool.

I think I need to hear more of Jay in Burning House, and I wasn't super sure of my intonation in Snowglobe. It's so hard to tell..

Forgot to record this concert in the rush of setting up. I'll place the phone in the back of the house before our line check tomorrow.

2018-05-13

Where? Played the show in Indianapolis at Hoosier Dome yesterday. It was pretty much a run down empty room, with an okay sound system and an engineer, but not much else.

Did you sound check? No, we had a brief line check before. We did have a chance to check monitor levels during the line check, and I turned my in-ear monitors down a little and it sounded much better and I felt like I could blend.

Did it go well? I thought it was better. It was nice to have the monitor levels louder on the vocal mic and keyboard. I didn't really need my monitoring, but with me turned down and with better general level of everyone else on the stage (which was smaller than the lakewood stage)

Any technical issues? I didn't have any issues with the monitor cutting out this time, which was kind of nice.

I got a recording this time! Listening to the recording:

I placed my phone on top of my bag, plugged down into my charger. It sounds a little muffled, but based on what I heard from the other band, this is probably just the phone and where the phone is placed. Theres definitely some commotion from people standing nearby.

25:00 Burning House

26:00 Violin entrance. E string pops out a lot.. this might be EQ on the mixer, or from me, I'm not really sure.

27:00 Intonation is pretty good. I think part of sounding out of tune this way is being a little too prominent in the mix. Maybe for the second entrance I can turn down a little bit, or just have stuff generally down (~100) until the loud part at 28:00.

28:00 I get kind of drowned out. It's okay, I think.

30:30 Too Young to Fall in Love

30:41. Damn. You can hear the keyboard a lot in the monitor but it's pretty reasonable sounding, not too loud or too soft, in the house. Keyboard level pretty much remains there for the whole song.

32:50 Harmonies reasonably in tune here, keyboard is still pretty up in the mix

33:41 More harmonies, this time I go up high, which is.... okay. I should probably not sustain where I think I'm kind of loud. I kind of felt that was the case when I was singing, anyway.

Hahaha, there was the point where Seamus thought the keyboard was too loud but the sound guy stepped out. So that was funny.

35:35 Weather Report

Damn, the hi-hat is really, really loud..

36:36 all the high stuff sounds really really loud. This might just be my phone.

Vocal harmonies there were okay.

37:01 Violin entrance - I get pretty buried here too.

38:00. Don't crescendo so much on vocal entrance, it's too much now

39:20 I get totally buried here. But nothing stands out as out of tune, at least.

Really, all I can hear is Seamus.

41:00 Paper Hands

42:30 Keyboard sounds mixed well. I can't really hear that part where I just harmonize with jay.

43:11 Harmonies with jay and Seamus are on point

44:20 Same deal as 42:30. Keyboard is kind of drowned out

44:55 Violin entrance sounds. E natural a little high

47:45 No Parachutes

48:00 The staccato material actually sounds better than it feels playing it on stage.

48:30 So do the double stops. Maybe I need to turn down my in ear monitor for this song.

50:35 Oh boy you can actually hear the part where I sing. At least it's in tune?

51:36: Gang vocals also audible.

53:00 Snowglobe

54:00 Violin entrance with tremolo not too loud, balanced well

54:32 Can't hear here (or remember if I came in..)

54:45 Octaver sounds good. Intonation is also better, which is nice.

55:51 Vocal harmonies good, non-octaver violin also in tune finally. I think on smaller stages it seems easier to hear everything, and that is directly related to being in tune.

57:45 Keyboard seems mixed well. I need to maybe increase reverb and decrease the volume in the parts where I need to fade in and out.

61:05 Final keyboard bit also mixed well. That clearly has nothing to do with anything anyone did since I basically turn everything all the way up

2018-05-14

Where? Yesterday, we played a show in Chicago at Subterranean Downstairs.

The venue is a bar, with no green room space. I know these memos aren't really a place to complain about gritty venues, but these venues are... gritty. There's literally no facilities, or places to stash gear. The stage was really, really small, so the amps were kind of on top/in front of each other.

Did you sound check? No. We had a brief line check before the show. When the

track is played is a good time for the sound check to get an idea of levels and stuff. I've been playing along, mostly to make sure that my in-ear volume is good for me. Usually when I check with that (mimicking the full context) I don't really have to adjust my in-ears much.

Did it go well? Not really. Nunzio's bass amp crapped out and this apparently threw everyone off. They were all complaining about it afterwards. I felt okay, mostly because the venue was so small and I could hear myself. But I was also feeling weird about Chicago, and unhappy to be in that space. But there wasn't much room to move around, and the venue was just really... loud. I'm interested to hear how the phone audio sounds, but I get the impression that it's going to be a lot of treble stuff like hi-hat. We'll see how in tune I feel when I am listening to the recording, but I suspect it shouldn't be too bad.

Any technical issues? On my end, not really. I feel like everything's been happening pretty smoothly, especially since I got rid of the wires from last tour. Occasionally stuff from the in-ears cuts out, but it hasn't happened the past two times.

Recording? Yes, I left my phone by the merch table.

Listening notes:

12:00 Burning House

13:11 violin entrance - I really should vibrate. Not sure why I didn't this time. For the second entrance (13:50) the violin doesn't poke out so much, it feels a little better.

14:47 the keyboard strings (or track)? are way, way, too loud compared to my soft entrance in the beginning.

15:16 - the guitars are really sharp. I think it's Seamus? I feel a little sharp in the lower register, and then when I'm in the higher register (16:08) it's better. Vibrato would have helped here, too.

16:29 - Articulation seems right for the staccato section

17:10 Too Young to Fall in Love

Keyboard pretty loud in the mix here. I was kind of annoyed and hitting the keys kind of hard. Particularly at 18:10... hahahahaha.. ugh.

19:16: Keyboard is now softer. Must have been turned down at the board.

19:40: Can't hear my vocals at all.

20:45: Not sure if these are track or my voice, but you do hear harmony here.

23:00 Weather Report

Jay just kind of starts, this is something that Ryan complained about later.

23:48 vocals pretty soft.

24:05 hi-hat just.. comes in? ehhhhh. Violin is pretty low in the mix, and I feel

pretty sharp..

25:35 Keyboard mixed well. Can't hear the vocals at all really..

26:39 violin more blended here, doesn't match up with guitar but it's pretty hard to tell who's sharp. Does the reverb have an effect on how flat or sharp it sounds? Seamus did just get another reverb pedal...

28:50 Paper Hands

29:30 Oops, wrong patch. Changed it mid phrase. Smooth. Keyboard is mixed pretty well throughout, though.

29:50, can't hear my voice at all.

30:15 You can hear me and Seamus here.. weird.

31:10 can't hear voice again.

31:44. I can't tell if I'm just imagining the vocal harmony?

31:57 violin is mixed kind of too low. Why does it seem like I didn't vibrate at all this entire set??

33:27 Nunzio replaces his bass amp; Jay plays Blue Moon

36:46 No Parachutes

37:20 I'm a little sharp and too prominent in the mix the whole time in the first part T\_T Double stops sound a little better, and are mixed in well

38:30 sustained part mixed pretty well.

39:40 voice comes out? I'm actually curious if it's in the track...

40:42 gang vocals sound pretty good. It's probably because the room is so small.

42:00 Snowglobe

43:02 That first crescendo is mixed pretty low. I could probably stand to come in a little sooner.

43:51 Octaver reasonably in tune. The room is so small you can hear the acoustic instrument, hahaha

44:45 Voice harmonies mixed low.

45:25 Gets kind of sharp... too bad. Was sitting much better yesterday. Maybe I'm just listening to the wrong stuff sometimes? I guess this part sounds wrong mostly in relation to the bass, which might have been a Nunzio thing.

47:10 The synth swells weren't as abrupt this time when getting softer. Cool..

Keyboard is mixed pretty well at the end. Not too loud.

[I think the engineer got the hang of the keyboard and where it should be. Though there's no way to know if he really was paying attention...]

49:59 Why did I hit the keys so hard at the end? Jeez...

2018-05-15

Where? We played a show on 5/14 at Fubar in St. Louis. The venue is a bar, and there's no green room space. There were six bands, so there was a lot of time to

get a sense of how the hall sounded, which was basically.... loud, and harsh.

Did you sound check? We had a longer than usual line check where we played a little bit together. It wasn't too bad. The sound guy asked me if I had any tips for mixing violin, and I just told him to turn the highs down when EQing, and that I had in-ears and didn't need much in the monitors. Maybe I should have told him that it should generally sound even. Not too boomy, not too treble-y.

Did it go well? Any technical issues? I guess it went pretty well. I was drunk. I was also pissed that we got there an hour earlier than load-in and that it was super hot outside and then I was really sweaty. On stage it felt pretty good, so I guess the monitor situation was pretty good. It also seemed like nothing cut out, or malfunctioned this time, so that was cool..

Recording? Yeah, I left my phone by the merch table. It's under the table on top of a drawer, so it might be a little more muffled. I viewed it as how I would hear it with a bunch of tissue in my ears... I also recorded a bit of the Plans set because I was curious..

30:00 Sound Check for us

32:00 track sounds pretty muffled.

34:31 E major sound check riff

35:40 Burning House

36:51 Intonation in first entrance is ok, initially too prominent in the mix and I guess he brought my level down. Nice.

38:24 No complaints about level in the second entrance..

39:17 Didn't get drowned out in the loud part which was pretty cool

40:10 Violin and guitar match up pretty well, it's nice. Seems like the right articulation.

40:36 Made it to the keyboard in time. Cool.

40:52 Too Young to Fall in Love

Hrmm, messed up keyboard in this song a little bit. Maybe I won't drink so much.

41:48 I think whatever I did the other day touch wise was actually best. This was less aggressive than the Chicago show

43:22 Can't hear harmonies that well, but they are uh.. there. Got kind of screamy at 44:35.... hrm

46:31 Weather Report

47:13 Oops. Voice too loud! All sorts of weird balance issues in this set...

47:39 Volume too low here. Maybe I should have just kept it at the normal level.

48:42 Seamus is so out of tune... wtf. I feel in tune I guess if we are too close but not matching, then I feel like I am out of tune.

49:10 I have to taper phrases a little better. Sustaining the whole way, when actually miced, does not sound like it matches Jay's voice well.

Fun pop that stopped the set briefly at 49:30.

50:18 can't hear keyboard. Guitar/bass/Jay very prominent

50:40 violin actually comes out here. Nice! feels pretty balanced for a change.

### 53:10 Paper Hands

Keyboard at beginning sounds mixed well

54:41 I am changing to the word "it" too late now.

55:40 Vocal entrance works out here too.

56:22 I pressed the volume pedal and it was way too soft for like a second. I really shouldn't do that. I do sound in tune when you can hear me though..

### 57:20 No Parachutes

Violin Pizz and keyboard Ds sound really blended.. lol.

57:46. This worked well! Kept stuff super short, stuff is blended. There is some feedback..

58:10 double stops also pretty balanced, in tune

59:15 Violin blended here. Mostly, you hear the MIDI track.

60:30 Is there voice in the track? Is it me? I can't even tell... Violin comes out in the mix, so that's good..

I don't have many complaints about the mix. Bass seemed a little loud throughout in this run, but violin seemed reasonably in tune and blended..

### 62:40 Snowglobe

64:02 Violin pokes out a little here, nothing crazy. I think the reverb channel is just a bit lower. Jay's having some feedback.

64:19 Can you hear the violin in the house? I don't think it's coming through the PA.. The octaver is kind of cool, but also sounds kind of dead. I don't really know if I am sold by it

65:15 voice mixed well/in tune. Violin entrance here sounds especially muffled. I don't remember it sounding this muffled in earlier points.. but I did switch back for the last phrase (around 66:10) and it sounds better.

67:13 keyboard mixed in. Maybe I'll turn the reverb up a little bit when I go over to the piano next time. Hopefully I remember tonight!

70:30 Why did the electric piano patch sound so muddy today!? I need to put my phone somewhere not covered by an object..

[note: priorities for what I am listening for??]

2018-05-16

Where? Played a 9pm-ish set in Oklahoma City at 89<sup>th</sup> Street Collective. It was a warehouse-y venue with a lot of concrete. There were four bands and we had lots

of time to get set up before our set. Noam drove in from Tulsa, he seemed like he liked it a lot. I don't think he was lying about it.

Did you sound check? Nah, just a line check before the set. But the engineer was really great and we had plenty of what we needed in the monitors. I think the guy had worked with the band before..

Did it go well? They all thought it went well. I could hear my voice much better than usual, and I'm not sure if it was because if it was in the monitors (it probably was) or reflecting off the room, which was basically a bathtub (it probably was that too.)

Any technical issues? No, didn't seem like it! They were all wondering about wrong notes in Seamus's parts, and I definitely played some wrong notes in the keyboard and the violin part (???) I was a little preoccupied about losing my cellphone.

Recording? I misplaced my cellphone so I didn't get the usual recording by the merch table. Noam took a recording of the set on his laptop, though, but it was on a table to the side of the PA next to the stage so I'm not sure how good it's going to sound. Not that the iPhone recordings sounded good..

#### Recording Review:

Yeah, the mic is clipping already in the beginning of Burning house... I'll keep listening because I'm curious how it sounds through the microphone. I feel like a less cool version of Bartok right now with these ratchet memos...

0:00 Burning House

1:33 Violin entrance in relation to everything else sounds pretty smooth on laptop audio!

2:08 Oh man, drum definitely clipped stuff.

3:00 violin entrance 2: Maybe don't gliss and be careful on shift up to third position..

3:33 violin gets drowned out here by Seamus's stuff. I can't tell if I'm hearing it barely because I'm listening for it, or if someone not listening for it would also hear it?

4:24 Maybe less sustained in the longer notes part when I switch to quarter notes. It's interesting how things don't match up as well in reality as I thought they would in my head...

5:33 Too Young to Fall in Love

5:55 lmao you can't hear the keyboard at all from this angle. It's probably just a laptop position thing.

I like the drum hits and how compressed they sound at like 6:33. I kind of want to steal them in the unlikely event I have the patience to make a piece..

6:57 Oh you can totally hear the keyboard here. I think it's a laptop audio thing.  
8:05 Oh! You can hear the vocals! they're mixed pretty well.

11:48 Weather Report

Piano at beginning is mixed okay

12:42 into in guitar is kind of funny

12:52 violin in mix pretty good! I'm sharp but matching guitar? Don't even know what to do in this situation lol. I'm tending a little sharp in this section in general. Not sure what I was listening to to get there but wondering if it was relying on the guitar too much.

14:18 keyboard mixed well, vocal entrance totally not audible in recording.

15:19 Violin totally covered by guitar at first, pops out of texture in fifth bar of the phrase

16:00 I'm a little sharp here too but not sure what to do about it.

17:46 Paper Hands

18:27 Piano is mixed well.

18:40 Harmonies are good here! Generally keyboard and harmonies etc are mixed pretty well.

20:48 Violin a little low in the mix but I don't really mind. Sounds blended enough from here! Crescendoing at the end feels a little extreme but is actually not so bad sounding from this recording.

21:52 No Parachutes

22:16 Violin a little too hot in the mix this time. Probably should have it down to like ~104. It sounds great when stuff gets loud though..

24:11 Violin blended well here, mixes with track.

24:40 High violin and voice blended well. I suspect the voice may be track though. Tonight, I am going to sing really soft and focus on violin, and not do vocals, and that way we will know (!) if it is in the track!

25:50 Gang vocals are cool..

26:53 Snowglobe

I totally remember messing up the beginning line of this. Whoops..

28:24 Washy effect is cool.

28:31 Here we go. I'm definitely going to just not use the octaver effect here from now on.. I'm a little sharp again, particularly the C# and E notes.

Other notes: The band actually listened to this recording in the van on the way to the next show but mostly assessed details of performance like drums, pitch and rhythmic mistakes.

2018-05-17

Where? Played a late set (around 11..) in Springfield, MO at FOH Lounge. It was a bar venue with a smallish stage. The sound for the earlier sets was not nearly as loud as the last two venues, which was kind of nice. But it seems like the engineer doesn't blast everything, so I think a lot of the stage noise comes from the amps.. Plans was way louder than the first name, whose name I can't remember.

Did you sound check? Had a line check before the set.

How did it go? It felt pretty good on stage. I had some issues getting my in-ear levels right, I think I kept turning the damn volume knob with my arm.

Any technical issues? Not that I remember, aside from my in-ear volume level being stupid.

Recording? Yes: back by the merch table. I hear Cody and Aubrey talking sometimes.

#### 28:48 Burning House

30:00 Came in a little too hot at the beginning of burning house. I think in these amplified settings it's really important to pay attention to articulation.

31:28 Keyboard strings are really strong here, they at first kind of drown out violin. C sharps are better in the violin than the night before though.

32:45 I am pretty low in the mix the whole time, which is funny because my in-ears were SO LOUD. Ouch.

33:41 Made the piano transition, that was cool.

#### 33:55 Too Young to Fall in Love

Keyboard levels seem fine. Seems like he brought it down generally in relation to what it was in Burning House.

36:24 Voice is audible, and in tune

37:30 Held the last vocal note a little too long.

38:57 Weather Report More talking from girls at the Plans merch table. Or someone. Maybe it's those two drunk girls that chatted us up after the set.

40:08 Keyboard level blended well, actually, maybe my harmonies were a little too prominent.

40:30 Violin covered in beginning, and stays pretty low in the mix. Maybe I had it too low.

41:54 Yeah, vocal harmonies are way too prominent.

#### 45:10 Paper Hands

46:00 Keyboard level makes sense.

46:43 Jesus, that guy had my vocal mic so much louder than Seamus in the mix

when we sang the three-part harmony. It's nice to hear myself, but damn..  
48:31 Violin level at least makes sense.

49:26 No Parachutes

49:45 Violin level not too loud this time.. which was hilarious because I thought my in ears were so loud.. I get a little covered in the loud section.

51:27 Violin actually sounds pretty balanced with Seamus here

52:15 I think the voice is actually in the track.. I guess that's probably better than it's that way.

53:10 Gang vocals are okay.

54:30 Snowglobe

The reverb stuff is so sharp in the beginning. At least the violin entrance (56:20) is a little less sharp.

56:40 Never mind, it's still sharp. Damn. The B naturals really stick out the most to me.

As I go up the scale it just gets sharper

Listening Objectives:

Mostly listening for balance, intonation, "blend". Blend is how much timbre and articulation match up to stuff around.

Also thinking about the engineer's job. I think mixing a group like this is hard because there aren't really static relationships that the instruments have to one another. Sometimes I play pads and need to be mixed a particular way, sometimes I play a lead part and need to be mixed a particular way.. And sometimes pads or a lead part need to be a certain level in relation to other stuff in the context.

2018-05-18

Where? Played a later set at a small venue in Nashville called Cafe Coco.. and by small, I mean all the stuff all the bands on the bill brought would have filled that room and there would have been no room for people. The engineer was a bit of an eager beaver and kind of got on my nerves. But he was talking the entire time about how he listened to a recording of us to get an idea of how we are mixed, and that was encouraging.. until the set started and everything was crazy.

Did you sound check? We had a very brief line check just before our set when everything was set up.

How did it go? It was very, very loud in that room. The sound guy (who even said that stage volume was an issue in the room) blasted the track and keyboards in the monitors. Honestly, in a room that small, I'm not sure we would even have needed much in the way of monitoring. That PA system kind of seemed too big for the space.

Any technical issues? The stage volume was so loud that I couldn't really hear my in-ears. That's how loud it was. So there were probably some issues with intonation and stuff...

Recording? Yes: back by the merch, and up high.

#### 22:12 Burning House

The recording sounds pretty muffled. It's probably because it was so loud. Violin level seems a little high, but what can you do. Aside from a bad shift to third position intonation seems okay in this context.

Got some feedback, 24:25..

25:00 Oh god, it is already REALLY loud.

26:00 It's really loud and the phone goes back to that muffled sound, but things, aside from generally sounding like they are underwater, sound fairly balanced.

#### 27:20 Too Young to Fall in Love

Keyboard level seems fine. It seemed so loud in the monitor...

30:02 Can't hear harmony voice at all.

31:03 The bass is CRAZY loud, hahahahaha

31:30 Oh, you can hear harmony vocals there... ok.

32:00 The recording goes up to normal volume ...

#### 33:00 Weather Report

34:04 voice harmonies are okay in the beginning.

34:13 Muffle city. Intonation seems okay, and based on the recording violin seems pretty prominent in the mix.

When the loud part comes back it's still pretty balanced.

Gets a little sharp at points in the 37:00 territory.

#### 38:12 Paper Hands

39:00 Keyboard volume seems okay.

40:15 Can't hear my vocal at all in the three-part harmony, also, it was so loud on stage it was impossible to know if I was in tune.. which, uh, we weren't

41:05 Can't hear harmony vocals at all.

41:50 Totally came in late. But was okay in tune?

#### 43:05 No Parachutes

43:30 violin is so loud..... I'm turning it down to 100 today.

45:22 It sounds more blended in the louder parts though

45:59 high violin sounds pretty good in relation to everything here.

47:00 Microphones didn't pick up the gang vocals at all

#### 48:00 Snowglobe

C sharp is a little too high. Definitely less sharp than the day before  
51:19 Violin still too prominent in the mix for me personally, but I feel better  
about this show compared to the other one.

2018-05-19

Where? We played at a radio station called Big Room Bar in Columbus, OH. It  
was a largish room with a roomy stage, and a bar in back.

Did you sound check? [taken right after the soundcheck] We actually got a  
soundcheck! We played through No Parachutes, the engineer asked for our sound  
at whatever levels we were going to play at.. so that was, uh nice.

[taken later..]

The engineer did such a thorough sound check that it made me feel pretty good  
that he would mix stuff sensibly in a way that makes sense with the room.

How did it go? It went pretty well! I could hear pretty well on stage, and

Any technical issues? Not that I remember. The engineer had the whole system  
basically on lock so that was nice for a change...

Recording? Yeah, right by the merch table, which was to the side of the PA  
system. Not the best place but didn't want to leave my phone by the bar. Typical  
close-to PA sound where everything sounds a little muffled.

17:40 Burning House

Violin mixed really well, it actually sounds kind of natural. I wonder what the guy  
did...

20:20 The part leading to the final loud part sounded a little muffled, but that  
might be cellphone placement.

20:50 Violin gets covered here.

22:10 staccato violin comes out, which is nice..

22:35 Too Young to Fall in Love

Keyboard hard to hear in the mix. This could all be microphone placement..

23:59 Okay, you can hear it in the loud part.

25:10 You can hear harmonies, that's cool.

28:00 Weather Report

28:45 Keyboard light in the mix, voice harmonies audible but not too loud

29:00 violin light in the mix again, but audible. I sense a theme....

33:30 Paper Hands

Vocal harmonies are background like in weather report.

Violin at the end also light in the mix. This may also be a phone placement thing.

38:00 No Parachutes

Violin intonation okay to me... The violin sounds pretty natural, but definitely "thinner" than the rest of the guitars..

40:00 Blends with the string sound.

41:00 Voice and violin blend okay. Can't tell if the voice is me. but whatever.

42:12 Muffled, probably a phone placement thing. I wish we could get a board mix. The AWS board mix I listened too was very clear...

43:06 Snowglobe

44:30 effects are okay? I wish there was a way to make this blend more.

45:16 the intonation gets a little sharp sometimes, but generally the pitch is better, not too sharp until you go up the scale

45:45 Can't hear voice at all

46:13 intonation good! I don't really remember if I was tuning to other things, but I imagine that I was just consciously trying to keep the pitch down. Seems like when I try and play with what I hear, I am sharp.

47:40 Man, can't hear keyboard strings at all.

49:00 Okay, now you can suddenly hear the keyboard? Weird...

50:58 Can hear the bell effect. Maybe the sound guy was dialing the stuff in and out?

We played All I Ever Know at the end of the set. Mix generally has violin pretty light.

## APPENDIX G

### OWEL RECORDING ANNOTATION

The recordings of the sets from the May 2018 tour are embedded as unlisted YouTube videos timepoints at <http://pattikilroy.com/owel-dissertation>. The password is “owel.” Video files are also available upon request via <http://www.pattikilroy.com/contact>. In Chapter 4, references to videos are found in footnotes with the YouTube link and corresponding timepoint. Shortlinks in footnotes open directly to the discussed timepoint in the video.

The videos are accessible individually via the links below. Each performance contains a table individual links for each set with video timepoints for each song. Line check activity and songs are included; talking between songs is in the YouTube video, but not included in the table.

Show	Timepoints	Activity/Song
Indianapolis, Hoosier Dome		<a href="https://youtu.be/QZqz9f4BD50">https://youtu.be/QZqz9f4BD50</a>
May 12, 2018	0:00-4:09	Line Check - Guitar
	4:10-6:33	Line Check - Drums
	6:34-7:21	Line Check - Bass
	7:21-7:45	Line Check - Violin
	7:45-8:40	Line Check - Keyboard
	8:40-9:49	Line Check - Vocal Microphone
	9:49-11:06	Line Check - Sakong's Guitar
	11:06-12:14	Line Check - Drumset, Electronic Track, Bass
	12:14-12:36	Line Check - Background Microphone
	12:36-17:55	Set - Burning House
	17:57-22:39	Set - Too Young to Fall in Love
	23:23-28:35	Set - Weather Report
	29:26-33:23	Set - Paper Hands
	35:13-39:59	Set - No Parachutes
	39:59-49:00	Set - Snowglobe

Show	Timepoints	Activity/Song
Subterranean, Chicago		<a href="https://youtu.be/26uZhDVW4Bo">https://youtu.be/26uZhDVW4Bo</a>
May 13, 2018	0:00-1:02	Line Check - Guitar
	1:02-1:57	Line Check - Violin
	1:57-2:20	Line Check - Background Vocal Microphone (Patti)
	2:20-2:39	Line Check - Keyboard
	2:57-3:44	Line Check - Background Vocal Microphone (Seamus)
	3:44-4:11	Line Check - Speaking Microphone
	4:11-4:52	Line Check - Laptop Electronics and Band
	4:52-5:52	Monitor Mixes
	5:52-11:16	Set - Burning House
	11:16-16:00	Set - Too Young to Fall in Love
	16:00-22:08	Set - Weather Report
	22:45-26:52	Set - Paper Hands
	28:06-30:50	Technical issues
	31:02-35:58	Set - No Parachutes
	35:58-44:57	Set - Snowglobe

Show	Timepoints	Activity/Song
FUBAR, St. Louis	<a href="https://youtu.be/7uIzWuKbHrw">https://youtu.be/7uIzWuKbHrw</a>	
May 14, 2018	0:00-1:56	Line Check - Background Vox
	1:56-3:02	Line Check - Keyboard
	3:02-3:30	Line Check - Violin
	3:30-4:44	Rechecking Keyboard
	4:44-7:02	Line Check - Guitar
	7:02-7:48	Line Check - Drums and Electronics
	7:48-8:17	Line Check - Drums
	8:17-8:52	Line Check - Sakong Guitar
	8:52-9:48	Line Check - Whole Band
	9:48-15:08	Set - Burning House
	15:08-20:47	Set - Too Young to Fall in Love
	20:47-27:20	Set - Weather Report
	27:20-31:38	Set - Paper Hands
	31:38-36:28	Set - No Parachutes
	36:28-45:17	Set - Snowglobe

The concert at 89<sup>th</sup> Street Collective was recorded on a MacBook Pro due to technical issues with the iPhone. Audio quality is consequently much worse than the other recordings. No audio recordings were taken of soundcheck, but a line check occurred before the set.

Show	Timepoints	Activity/Song
89 <sup>th</sup> Street Collective, Oklahoma City		<a href="https://youtu.be/NoxDLNafk90">https://youtu.be/NoxDLNafk90</a>
May 16, 2018	0:00-5:26	Burning House
	5:26-11:49	Too Young
	11:49-17:38	Weather Report
	17:38-21:49	Paper Hands
	21:49-26:27	No Parachutes
	26:27-35:26	Snowglobe

Show	Timepoints	Activity/Song
FOH Lounge, Springfield		<a href="https://youtu.be/pTG2AQKvrzw">https://youtu.be/pTG2AQKvrzw</a>
May 17, 2018	0:00-2:14	Line Check - Drumset
	2:14-3:06	Line Check - Guitar, Drums, Track
	3:06-5:24	Line Check - Guitar (Sakong)
	5:24-6:21	Line Check - Violin
	6:21-7:28	Line Check - Keyboard
	7:28-8:41	Line Check - Lead Vocals
	8:41-9:37	Line Check - Background Vox
	9:37-14:52	Burning House
	14:51-20:10	Too Young to Fall in Love
	20:10-26:08	Weather Report
	26:08-30:15	Paper Hands
	30:15-35:18	No Parachutes
	35:18-43:40	Snowglobe

Show	Timepoints	Activity/Song
Cafe Coco, Nashville	<a href="https://youtu.be/340CTYFxGoY">https://youtu.be/340CTYFxGoY</a>	
May 18, 2018	0:00-0:45	Line Check - Violin
	0:45-0:59	Line Check - Keyboard
	0:59-1:33	Line Check - Guitar
	1:33-1:41	Line Check - Keyboard Monitor
	1:41-1:46	Line Check - Drumset
	1:46-2:52	Line Check - Bass
	2:52-3:40	Line Check - Lead Vocal
	3:40-5:06	Line Check - Tracks and Band
	5:06-10:35	Burning House
	10:35-15:55	Too Young to Fall in Love
	15:55-21:55	Weather Report
	21:55-25:58	Paper Hands
	25:58-30:51	No Parachutes
	30:51-39:22	Snowglobe

The soundcheck in the afternoon was not recorded; the line check prior to the set has been omitted from the recording.

Show	Timepoints	Activity/Song
Big Room Bar, Columbus	<a href="https://youtu.be/3AGvz9lvCsw">https://youtu.be/3AGvz9lvCsw</a>	
May 19, 2018	0:00-5:15	Burning House
	5:15-10:41	Too Young to Fall in Love
	10:41-16:31	Weather Report
	16:31-20:41	Paper Hands
	20:41-25:45	No Parachutes
	25:45-34:09	Snowglobe