## Integrating Performer-Controlled Electronics in a Post-Percussive Practice

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### Abstract

The integration of electronic devices into Western contemporary instrumental practices has emerged as a driving force in the expansion of music performance possibilities. The ambition to treat electronic devices as musical instruments leads to the emergence of unique behavioural tendencies that can be manipulated in order to further expand the potential of new music performance. Similarly, radical developments in contemporary percussion performance in the 20<sup>th</sup> and 21<sup>st</sup> centuries have introduced a wide range of challenges, extending the fundamental notion of percussive playing and stimulating performers to develop new skills and approaches to musicmaking.

This extended understanding of percussion performance has formed what can be identified as a *post-percussive practice*. The manipulation of electronic devices in music performance, developed out of a desire to reintroduce human presence in electronic music, can be described as *performer-controlled electronics*.

This thesis proposes that integrating performer-controlled electronics within the context of a post-percussive practice can present a fresh perspective on performing with electronics, and help bridge the gap that currently exists between acoustic performance and live electronic music.

Various solo and chamber music works by multiple generations of composers are used to illustrate the characteristics of a post-percussive practice and those of performer-controlled electronics. A comparison of these characteristics suggests that a post-percussive approach to integrating electronic devices can lead to more rewarding experiences in performing with electronics, and ultimately advocates for performers to assume a more active role in electronic music performance.

### Abrégé

L'intégration des technologies électroniques dans la musique contemporaine occidentale s'est révélée être un aspect incontournable dans l'expansion du champ des possibles de l'interprétation musicale. Le désir de traiter des appareillages électroniques de la même manière que des instruments de musique acoustique conduit à l'émergence de tendances comportementales uniques qui peuvent être manipulées pour développer davantage le potentiel de la musique nouvelle. De même, les développements radicaux dans la pratique de la percussion contemporaine aux 20<sup>e</sup> et 21<sup>e</sup> siècles ont introduit un large éventail de défis, élargissant le concept fondamental de la percussion et incitant les interprètes à développer de nouvelles approches et compétences musicales.

Ce concept étendu des percussions a formé ce qui peut être identifié comme une *pratique post-percussive*. L'opération manuelle des appareillages électroniques dans la performance musicale, née d'un désir de réintroduire la présence humaine dans la musique électronique, peut être décrite comme *l'électronique contrôlée par l'interprète*.

Cette thèse propose que l'intégration de l'électronique contrôlée par l'interprète dans le contexte d'une pratique post-percussive puisse donner une nouvelle perspective à l'interprétation de la musique électroacoustique, et aider à combler le fossé qui existe actuellement entre les performances musicales acoustique et électronique.

Diverses œuvres en solo et en musique de chambre écrites par plusieurs générations de compositeurs sont utilisées pour illustrer les caractéristiques d'une pratique post-percussive et celles de l'électronique contrôlée par l'interprète. Une comparaison de ces caractéristiques suggère qu'une approche post-percussive à l'intégration des appareillages électroniques peut conduire à

des expériences plus enrichissantes, et en fin de compte, encourager les interprètes à assumer un rôle plus actif en situation de performance musicale électronique.

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### **1. Introduction**

There is a perpetual dynamic relationship between performers and electronic technology throughout the development of Western contemporary music. This is driven by constantly evolving electronic equipment and a desire to explore the artistic potential of such devices. As a result, performers are driven to expand their musical capacities as they incorporate electronic devices into their artistic practices. The rapid progression of contemporary percussion performance since the early 20<sup>th</sup> century has similarly initiated an exponential growth of musical and technical possibilities within the practice. With percussionists operating at the heart of new musical developments over the last century, this paper proposes that integrating electronic performance through the lens of an expanded understanding of a percussive practice can present a fresh perspective on performing with electronics, and help bridge the gap that currently exists between acoustic performance and live electronic performance.

### 1.1. General background

My evolution as a classically-trained percussionist took a sharp turn in 2013 while I was living in Paris. Following my undergraduate music studies at McGill University, I moved to Paris in 2012 to pursue a Master's degree at the Conservatoire National Supérieur de Musique et de Danse de Paris, in large part to deepen my knowledge and practice of the contemporary percussion repertoire. However, my excitement for much of this repertoire began diminishing after a few months; I felt that many works were taught and performed in a very sterile, etude-like manner, with little room for personal interpretation.

This propelled me to search for other branches of percussion practice. I was fortunate to meet the Australian saxophonist Joshua Hyde, who quickly became a close friend and collaborator, and study with Frédéric Stochl, a double bassist specialized in theatrical and choreographic

musical practices. Hyde and I first formed a trio with the pianist Antoine Alerini, performing largescale works such as *durch* by Mark Andre, *Terres brûlées, ensuite*... by Vinko Globokar, and *Läuterung des Eisens* by Peter Ablinger, that were rarely, if ever, performed in France. *Läuterung des Eisens* was so foreign to the Conservatoire that it nearly caused us to fail our chamber music degree.

During this time, Hyde and I also formed our duo *scapegoat*, a main performance project of ours to this day, and I discovered the music of composer Pierluigi Billone, with whom I have since developed a close collaborative relationship. I view these two projects as the root of two parallel yet interconnected streams in my practice that have led me towards this research project. Billone's radical treatment of percussion led me on a search for the limits of what could still be considered as percussion performance, while scapegoat's first commissioning project resulted in a work by Mauricio Pauly, entitled *The Threshing Floor*, that initiated my pursuit of integrating electronics into my instrumental practice.

### **1.2.** Purpose

The purpose of this thesis is to investigate the interconnectedness of these two streams within my practice and how they can inform one another. I have come to identify these two streams as a *post-percussive practice* and the use of *performer-controlled electronics*.

A post-percussive practice abandons the fundamental concepts of what is typically considered as percussion, making its original characteristics practically unrecognizable.<sup>1</sup> These concepts can be technical or conceptual and pertain to the act of hitting, the coherency of technique, the instruments that are traditionally recognized as percussion, and how we assume certain

<sup>&</sup>lt;sup>1</sup> Håkon Stene, "This Is Not a Drum: Towards a Post-Percussive Practice" (Dissertation, Norwegian Academy of Music, 2014).

instruments are supposed to be played. The notion of a post-percussive practice is a fluid and eclectic collection of approaches that celebrates curiosity, openness and personal contribution.

Performer-controlled electronics refers to the use of electronic devices or systems that are manually operated by the performer in musical performance. It implies that a performer can develop a certain tactile connection to a device that allows them to manipulate it, leading to the creation of responsive interactions with a device and its sonic behaviour. This is a broad definition that, like a post-percussive practice, requires a personal approach and does not set strict boundaries as to what is or is not "performer-controlled."

As I developed these two streams of performance in my practice, I began to realize that they both presented me with constantly evolving performance conditions from one work to the next, and I began to wonder what propels my growth as an artist in such fluctuating conditions. Just as I was reaching the point of my percussion training where I was supposed to have "mastered" my instrument and developed the specialized skills needed to tackle any repertoire, I discovered instead that the versatility and adaptability that I had developed was of much greater use and could be applied to a wide variety of performance situations.

Some questions emerged as my musical pursuits redirected towards this less conventional performance approach that has contextualized this research project:

- 1. How can a post-percussive practice inform the use and treatment of performercontrolled electronic devices?
- 2. What are the characteristics of an electronic device that make it performative in an extended-instrumental setting?
- 3. How does a performer's relationship to their instrument change when electronic devices are incorporated?

Finally, the purpose of this thesis is to suggest that a post-percussive approach to electronic music performance can lead to a more accessible understanding of performing with electronics,

and ultimately reaffirm the importance of live performers and live performance in a computerdominated field.

### **1.3. Methodology**

This thesis is structured through a reflection on my personal artistic development and musical pursuits within a post-percussive practice and the integration of performer-controlled electronics. I begin by presenting a brief history of the musical developments that have led towards a post-percussive practice, followed by a discussion of two performance projects that have led me to understanding my practice as post-percussive: firstly, the performance of Billone's percussion music, and secondly, the use and potential of the piano as a percussion object. Emerging from these two projects, I outline four characteristics of a post-percussive practice that become invaluable to the integration of performer-controlled electronics: defamiliarization of instrumental technique, work-specific techniques, adaptability as a form of virtuosity, and exploiting the potential of an instrument.

This is followed by a presentation of the history and development of performer-controlled electronics in the  $20^{th}$  century, with a focus on two emblematic works of this approach, *Cartridge Music* (1960) by John Cage (1912-1992) and *Mikrophonie I* (1964) by Karlheinz Stockhausen (1928-2007). I present three characteristics of a performer-controlled electronics approach, namely the notions of instrumentalizing, creative abuse, and inherent unpredictability. I then compare these with post-percussive characteristics to outline how a post-percussive approach can be applied to the use of performer-controlled electronics, and discuss the importance of human presence in electronic music performance.

Finally, I present case studies that detail various approaches to performer-controlled electronics. I discuss the work of three performers, Andrea Young, Sabrina Schroeder, and

Fernando Rocha, who have each developed unique approaches, followed by three works that I have performed that have been vital to my pursuit of integrating performer-controlled electronics into a post-percussive practice: *Message from the Lighthouse* (2009/16) by Hanna Hartman (b. 1961), *The Threshing Floor* (2014) by Mauricio Pauly (b. 1976), and *Opal* (2017) by Michelle Lou (b. 1975).

### 2. Post-percussive practice

This chapter presents the emergence of a post-percussive practice from the rapid expansion of percussion performance in the 20<sup>th</sup> and 21<sup>st</sup> centuries. The percussion music of composer Pierluigi Billone (b. 1960) is emblematic of a post-percussive approach, and my performance of his works such as *Mani. Gonxha* (2011) influenced my pursuit of works that explore the potential of the piano as a percussion object. These two performance projects are used to highlight important characteristics of a post-percussive practice that are also essential to the integration of performer-controlled electronics.

### 2.1. Historical background and development

The notion of a post-percussive practice has emerged from the rapid development of classical percussion playing and tradition throughout the 20<sup>th</sup> and 21<sup>st</sup> centuries. Early works for percussion by composers such as Edgar Varèse (1883-1965) and John Cage already featured the use of objects that were not typically considered as percussion instruments, such as sirens in Varèse's *Ionisation* (1929-31), turntables in Cage's *Imaginary Landscape No. 1* (1939), and a conch shell in Cage's *Third Construction* (1942).

The image of the contemporary music percussionist, standing within a large setup of instruments or behind collection of objects, has reinforced the perspective of percussionists as multi-tasking performers capable of using any possible sound-producing object as an instrument. In Western music tradition, with the exception of orchestral timpanists or the rare marimba soloist, percussionists are rarely attached to one instrument as is the case for other musicians. Whereas the identity of other musicians is generally tied to their respective instruments, percussionists are instead tied to their identity as versatile hitters of various objects. Whether a percussionist is playing a conventional instrument or a collection of found objects, the root of the word

percussion—to hit or to strike—has been the primary feature that maintains a percussionist's identity. As Steven Schick describes,

"The instruments involved in various percussion traditions may be different from each other—in construction, in cultural origins, in historical lineage and musical vocabulary—but the basic action of performance, at the root of which is the stroke with its lift, quick descent, and contact, remains largely consistent."<sup>2</sup>

Through the latter part of the 20<sup>th</sup> century, what can be considered as extended techniques for percussionists begin to occur more frequently, such as the increased use of bows on vibraphones, cymbals, and various other metal instruments, the rubbing of a superball on a bass drum, or simply finding new methods of producing sounds that are not limited to the traditional notion of how instruments are "supposed" to sound. This mirrors the development of the use of extended techniques on other instruments, rooted in a quest to expand the sonic capacities of an instrument.

All Western classical instrumental practices, including percussion, have developed a catalogue of conventional playing techniques formed by the standard repertoire for the instrument. As a result, a shift of perspective must occur for extended techniques to no longer be viewed as "extended" or special, exotic effects that are added to an existing catalogue that is considered as the standard or correct way to play an instrument. This shift of perspective, in the form of a desire to abandon the considered conventions and characteristics of Western classical instrumental practice, has driven further developments in contemporary music. In percussion music, these tendencies take advantage of the versatility of a percussionist's skillset, but move so far away from conventional percussive techniques and instruments that they have formed what can be described as *post-percussion* or a *post-percussive practice*.

<sup>&</sup>lt;sup>2</sup> Steven Schick, *The Percussionist's Art: Same Bed, Different Dreams* (Rochester, NY: University of Rochester Press, 2006), 5.

A post-percussive practice advances further than a simple notion of extended techniques for percussionists. Rather, it can be understood as a practice that abandons the fundamental concepts of what is typically considered as percussion, making its original characteristics practically unrecognizable. These fundamental concepts can be technical or conceptual and pertain to the act of hitting, the coherency of technique, the instruments that are traditionally recognized as percussion, and how we assume certain instruments are supposed to be played. The notion of a post-percussive practice does not set strict boundaries as to what is or is not *post-percussive*, but is instead a fluid and eclectic collection of approaches, and as Håkon Stene describes, "it is not a definable technique, it is an attitude, a mind-set [*sic*] and an aesthetic positioning."<sup>3</sup>

The notion of a post-percussive practice makes it possible to operate under the label of a percussionist without necessarily using any instruments commonly considered as percussion or without any conventional percussion techniques. It allows for the use of newly invented techniques as well as concepts borrowed from other performance-related domains—such as vocal or electronic performance, theatre, and choreography, to name a few—as primary musical material. The reason that this can still be characterized as operating within the extended realm of percussion is that percussionists have always been gatherers of sorts, constantly searching for musical potential in any kind of sonic material, and borrowing or appropriating instruments and objects into the musical domain of percussion.<sup>4</sup>

<sup>&</sup>lt;sup>3</sup> Stene, "This Is Not a Drum: Towards a Post-Percussive Practice," 86.

<sup>&</sup>lt;sup>4</sup> The majority of instruments recognized as percussion in Western classical music, including marimbas, gongs, temple bowls, and every form of what we very broadly label as hand drums, have been taken from other cultures and musical traditions. This is why it is perhaps still relevant to use the label of percussionists as we dissolve boundaries into other practices, or rather, continue to incorporate aspects of other practices, cultures and domains into the realm of percussive arts.

The disorganized and dispersed nature of a post-percussive practice makes it difficult to define as a coherent system. However, this lack of coherency can be understood specifically as the identity of the performer in this practice. The versatility that contemporary percussionists have developed proves to be an advantage when dealing with the new and unconventional demands of experimental practices such as the post-percussive.

The following two subchapters present performance projects that I have carried out over the past few years that exemplify a post-percussive approach. They have both been vital to my development in this field and have greatly influenced my pursuits in the incorporation of performer-controlled electronics.

#### 2.1.2. Pierluigi Billone, Mani. Gonxha (2011)

Pierluigi Billone is one of the most important figures in the development of percussion writing in the 21<sup>st</sup> century; his works have revolutionized percussion writing in a way that is emblematic of a post-percussive practice. I began performing Billone's music in 2014, when I learned his solo work *Mani. Gonxha*, for two Tibetan singing bowls. This experience not only triggered my interest in Billone's music, but also led to us developing a close collaborative relationship. Furthermore, I view the learning of *Mani. Gonxha* as a starting point that redirected my musical pursuits towards a less conventional performance approach that has contextualized this research project. The skills and capacities that I developed through the performance of Billone's music have greatly informed and influenced my pursuits in the field of performer-controlled electronics.

I was fortunate to work with Billone at the Darmstadt Summer Course for New Music in the summer of 2014 and over numerous email exchanges since that time. This has helped me develop a much deeper understanding of and connection to his music which has now become a standard of my performing repertoire. In addition to *Mani. Gonxha*, I have also performed *Mani.*  $\Delta i\kappa \eta$  (2012) for solo percussion, *2 Alberi* (2017), that I commissioned with my saxophone and percussion duo scapegoat, and I will be premiering *Mani. Amon* (2019), a new solo work that Billone wrote for me, in 2020.

Billone's compositional approach can be considered as a radical expansion of Helmut Lachenmann's concept of *musique concrète instrumentale* and its surrounding ideas. *Musique concrète instrumentale* focuses on the physical experience of producing sounds on acoustic instruments. It signifies an extensive defamiliarization of instrumental technique, adopting instead a musical language that embraces all sounds made possible through unconventional playing techniques. One hears the conditions under which a sound is executed, what materials are involved and what resistances are encountered. This notion is rooted in an embrace of extraneous sounds that are often hidden or obscured in conventional music performance, and a desire to perceive the immediate inherent energy of producing a sound.<sup>5</sup>

Billone has been very much influenced by Lachenmann and employs many similar working methods in the development of his music. Nonetheless, Lachenmann's breakthroughs have created a space for Billone to further develop and personalize his approach, resulting in a unique compositional language and a distinctive conception of sound. Billone's pursuits in his percussion works can be considered as a deeper and more extensive exploration of notions introduced by Lachenmann in other instrumental contexts. Billone's percussion music pursues an extensive exploration of a single instrument's—or instrumental group's—capabilities, and he exploits these capabilities in various works and contexts.

<sup>&</sup>lt;sup>5</sup> Helmut Lachenmann, "Philosophy of Composition: Is There Such a Thing?," in *Identity and Difference: Essays on Music, Language and Time* (Leuven: Leuven University Press, 2004), 64-66.

*Mani. Gonxha* is written for two Tibetan singing bowls, traditionally sacred instruments used as a signal to begin and end periods of silent meditation. In Western contemporary music, Tibetan singing bowls are generally used in a manner that showcases their resonant qualities, such as striking them with a mallet for a bell-like sound, or sustaining their resonance with a bow or by rubbing the outer edge with a traditional Tibetan mallet. In *Mani. Gonxha*, however, Billone uses them to extract a rich soundscape featuring a variety of impacts, timbres, resonances and harmonics that one would not imagine could be produced by a single source. As I have described in the program note for this work, Billone creates an intensely intimate ritualistic experience for the performer that becomes naked and exposed when placed in front of an audience. It is as if one were to visit a place of worship and find someone deep in personal prayer; this moment of great significance for the individual creates an unsettling but captivating situation for the observer.<sup>6</sup>

The performer holds a singing bowl in each hand and performs the entire 17-minute piece in this manner, using techniques meticulously detailed in the five-page instruction manual preceding the score (see Figure 1).<sup>7</sup> This of course requires a steep learning curve, as not only must the percussionist learn a wide range of new techniques but also a new notational system that is adapted to the techniques. Nonetheless, Billone develops a musical language where the sounds and techniques used are both inherent and idiomatic to the instrument and to the structure of the work. This is a result of Billone's compositional method where instrumental study, systematic instrumental exploration, structural elaboration, notational development, and compositional conception are all integrated and inseparable from the beginning of the working process.<sup>8</sup>

<sup>&</sup>lt;sup>6</sup> Noam Bierstone and Christian Smith, "Mani. Gonxha: Program Note,"

http://www.pierluigibillone.com/en/texts/mani\_gonxha.html.

<sup>&</sup>lt;sup>7</sup> Pierluigi Billone, *Mani. Gonxha*, (Vienna: Self-published, 2011).

<sup>&</sup>lt;sup>8</sup> Pierluigi Billone and Laurent Feneyrou, "Le son est ma matière : entretien avec Pierluigi Billone," http://www.pierluigibillone.com/it/testi/il\_suono\_e\_la\_mia\_materia\_2010.html.



Figure 1: Pierluigi Billone, Mani. Gonxha. Instructions, page 1.9

It is then the performer's responsibility to learn and absorb these techniques in a way that allows them to effectively transmit musical ideas, as one does instinctively in a more conventional instrumental setting. The Tibetan singing bowls are used as an extension of the hands in *Mani*. *Gonxha*, allowing for a very tactile connection to the sounds created since the performer is always in direct contact to the sound producing object. As a result, one can develop a unique and personal relationship to the instrument and form a deeper connection to the work.

Billone's treatment of the Tibetan singing bowls ultimately breaks down the separation between the instrument and the performer's body. Rather than having the performer use their body in various ways to create a sound on the instrument, Billone combines the body with the instrument in the production of various sounds. The instrument becomes a natural extension of the performer

<sup>&</sup>lt;sup>9</sup> Billone, Mani. Gonxha.

and the performer becomes part of the resonating instrumental body, creating a circle of energy where the source of sound is sometimes no longer distinguishable. Various examples of this can be found in *Mani. Gonxha*: the voice is used to colour and extend the attacks and resonances of the Tibetan bowls (see Figure 2); the bowls are struck against the performer's torso in various ways; one bowls strikes the other that is placed against the performer's stomach, simultaneously muting the resonance of the bowls while providing a makeshift resonant chamber for the sound; and one bowl softly hits a finger placed on the second bowl that is held against the performer's stomach, combined with an almost imperceptible vocalisation (see Figure 3). The nature of the small Tibetan bowls, with all their possible hand-held manipulations, creates the ideal situation for the elimination of the separation between the instrument and the performer's body.



Figure 2: Mani. Gonxha. Vocal colouring, page 5, 2<sup>nd</sup> line.<sup>10</sup>



Figure 3: Mani. Gonxha. Finger hits & vocalisations, page 11, 2<sup>nd</sup> line.<sup>11</sup>

<sup>&</sup>lt;sup>10</sup> Ibid.

<sup>&</sup>lt;sup>11</sup> Ibid.

Since Billone's music is so tactile and physical, there is no substitute for holding the instruments, experimenting with techniques and sounds, and discovering the behaviours of the material. *Mani. Gonxha* requires the performer to be more invested in the development and elaboration of the musical language, as one cannot simply apply previously learned techniques to the performance of the work. There is an inevitable daunting feeling of having to learn an instrument from scratch, and there are very few techniques that can be transferred directly from conventional percussion playing into this situation where sticks or mallets are replaced by two Tibetan singing bowls in the performer's hands. Nonetheless, the identity of percussionists as versatile musicians accustomed to playing different instruments and adapting to new setups is vital to developing the necessary skills to perform a work such as *Mani. Gonxha*. Similarly, percussionists are trained to cultivate gestural sensibility and control to differentiate the quality of their strokes—through velocity of movement, time of contact with the hitting surface, and physical weight—that can achieve delicate variances in sound.

The differentiation of techniques is an essential feature of *Mani. Gonxha*. Each technique that is used produces a specific sound, or belongs to a specific sonic family, and these sounds must be distinctive and defined for the music to carry any meaning. This is a challenge when dealing with such a seemingly limited instrument, and the responsibility falls on the performer to delineate each technique's sound and maintain this consistently throughout the work. An example of this can be seen in the very opening the work, where Billone creates a musical gesture formed by a combination of various techniques. This musical gesture returns in various instances throughout the work as a recognizable sounding action, even though the ordering of the techniques used changes (see Figure 4). For these actions to be perceived by a listener as belonging to the same family, the techniques must be performed with utmost precision and consistency.



Figure 4: Mani. Gonxha. Examples of related sounding actions.<sup>12</sup>

This precision and consistency is achieved through detailed practicing and listening, just as a percussionist will do when working towards an even snare drum or timpani sound. And while this may appear overly daunting at first, I quickly discovered in my preparation of *Mani. Gonxha* that the work in fact feels very idiomatic. This is due to the fact that Billone is extremely thorough in his approach to developing the musical language of his works. Not only can he perform every technique and sound that he uses, but he also understands the physical relationship between different techniques and how they can be combined. This is precisely what makes the techniques used idiomatic to the work. Any technique performed on its own can be considered as comfortable, but it is the combination of different techniques that determines whether a performer can develop a natural relationship to the instrument through the new techniques.

The idiomatic nature of Billone's music, and *Mani. Gonxha* in particular, has become an important barometer for me in choosing and developing repertoire within a post-percussive practice. *Mani. Gonxha* helped me discover that even though I have been trained as a classical percussionist, the assumed conventional use of sticks, mallets, or instruments can be more

constricting than a seemingly restricted object. As such, my search for the limits of what can be considered as percussion performance led me on a path towards the project presented below.

#### 2.1.2. Potential of the piano as a percussion object

In 2016, I put together and performed an entire concert of works for piano played by a percussionist, centred around the idea of exploiting the potential of the piano as a large and extensively versatile sound object. This project developed from working with various pianists and seeing them perform pieces that featured actions that appeared to me as more suited to a percussionist's practice than to a pianist's. With the exception of one commissioned work written for me for the occasion, the chosen works were not written for a percussionist, but rather for pianists such as Mabel Kwan and Heloisa Amaral who specialize in extended piano performance.

Having never received formal keyboard training, playing the piano keyboard conventionally was no more natural for me than performing various actions on or inside the piano. An act as simple as sitting down at the piano bench in front of the keyboard was not an automatic point of departure for me as it would be for pianists. This meant that I could really approach this project from the perspective of using the "piano as a sound source" rather than "playing the piano,"<sup>13</sup> a perspective that is much more aligned with a post-percussive practice in which an instrument is exploited as a total configuration instead of being used to produce sounds in a conventional or accepted manner.

This subversive approach to the piano, a symbol of the glorified nature of Western classical music and the sounds that it is supposed to make, is of course nothing new. John Cage's 4'33" (1952) is a primary reference, as is the prepared piano that was originally used to replicate percussion instruments when they were not available, and the many Fluxus works of the late 1950s

<sup>&</sup>lt;sup>13</sup> Michael Nyman, Experimental Music: Cage and Beyond (New York: Schirmer Books, 1974), 17.

and early 1960s that re-evaluate the function, purpose, and identity of the piano. By importing this use of the piano into the realm of percussion performance, and through the shock and surprise that this project resulted in, I realized that the more significant subversion that was taking place was the subversion of my identity as a percussionist.

Pursuing this project thus felt like a natural progression for me following my performance of works such as *Mani. Gonxha*. This project included the performance of six works: *Guero* (1969) by Helmut Lachenmann (b. 1935), *Stircrazer III* (2013) by Sabrina Schroeder (b. 1979), *one poetic switch* (2014) by Santiago Díez-Fischer (b. 1977), *Patrulla reliquia* (2015) by Mauricio Pauly (b. 1976), *101% mind uploading* (2015) by Elena Rykova (b. 1991), and *Pose IV: in situ* (2016) by Anthony Tan (b. 1978). Although these works all present various qualities of a post-percussive practice, I will focus my discussion on *Guero* and *one poetic switch*.

*Guero*, originally composed as an etude, is a short work that uses a piano to recreate the sounds of the small, serrated percussion instrument of Latin American origin from which it takes its name. The nature of the piano is reinvented by the mechanism of rippling fingernails, moving from the vertical and horizontal surfaces of the white keys, via the black keys into the piano, onto the pegs and finally the strings. *Guero* can be viewed as a narrowing of all the possibilities of a grand piano into variations on the "perforated" sound of a guiro, zooming in on the subtle differences of the techniques used.<sup>14</sup>

*Guero* completely avoids traditional instrumental techniques; not a single piano key is pressed throughout the work. For this reason, I had very little trouble approaching the work as if the piano was simply a new percussion instrument that I had to discover for the purpose of this piece. My experience as a percussionist having encountered various qualities of perforated

<sup>&</sup>lt;sup>14</sup> Helmut Lachenmann, *Guero*, (Wiesbaden: Breitkopf & Härtel, 1969).

sounds—such as the sounds of a ratchet, a snare drum roll, or various kinds of rattles—proved to be an advantage in differentiating between the techniques used in *Guero* to create a sense of sonic variation and relief in the work. The score excerpt below displays five playing techniques on the keyboard that must be differentiated in performance.



Figure 5: Helmut Lachenmann, Guero. Page 3, last two lines.<sup>15</sup>

Empty square: gliding over the front surface of the white keys with the thumbnail or the nail of an extended finger.

Circle with one dot: upper surface of the white keys with the nail of an extended finger.

Circle with three dots: upper surface of the white keys with the nails of three curved fingers.

Black filled circle: upper surface of the black keys with the nail of an extended finger, possibly with several fingers.

Half-filled circle: upper surface of the white keys and front surface of the black keys simultaneously with the nail of an extended finger.<sup>16</sup>

Díez-Fischer's one poetic switch presents a different set of challenges than Guero or Mani.

Gonxha. The performer controls the rubbing of two plastic Tupperware containers on the piano

strings, the col legno bowing of a plastic wine glass on the piano strings, a narrow selection of

piano keys, and the sustain pedal.<sup>17</sup> These separate entities influence and interfere with one

<sup>&</sup>lt;sup>15</sup> Ibid.

<sup>&</sup>lt;sup>16</sup> Ibid.

<sup>&</sup>lt;sup>17</sup> Santiago Díez-Fischer, *one poetic switch*, (self-published, 2014).

another, acting as switches that generate rhythms, textures and phrases, and sometimes resulting in dramatic appearances or disappearances of sound. *one poetic switch* embraces the limits of audibility created by the inherent instability and volatility of modified instrumental bodies, toying with the performer's ability to control such an erratic system.



Figure 6: Santiago Díez-Fischer, one poetic switch. Setup of objects on piano strings.

*one poetic switch* places the performer in an uncomfortable position for most of the piece as one must stand in front of the keyboard with one hand on the keys, one hand on the Tupperware placed on the piano strings, and one foot on the sustain pedal. While this contorted position is awkward for both pianists and percussionists, percussionists are more accustomed to contorting their bodies around different instrument combinations. As such, it did not take me too long to find a comfortable positioning that allowed me to perform all the required actions without putting unwanted stress onto my body.

My background as a percussionist was also an advantage in acquiring the coordination and independence required by the combined actions of my various limbs. The greatest challenge I encountered in this case was that the superposed actions could result in unpredictable sonic results. For example, the rubbing of the Tupperware on the piano strings is already somewhat unpredictable in a similar way to the bowing of cymbal; one can develop a certain amount of control over the resulting sounds, but rarely is it possible to reproduce an exact sound every time.

Furthermore, the depressing of the sustain pedal and the playing of the piano key greatly influence the resulting sound. The amount of pressure placed on the Tupperware similarly affects the sound in various ways depending on the accompanying actions, not to mention the material quality of different pianos one may encounter (see Figure 7).



Figure 7: one poetic switch. Measures 5-8.<sup>18</sup>

The upper line indicates the movement of the Tupperware on the strings along with the amount of pressure: black is heavy, grey is medium, white is very little. The staff indicates the note played on the keyboard, with the sustain pedal notated underneath.

While a performer must discover the relationships between the various actions and the possible consequences of their combinations, the nature of these actions do not allow for a fully controllable and consistent sound. I found that I could develop the skills needed to recreate sonic

<sup>&</sup>lt;sup>18</sup> Ibid.

behaviours rather than exact sounds, and with this embrace the instability of the performance situation within the confines of my control. The use of unstable sonic environments is a recurring feature in many works that comprise my practice, and as I present in Chapters 3 and 4, it is a central characteristic of performer-controlled electronics.

I have performed all six of these piano works on various concerts since the initial performance, and have found that they do not appear out of context when presented along with works written specifically for percussionists. This is perhaps the best reasoning for why these works belong in my artistic practice as a percussionist. I have even found that I am more comfortable playing such works at the piano than I am playing orchestral timpani, for example. This approach to the piano better reflects the artistic identity that I have created for myself through the performance of works such as *Mani. Gonxha*. My pursuits of these two performance projects help pinpoint certain recurring characteristics of a post-percussive practice that I outline below, and that also become fundamental to the integration of performer-controlled electronics.

### 2.2. Characteristics of a post-percussive practice

### 2.2.1. Defamiliarization of instrumental technique

The defamiliarization of instrumental technique is a distinctive quality of a post-percussive practice. It signifies a deconstruction of instrumental conventions to instead develop an approach that embraces all possible sound-producing actions on an instrument. The concept of defamiliarization, a term coined in 1917 by the Russian formalist Viktor Shklovskij, refers to the artistic technique of presenting an object in an unfamiliar way in order to enhance perception of the familiar object, <sup>19</sup> and has greatly influenced 20<sup>th</sup> century art movements such as Dadaism. In

<sup>&</sup>lt;sup>19</sup> Lawrence Crawford, "Viktor Shklovkij: Différance in Defamiliarization," *Comparative Literature* 36, no. 3 (1984).

music, this process can be carried out on any instrument or instrumental combination, as demonstrated by works such as Lachenmann's *Guero*, *Pression* for solo cello (1969), and *Gran Torso* for string quartet (1972). By not recognizing traditional technique as the gold standard of sound production, all techniques and sounds—including traditional techniques—can be considered as new and suitable to the renewed instrumental context.<sup>20</sup>

In the case of percussion, this implies that the act of hitting and the assumed conventional use of sticks or mallets is not taken as an automatic point of departure. This does mean that such works do not contain conventional percussive strokes or sounds, but rather that there is no overarching instrumental technique that can be learned independently and applied from one work to the next as is the case in conventional instrumental performance. That said, the relationship that one builds with an instrument through the study of conventional playing can still inform newly invented techniques, as it provides the musician with the reflective listening and performance skills to adapt oneself to a new, defamiliarized instrument.

Musical works created in this manner are often born from a composer's direct experimentation with the instrument. Lachenmann and Billone both pursue an extended hands-on process in the conception and development of a work. They spend countless hours experimenting with the instrument to develop a practical knowledge of its functioning, leading them to develop distinct sound-producing actions that are used as the inherent musical language of the piece. The unique musical language that is developed for a work functions as the reconstruction of the previously deconstructed instrument, and inevitably leads to the creation of work-specific techniques.

<sup>&</sup>lt;sup>20</sup> Helmut Lachenmann and David Ryan, "Composer in Interview: Helmut Lachenmann," *Tempo* New Series, no. 210 (1999): 21.

#### 2.2.2. Work-specific techniques

Work-specific techniques are techniques that are uniquely developed in the conception of a work, and are often idiomatic to the structure and aesthetic of the work.<sup>21</sup> As demonstrated by *Mani. Gonxha*, this often necessitates a lengthy set of instructions that describe how to perform the required techniques and the sounds they are meant to produce, as a way of teaching the performer the musical language of the work. This concept is important, as it differentiates the use of unconventional playing techniques as described above from a more superficial approach that showcases the use of such techniques as a novelty catalogue of sounds that can be produced on an instrument.

Work-specific techniques must be treated—by both the composer and performer—with the same care and precision as one would a conventional instrumental sound. This allows for the performer to transmit musical meaning through the produced sounds and surpass the novelty use of extended techniques. *Mani. Gonxha* provides an ideal example of this. At first glance, it can appear as if Billone uses every possible sound that could be produced on the two Tibetan singing bowls. In reality, however, the techniques reveal themselves to have been carefully chosen for their sonic characteristics and become inseparable from the musical purpose of the work.

The use of work-specific techniques inevitably requires the performer to dedicate additional time to learning and absorbing the unique musical language of the piece. Nonetheless, I have found that with enough time spent with the material, work-specific techniques allow a performer to re-familiarize themselves with an instrument in a manner that forms a deeper connection to the piece. One can feel that the musical language naturally emerges through the physical relationship between the performer and instrument and can be renewed from one work to

<sup>&</sup>lt;sup>21</sup> Stene, "This Is Not a Drum: Towards a Post-Percussive Practice," 39-40.

the next. As cellist Tanja Orning describes her experience performing *Pression*, "The result is the opposite of defamiliarization; it is a serious embodied and sonic experience demanding a self-reflecting position and conscious contribution."<sup>22</sup>

The endeavour to develop instrumental technique and vocabulary is empty if it does not accompany an artistic project. The instrumental techniques used in works such as *Pression* or *Mani. Gonxha* are formed to bring to life artistic intentions. The performer in these cases carries responsibility but also artistic freedom due to the personal and physical nature of the instrumental relationship; not only must they create a sound as desired by the composer, they must also create a sound that they desire themselves, through their own discovery and pleasure of working in such a way with the instrument. As Jean Geoffroy explains, one of the most important things for a performer is to find themselves in a work, to make it their own, it is the only possibility for them to understand the meaning, or in any case, to get as close as possible to it.<sup>23</sup>

#### 2.2.3. Adaptability as a form of virtuosity

A post-percussive practice highlights the skill of adaptability as a new form of virtuosity in musical performance. Percussion music has always required flexibility and versatility from the performer: percussionists must constantly adapt to new instruments and setups, they modify percussive strokes to instruments and materials with different responses, and they frequently swap out sticks and mallets as they enter new performance spaces. Successful contemporary percussionists are also equally proficient moving around large instrumental setups as they are

<sup>&</sup>lt;sup>22</sup> Tanja Orning, "*Pression* Revised: Anatomy of Sound, Notated Energy, and Performance Practice," in *Sound & Score: Essays on Sound, Score and Notation*, ed. Paulo de Assis, William Brooks, and Kathleen Coessens (Leuven: Leuven University Press, 2013), 108.

<sup>&</sup>lt;sup>23</sup> Jean Geoffroy, "Le feedback dans la création musicale," *La revue de l'Association Française pour la Percussion* 22 (2007): 23. "Une des choses les plus importantes pour un interprète est de « se retrouver » dans la pièce, la faire sienne, c'est l'unique possibilité pour lui d'en comprendre le sens, en tous les cas, d'aller au plus près de celle-ci."

performing small object setups with minimal movement.

The concept of work-specific techniques increases the importance of adaptability to a different degree as performers attempt to apply previously learned skills to new, dissimilar situations. Unlike conventional percussion practice where percussionists learn basic technical principles that can be applied or adapted to a majority of standard percussion instruments, a post-percussive practice calls upon the musician to discover unique and unrelated performance setups, actions, and systems from one work to the next. This means that each performer must form their own set of skills within this practice, applying what they have learned and gathered from previous personal experiences to the requirements presented by new situations.<sup>24</sup>

The skill of adaptability might not typically be considered as virtuosic, since we often associate virtuosity to more specialized skills. The image of a musician showing off their physical prowess on an instrument through speed and accuracy—in an almost acrobatic sense—is still central to much Western classical and contemporary music. Virtuosity of adaptability requires the musician to perform specialized actions using techniques or objects that they have often never encountered before. This demands a reflective approach to performance in which the performer must discover for themselves how previously learned skills can be applied to what may initially appear as an unfamiliar context.

Post-percussion can be viewed as having changed conventional percussion practice but also as having created a new practice—in relation to and in reaction to conventional percussion resulting in a new notion of what can be considered as "percussion". The overarching practice of Western classical and contemporary percussion has been deconstructed, stripped down to its bare

<sup>&</sup>lt;sup>24</sup> Stene, "This Is Not a Drum: Towards a Post-Percussive Practice," 41-42.

minimum, and reconstructed in a way that broadens and expands the possibilities for artistic expression within the practice.

#### 2.2.4. Exploiting the potential of an instrument

A recurring theme in works that can be characterized as post-percussive is the exploitation of one instrument or a small collection of instruments through a multitude of playing techniques, in contrast to early solo percussion works that are characterized by a large collection of instruments performed with a limited set of techniques such as Karlheinz Stockhausen's *Zyklus* (1959), Morton Feldman's *King of Denmark* (1964), or Iannis Xenakis' *Psappha* (1975).

The composer and trombonist Vinko Globokar (b. 1934), an important figure in the development of instrumental theatre and extended percussive practice, addresses this difference in his article *Anti-Badabum* (1992).<sup>25</sup> He criticizes the existing contemporary Western percussion practice at the time of automatically accepting that each instrument has a unique natural timbre, primarily based on the action of striking, that musicians must seek as the preconceived ideal sound of the instrument. As he explains,

"This philosophy implies an accumulation of sound materials, for according to this logic of unique sound one must, for every new timbre to be obtained, use a different instrument. With a large number of instruments, a stereotyped kind of virtuosity can be developed based on the joy of striking with an emphasis on physical activity, the aim being to play faster and faster and louder."<sup>26</sup>

Globokar suggests instead an approach where a single instrument is used for a varied palette of timbres and articulations that might initially be considered as foreign to the nature of the instrument, modelled on the tradition of instruments such as the zarb or the tabla, where multiple

<sup>&</sup>lt;sup>25</sup> Vinko Globokar, "Anti-Badabum," Percussive Notes 31, no. 1.

<sup>&</sup>lt;sup>26</sup> Ibid., 77.

performance techniques are used to extract the timbral complexities of the instrument. He describes this in the following excerpt:

"Striking is but one aspect involved; damping, sliding, rubbing, or brushing are equally important. In this case we realize that much greater subtlety of control and diversification of timbres is achieved when the instrument is only played by the hands without using mallets. With the hands one can shape, mix, model, and refine the sound texture; the contact with the instrument is felt more directly through the body. The result is that one can think the sound, pre-form it in oneself and the instrument can then be considered as an amplifier of one's ideas."<sup>27</sup>

In his own work, Globokar prefers to limit the performer to a smaller number of instruments and have them develop highly diversified playing techniques as a way to expand their sonic capabilities.<sup>28</sup> His work *?Corporel* (1985), for a percussionist and their body, is a prime example, as the performer must discover the sonic capacities of their body and voice in order to realize the actions notated in the score.

This approach is also fundamental to Billone's work. The drastic reduction of percussion setups in Billone's music, as well as various sections of his works that focus in on the subtle variations and fluctuations of one specific technique or action, highlight the idea that it is precisely through the narrowing of material that the experience of differentiation can be expanded. This can be considered as a focusing in—or zooming in—on an object's sound to discover variations in sound that may not be perceived from further away. In addition to requiring the performer to develop the technical capacities to produce these subtle variations in sound, it also requires the performer to develop more acute and sensitive listening in distinguishing sonic parameters such as timbre, texture, and grain that one may not typically encounter in conventional classical music performance. This is very important because these sonic parameters, drawn from an interest in noise-based sounds, figure prominently in the incorporation of electronics into concert music

<sup>&</sup>lt;sup>27</sup> Ibid.

<sup>&</sup>lt;sup>28</sup> Ibid., 81.

performance, and a sensitivity to them is invaluable in the integration of performer-controlled electronics.
# **3.** Performer-controlled electronics

This chapter presents the history and development of performer-controlled electronics in the 20<sup>th</sup> century, with a focus on two emblematic works of this approach, *Cartridge Music* by John Cage and *Mikrophonie I* by Karlheinz Stockhausen. These works are used to highlight recurring characteristics of performer-controlled electronics, followed by a comparison with the post-percussive characteristics discussed above in order to detail how a post-percussive approach can be applied to the use of performer-controlled electronics.

# 3.1. Historical background and development

The incorporation of electronic devices into music is rooted in the aesthetic, cultural, and technological advances of the 20<sup>th</sup> century that prompted the notion that any sound could contribute to the musical palette. Luigi Russolo's Futurist manifesto *The Art of Noises* (1913) calls for the embrace of noise born from the invention of the machine, and for it to become a primary element in art.<sup>29</sup> John Cage similarly appeals for the incorporation of noise in *The Future of Music: Credo* (1937), and for the need for electronic instruments to construct the future rather than imitate the past.<sup>30</sup> Cage viewed electronic music as an extension of percussion, since any sound that could be manually produced was considered as acceptable in percussion music. This helps to explain why the early examples of performer-controlled electronics are often combined with the use of percussion, and provides context for approaching the use of performer-controlled electronics as an extension of a post-percussive practice.

<sup>&</sup>lt;sup>29</sup> Luigi Russolo, "The Art of Noises," in *The Art of Noise: Deconstruction of Music by Futurist Machines*, ed. Candice Black (Sun Vision Press, 2012).

<sup>&</sup>lt;sup>30</sup> John Cage, "The Future of Music: Credo," in *Silence: Lectures and Writings* (Middletown: Wesleyan University Press, 1961).

Cage's *Imaginary Landscape No. 1* (1939) is the first work to incorporate electronic devices in performance. It is scored for four players: two players controlling turntables, one playing a Chinese cymbal, and one playing the piano.<sup>31</sup> Cage asks for the piece to be executed in a radio studio and then performed through a live or recorded broadcast, reformulating the fundamental relationship between a musical creation and its environment. Additionally, Cage transforms the radio studio itself into an instrument by using the test tones of the studio—in the form of frequency recordings played on the turntables—as a generator of meaningful sound. Since the test tones are an inherent part of the medium of the radio, Cage is taking a formerly neutral medium and bringing it to the foreground of the work. This makes the listener perceive a sound emanating from the speaker that is not intended to be noticed, and that one would usually ignore, as an integral part of the musical work. The listener is thus forced to disengage the sound from its normal use and meaning, first by accepting it as a discreet phenomenon and then as an aesthetic object. This approach simultaneously challenges the nature of the radio and of musical sound itself.

The use of sounds that are originally by-products of a system and incorporating them into the structural framework of a piece is very important in both experimental acoustic music and performative electronic music. Cage's treatment of the radio unifies the medium and the message by creating a sounding object of the medium itself. This becomes an essential principle in the use of performer-controlled electronic devices. Just as extended techniques are no longer exotic extensions of conventional technique but become integral to the musical language of an instrument, electronic devices are not used as special auxiliary effects but instead can be fully integrated into the conception and realization of a work.

<sup>&</sup>lt;sup>31</sup> Imaginary Landscape No. 1, (New York: Edition Peters, 1939).

Cage continued to explore the radio in later compositions such as *Credo in Us* (1942) and *Imaginary Landscape No. 4* (1951). In *Imaginary Landscape No. 4*, for 12 radios, Cage instructs the performers to manipulate the dials of the radio, reversing the use of the radio as compared to *Imaginary Landscape No. 1*, since the piece uses the radios' broadcasts as its instruments rather than using the radio's electronic instruments to broadcast. Although the use of a radio is not obligatory in *Credo in Us*—a phonograph can also be used, playing recordings, as suggested by Cage, of classic symphonies by Dvořák, Beethoven, Sibelius, or Shostakovich<sup>32</sup>—the work represents the first occasion in which radio broadcast was used as part of the compositional language of a piece.<sup>33</sup>

*Imaginary Landscape No. 1* also signals the first use of the turntable in performance, taking advantage of the clutch that initiates a change of rotation speed to produce a change in pitch, with a short glissando effect, in the test tones. Cage further expands the use of the turntable in *Credo in Us* and, most notably, in *Cartridge Music*.

## 3.1.1. John Cage, *Cartridge Music* (1960)

*Cartridge Music* expands the phonograph beyond its original function as a simple playback device. Cage uses the phonograph and its transformations to produce the content and sound of the work. The piece uses prepared phonograph cartridges and contact microphones to reveal sounds that could not be heard otherwise. The cartridge is modified by removing the stylus and replacing it with a variety of small foreign objects such as a pipe cleaner, a wire, a toothpick, a twig, and more. Sounds are produced by striking or rubbing various objects with the cartridges, along with

<sup>&</sup>lt;sup>32</sup> Credo in Us, (New York: Edition Peters, 1942).

<sup>&</sup>lt;sup>33</sup> Martin Iddon, "(in)Determining the Indeterminate," in *John Cage and David Tudor: Correspondence on Interpretation and Performance* (Cambridge: Cambridge University Press, 2013), 43.

"auxiliary sounds" produced by objects amplified with contact microphones. These sounds are picked up by the devices, amplified, and played through loudspeakers.<sup>34</sup>



Figure 8: Picture of Mario Bertoncini's setup for Cartridge Music, 1968-69.35

The larger-than-life sounding result is an amalgamation of noisy scratches, scrapes, buzzes, and attacks produced by the performers according to each person's score derived from Cage's instruction, along with friction noises, thumps and hums that come from manipulating the delicate cartridges that are not designed to be handled themselves. The sounds created by small objects and minute movements vary immensely from one performance to the next, yet in every case, they maintain a strong physicality while also being unmistakeably electronic in nature.

<sup>&</sup>lt;sup>34</sup> John Cage, *Cartridge Music*, (New York: Edition Peters, 1960).

<sup>&</sup>lt;sup>35</sup> Mario Bertoncini, "1968-69 Cartridge Music," http://www.mariobertoncini.com/all/1968-69\_cartridge\_music.jpg.

Cage developed *Cartridge Music* out of his desire "to hear small sounds and the sounds of physical objects," and "he was also looking for ways to make electronic music live."<sup>36</sup> He believed that the physical presence of the performers and the objects used was of great importance.<sup>37</sup> The composers and works I discuss in Chapter 4 share this quest for liveness in electronic music; this is naturally vital to the continuation of my artistic practice as a performer.

*Cartridge Music* marks the development of the turntable from a tool used to reproduce previously recorded material into an instrument capable of producing its own sounds and even possess its own aesthetic.<sup>38</sup> A similar transformation can be observed in the use of microphones and loudspeakers as performance devices. Originally designed to reproduce sounds, microphones and loudspeakers cannot reproduce their own specific sound. Since sound reproduction technology strives to reproduce sound without being audible in itself, its own sound only appears when applied to or triggered by another sound source. Microphones and loudspeakers are typically designed to act as transparent technology in performance, amplifying the volume of an instrument but with the goal that the technology itself not be perceived. However, new aspects of music can be discovered by treating microphones and loudspeakers as musical instruments, exploiting the complex relationships between performer, microphone, and loudspeaker to create sounds from the characteristics of the devices themselves.

## 3.1.2. Karlheinz Stockhausen, Mikrophonie I (1964)

*Mikrophonie I* by Karlheinz Stockhausen exploits the microphone as a mobile performance instrument in relation to a large tam-tam. Stockhausen attempts to use the microphone to modify

<sup>&</sup>lt;sup>36</sup> Alvin Lucier and Robert Ashley, "Cage and Tudor," in *Music 109: Notes on Experimental Music* (Middletown: Wesleyan University Press, 2012), 57.

<sup>&</sup>lt;sup>37</sup> Iddon, "(in)Determining the Indeterminate," 167.

<sup>&</sup>lt;sup>38</sup> Caleb Kelly, Cracked Media: The Sound of Malfunction (Cambridge, Mass.: MIT Press, 2009), 116.

the same parameters as conventional musical instruments and guide all aspects of sound shaping. *Mikrophonie I* is written for six players divided into two groups of three, with the three performers in each group, and sometimes the sextet as a whole, working together to produce each individual sound.<sup>39</sup> The tam-tam is positioned in profile on stage, acting as a metal barrier dividing the two groups on either side (see Figure 9).



Figure 9: Karlheinz Stockhausen, Mikrophonie I. Setup diagram.<sup>40</sup>

One player on each side of the tam-tam excites the instrument with a variety of materials through percussive and fricative actions. These actions are sometimes combined with a secondary resonance, such as a tube or a wine glass, that radically affects the sound quality. A second player on each side controls a microphone across the surface of the tam-tam exploring the different sound

<sup>&</sup>lt;sup>39</sup> Karlheinz Stockhausen, *Mikrophonie I*, (London: Universal Edition, 1964).

<sup>&</sup>lt;sup>40</sup> Ibid.

zones produced by the first player, and away from its surface to exploit the proximity effect. Stockhausen also requires the microphone player to use a secondary resonator—defined as a hollow object open at one end, such as a glass or plastic flower pot, and designated in three sizes that acts as a filter and is used at specified angles. This secondary filter is also sometimes used to excite the tam-tam. Each duo's sound output transmitted by the microphone is further processed by a third player manipulating a band pass filter, with the complete sound projected in a quadraphonic loudspeaker system.



Figure 10: Talea Ensemble performs *Mikrophonie I*.<sup>41</sup>

*Mikrophonie I* is unique in that it simultaneously cultivates the performative use of electronic devices, extends the fundamental notion of percussion playing, and presents a new

https://newyorkclassicalreview.com/2016/05/darmstadt-institute-goes-back-to-the-future-brilliantly/. Photo: Michael Yu.

<sup>&</sup>lt;sup>41</sup> George Grella, "Darmstadt Institute Goes Back to the Future,"

model for chamber music performance. It introduces unique performance challenges through a renewed notion of virtuosity and a shift towards deliberately unstable sound-producing systems. As such, *Mikrophonie I* signals a turning point both in the history of percussion music and in the development of performer-controlled electronics.

*Mikrophonie I* represents one of the first uses of the microphone as an active performance instrument. The microphone, not originally designed to be used as a musical instrument, is appropriated by Stockhausen as a mobile performance device and brought into the realm of music creation. Stockhausen treats the microphone as if it were a conventional instrument in an attempt to modify and shape all parameters of sound, including pitch, rhythm, timbre, dynamics, and spatial projection. For example, small changes in distance between the microphone and the tamtam can result in extreme changes in frequency response and aural perspective. Although a microphone will never function in the same manner as an acoustic instrument, it does maintain a similar relationship to the resulting sound since a microphone captures the results of physical performance gestures. As a result, the microphone is no longer simply supporting another voice; it transmits a voice of its own through its movements and shapes sound in real time.

The microphone acts like a stethoscope in *Mikrophonie I*, listening to the tam-tam in a way that discovers the micro-world of its acoustic vibrations through amplification and transformation. This brings the ears of listeners to the tam-tam in an attempt to control how they listen to the instrument. However, this reverses the sense of privileged position that a performer typically has at their instrument by being able to hear the minute details of their manipulations, as it is the audience in this case that perceives the transformations caused by the microphone movements. This poses an important challenge for the microphone players, as not only are they transforming sound in ways that cannot always be anticipated, they also do not necessarily hear the result of

their actions that gets projected into the hall. The players are thus required to accept higher levels of unpredictability than in typical instrumental performance. This is also the case for the first player of each group who excites the tam-tam. Although the percussionist is relatively in control of the action they are producing, the sound that is captured by the microphone may be very different than what the player hears, and undergoes further transformation through the filtering. Both players in this case must accept a less direct and more unpredictable relationship with sound than in typical percussion performance.

The unpredictability is heightened by the fact that the three players of each group are equally responsible and dependent on one another. This interdependence breaks down the process of the electronic manipulation of live sound by separating each step into performer-controlled actions, operating as a sequentially ordered set of filters and effectively achieving Stockhausen's goal of making electronic music live. Although each sound is defined by the combination of the three players, there is an inner polyphony within each sound caused by the superimposition of transformations. In this sense, the performance of *Mikrophonie I* requires true team effort, representing the highest degree of chamber music through the radical interdependence of the players.

As *Cartridge Music* and *Mikrophonie I* demonstrate, the general approach of performercontrolled electronics implies a certain tactile connection to a device that allows the performer to track the relationship between an action or adjustment and the resulting sound, leading to the creation of responsive interactions with the device and its sonic behaviour. Since more recent technological developments have been digital and computer-based, the technology does not have an inherent specificity that can be explored and exploited in an immediate and direct manner. The seemingly endless possibilities of computer-based music and the incredibly rapid development of digital technology have removed the material characteristics and limitations of technology that could be manipulated previously. This does not imply that digital technologies are not used in performer-controlled electronics settings, but rather explains the aesthetic tendency towards analog devices.

# 3.2. Characteristics of performer-controlled electronics

Similar to the notion of a post-percussive practice, performer-controlled electronics cannot be strictly defined as to what is or is not *performer-controlled*, but certain characteristics of performer-controlled electronic devices can be highlighted. These characteristics provide us with a point of comparison to the characteristics of a post-percussive practice, from which we can investigate how to apply a post-percussive approach to this kind of electronic music performance.

#### **3.2.1.** Instrumentalizing

*Instrumentalizing*, a term proposed by Andy Keep in "Instrumentalizing: Approaches to Improvising with Sounding Objects in Experimental Music,"<sup>42</sup> refers to the potential of treating any object as a musical instrument. The process "seeks to discover the performability, intrinsic sonic palette and possibilities for sonic manipulation of objects."<sup>43</sup> It can be performed on any object that has the potential to sound or to manipulate sound in real time, and can range from simple acoustic objects to a wide range of technologies. Instrumentalizing typically involves the de-contextualization and re-contextualization of the device used, and can include devices designed for music production as well as those intended for uses in other fields.<sup>44</sup> At its core, the idea is that

<sup>&</sup>lt;sup>42</sup> Andy Keep, "Instrumentalizing: Approaches to Improvising with Sounding Objects in Experimental Music," in *The Ashgate Research Companion to Experimental Music*, ed. James Saunders (Farnham, England: Ashgate, 2009).

<sup>&</sup>lt;sup>43</sup> Ibid., 113.

<sup>&</sup>lt;sup>44</sup> Ibid.

an instrument is not completed at the stage of design or production, but is rather made complete through its use.

The process of instrumentalizing reformats the perception of a musical instrumental or object as a predetermined entity that is performed to realize an external musical language. Instead, the object is explored for its inherent sonic properties, seeking to create an artistic statement that responds to the emerging characteristics of an adopted or appropriated sounding object. For example, the use of prepared phonograph cartridges in *Cartridge Music* uncovers the inherent sounds of objects that would otherwise go unheard through the re-contextualization of its own purpose. The phonograph's original function as a playback device is deconstructed and reconstructed as an instrument capable of producing its own sounds, stretching and redefining its sonic potential.

This approach is similar to the defamiliarization of instrumental technique described earlier, rooted in a rejection of instrumental conventions and an embrace of extraneous instrumental sounds. The treatments of technologies such as the phonograph, microphones, and oscillators in *Cartridge Music* and *Mikrophonie I* represent a reaction to the fixed nature of electronic music studio composition. These technologies could be explored for their unfamiliar sounds and new performance possibilities, resulting in unique sonic characteristics and an "explicit rejection of past musical technique."<sup>45</sup>

### 3.2.2. Creative abuse

The notion of creative abuse is a primary method within the process of instrumentalizing, especially when working with electronic devices. Creative abuse refers to the exploitation of a sonic object by any means necessary and in manners for which it is not initially intended or

<sup>&</sup>lt;sup>45</sup> Ibid., 115.

generally accepted. This can be achieved by pushing an electronic device to the edge of unstable activity through the experimentation of its capacities, leading to the emergence of the device's "personality" and the discovery of unique behaviours. Creative abuse places devices in situations where undesired elements of the media are accepted and embraced, and can ultimately be exploited in performance.<sup>46</sup>

In acoustic music, the use of prepared instruments and extreme extended techniques can be understood as a form of creative abuse. As extended techniques are pushed to the extreme, the original intention of an instrument is forgotten; it is fractured by its treatment and is transformed into a new sounding object. In electronic music, although creative abuse can be applied to both new and outdated technology, it relies on the materiality and inherent limitations of the media, just as acoustic instruments by nature are material objects with limitations. While these limitations can be stretched, as demonstrated by developments throughout musical history and especially in experimental performance practices, they cannot be completely erased. The computer mediation of digital data erases the specificity of media, which explains why older and simpler technologies are generally favoured in this approach.

Creative abuse is central to the notion of *cracked media*, a term proposed by Caleb Kelly that refers to a practice where tools of media playback are expanded beyond their original function as a simple playback device.<sup>47</sup> The crack refers to a point of rupture or a place of chance occurrence, where unique events emerge that can be exploited for new creative possibilities, such as the use of acoustic feedback in performance.

Creative abuse and cracked media highlight elements of musical technologies that the production process attempts to eliminate, bringing these elements to the foreground of the

<sup>&</sup>lt;sup>46</sup> Ibid., 116.

<sup>&</sup>lt;sup>47</sup> Kelly, Cracked Media: The Sound of Malfunction, 4.

technological system. Through the creation of music from the sounds of technological dysfunctions, our attention is shifted to the failing of systems that have been designed to not fail, therefore contributing to the transformation of these devices into active participants of artistic creation and performance. The mistreatment of technology, just like the misuse of a piano or any other acoustic instrument, therefore goes beyond the shock of the act and into the field of artistic productivity.<sup>48</sup>

#### 3.2.3. Inherent unpredictability

Since the practices of instrumentalizing and creative abuse highlight functions of electronic devices for which they are not initially intended, these functions generally will not behave as consistently as musicians are accustomed to in instrumental performance. Therefore, the use of performer-controlled electronic devices requires a performance practice that accepts and embraces the inherent unpredictability of electronic devices. This is demonstrated in *Cartridge Music*, an extreme example in this case since Cage requires the performers to follow instructions without subjective input.<sup>49</sup> Players must perform an action and accept any possible outcome, which allows for unexpected outcomes to emerge. Cage notes in the score that "all events, ordinarily thought to be undesirable, such as feed-back, humming, howling, etc., are to be accepted in this situation."<sup>50</sup>

*Mikrophonie I* represents another form of unpredictability, since no performer has full control over the final sounding result. With each individual sound being produced by the combination of three performers, the players are performing actions resulting in sounds that cannot always be anticipated. Therefore, in addition to the complexity of notated actions in *Mikrophonie* 

<sup>&</sup>lt;sup>48</sup> Ibid., 126.

<sup>&</sup>lt;sup>49</sup> Lucier and Ashley, "Cage and Tudor," 60.

<sup>&</sup>lt;sup>50</sup> Cage, Cartridge Music.

I, a key issue for performers becomes the embrace and management of an aesthetic of unpredictability.

The embrace of an aesthetic of unpredictability can also be demonstrated by the use of acoustic feedback in musical performance. Feedback is created when a microphone-loudspeaker system oscillates on one or more frequencies. This phenomenon occurs when there is enough overlap contact between the sound waves diffused by the loudspeaker and picked up by the microphone. This contact is achieved when the microphone and loudspeaker are positioned too closely or facing one another, or through high amplification levels. As with conventional instruments, the material characteristics of microphones and loudspeakers greatly influence the sonic result.<sup>51</sup>

Feedback was originally a sound to be avoided, since it disturbed the standard approaches of sonic reproduction and amplification. As with the previous examples, the active use of feedback was a way to purposely misuse technological equipment. Feedback became a common feature of much music in the 1960s, which could be due to the fact that the problem of feedback had largely been solved and could be controlled; therefore, since it could be avoided, there was a clear difference between sounds that were intended or not.<sup>52</sup>

Once feedback functions as a central sounding element of a work it can be manipulated as sounding matter, drawing the audience's attention to the interaction between the performer and the feedback system. Artists such as Robert Ashley, Eliane Radigue, and Jimi Hendrix were drawn to the unpredictability of sound production in acoustic feedback, as opposed to the very controllable

<sup>&</sup>lt;sup>51</sup> Cathy van Eck, Between Air and Electricity: Microphones and Loudspeakers as Musical Instruments (New York: Bloomsbury, 2017), 55-56. <sup>52</sup> Ibid., 83.

nature of conventional instruments that had been developed over time. The instability and fragility of the feedback system was regarded as an interesting and captivating element of the work.<sup>53</sup>

Jimi Hendrix fully incorporated feedback into the physicality of his playing, introducing the electric guitar as an entirely new kind of instrument by diverting it away from its conventional use. His crucial innovation was to play at high volume while standing close to the speaker to obtain feedback, which he could then control in a very nuanced and sensitive way using the angle of his guitar, the weight and position of his fingers on the strings, and the position of his entire body.<sup>54</sup> These developments played an important role in the use of feedback in rock and popular music genres, influencing future generations of artists and composers working in various musical fields to incorporate feedback into their work.

*The Wolfman* (1964) by Robert Ashley represents one of the first instances of a musician being required to control feedback in performance. *The Wolfman* combines sustained vocal sounds with highly amplified resonance feedback shaped by the performer's mouth cavity. This kind of feedback is created by bringing a microphone into close proximity to an air cavity—the performer's mouth in this case—which can be excited to resonate into feedback even with a relatively distant loudspeaker. Ashley explains that the tongue must be kept touching some point along the roof of the mouth to create a special cavity that allows for a certain amount of acoustic feedback to be present within the vocal sounds. The mouth must also be kept close to the microphone to allow for the softly produced vocal sounds to control the feedback and achieve a proper mix of levels. As a result, the performer is able to more or less control the electronic sound with their mouth cavity.<sup>55</sup>

<sup>&</sup>lt;sup>53</sup> Ibid., 83-84.

<sup>&</sup>lt;sup>54</sup> Bob Ostertag, "Human Bodies, Computer Music," Leonardo Music Journal 12 (2002): 13.

<sup>&</sup>lt;sup>55</sup> Robert Ashley, "The Wolfman for Amplified Voice and Tape," in *Source: Music of the Avant-Garde, 1966-1973*, ed. Larry Austin and Douglas Kahn (Berkeley: University of California Press, 2011).



Figure 11: Robert Ashley, The Wolfman. Transition between feedback and vocal sounds.<sup>56</sup>

Feedback systems have since been used by composers, performers, improvisers, and sound artists in various ways, such as sending a feedback signal through effect pedals or controlling it in a very nuanced and sensitive manner with an instrument. A feedback system is given vitality as an active sound shaping instrument by the very strong interaction between performer movement and feedback sound. Although the relationship between movement and resulting sound is much less predictable than with conventional instruments, every small movement affects the sound. Since these devices are not intended to be used in this manner, they have an inherent and designed resistance against this approach, resulting in sounds that can be surprising for both audiences and performers. The unpredictability that results from such treatments of electronic devices, and the tension that emerges from the juxtaposition of unpredictability and strict musical performance, is central to the works that have shaped my experiences with performer-controlled electronics that I discuss in Chapter 4.

# 3.3. Performing (with) performative electronics

My pursuits in the field of performer-controlled electronics have largely been self-taught. Shortly after I began performing Billone's music, I started performing works that integrated electronic devices into my instrumental setup. As with many classically-trained musicians, the use of electronics in performance was daunting to me. However, I discovered that in cases where I was given control of the performative electronic component—as opposed to simply playing an

<sup>&</sup>lt;sup>56</sup> Ibid., 144.

instrument and having the electronics controlled independently—I could apply similar working methods that I had developed in the performance of Billone's music and the various piano works.

The following section compares characteristics of performer-controlled electronics to those of a post-percussive approach to provide a fresh perspective on performing with electronics, and help bridge the gap that currently exists between acoustic performance and electronic performance.

#### 3.3.1. Comparison to post-percussive characteristics

The practice of instrumentalizing, where any object has the potential to be transformed into an instrument that can be exploited for its sounding possibilities, can be understood as a similar procedure to the defamiliarization of instrumental technique. In both cases, the conventional or intended use of the object is set aside to instead develop a sounding language that is used as a basis for musical performance. This is a process followed by Billone in *Mani. Gonxha* with the two Tibetan singing bowls, and by Stockhausen in *Mikrophonie I* with the combination of the tam-tam, microphones, and band pass filters. Both composers develop a deep understanding of the objects' behaviours through the process of instrumentalizing, and this understanding must be developed by performers of the works as well.

The incorporation of electronic devices into an already extended musical practice can thus be viewed as a further defamiliarization of instrumental performance, rather than an entirely different practice. In this way, one can develop electronic performance techniques in conjunction with newly invented instrumental techniques, allowing them to function and interact on the same plane of importance.

Since the use and treatment of electronic devices will inevitably vary from one work to the next, the notion of work-specific techniques from a post-percussive practice is similarly applicable to performer-controlled electronics. The process of developing these techniques allows performers

to familiarize themselves, and develop a performing relationship, with an electronic device in a manner that will resemble their re-familiarization with an acoustic instrument. A performer adept at developing work-specific techniques in acoustic performance should be able to transfer these skills to the performance of electronic devices by discovering their sounding characteristics, their tactile response, and their unique behaviours. In this way, developing a musical language from two Tibetan singing bowls, from a piano being rubbed with plastic Tupperware, or from microphone movements and manipulations can be approached in a similar manner.

A key difference in the use of performer-controlled electronics as compared to acoustic performance is the unstable and volatile nature of the treatment of certain electronic devices. This necessarily leads to a change in performance practice that involves more searching, listening, and adapting to sounds, with a greater acceptance for unpredictability. When working with such unstable environments, one cannot search for the reproduction of exact sounds but must rather aim to recreate sonic behaviours. This perspective can be paralleled to common percussion techniques such as bowing a cymbal or rubbing the tip of a drumstick across the surface of a tam-tam to create a high-pitched harmonic, as well as the unstable nature of sounds used on the piano in *one poetic switch* as I described earlier. One can develop the skills to shape and manage the produced sound while also embracing its unpredictable nature.

Performers can treat their connection to such devices as an extension of their traditional relationship to an instrument, finding the skills that are transferable and viewing this as an opportunity to expand their capacities and develop new performance sensibilities. Percussionists, and especially those working in a post-percussive practice, are perhaps best suited to this approach since they are trained to develop a versatility in adapting to new instruments and methods of sound production. The use of sticks and mallets already creates a separation between the percussionists

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and the instrument—as opposed to most other musicians who are in direct contact with the sounding object—so the incorporation of electronic devices can be viewed as a further distancing of the produced sound from the performative action.

The integration of performer-controlled electronic devices into an instrumental practice extends the performer's capacity for adaptability. Rather than operating as a conventional instrumentalist, the performer often becomes an exciter or prober of sounds, controlling sonic activities that may have a behaviour of their own. The traditional notion of virtuosity becomes even further removed in the use of performer-controlled electronics, but the virtuosity of adaptability that is already present in a post-percussive practice assumes a more important role. The integration of performer-controlled electronics into a post-percussive practice stimulates performers to expand an ever-growing set of skills while also drawing on past experiences to transform the unfamiliar into the familiar.

The use of "instrumentalized" and "creatively abused" electronic devices can be understood as contributing the continued expansion of musical instrument possibilities. In instrumental practices, the inherent limitations of an instrument are what allow for creativity and innovation to emerge as these limits are exploited, pushing an instrument's and a performer's capacities past what was previously conceivable. The processes of instrumentalizing and creative abuse subvert the use of electronic devices typically designed for their transcendent qualities, and instead reveal their material limitations. These material limitations are precisely what allow them to be treated and exploited as musical instruments, even if they may not share the same behavioural characteristics as acoustic instruments. The incorporation of electronic devices thus affords performers the opportunity to further expand their instrumental capacities through the creation of new hybrid instrumental-electronic setups. *Mikrophonie I* can be considered as a model work for timbre-driven electronic percussion music. It represents the opening of percussion practice towards non-percussive gestures by inciting performers to discover an instrument through various fricative manipulations, treatments, and filtrations. Stockhausen's use of the microphone as a performance device maintains the presence of the musicians' bodies in electronic music performance, resulting in a work that is dynamic, flexible, and unpredictable. *Mikrophonie I* is unique in its combination of percussion, performercontrolled electronics, and ensemble playing, ultimately challenging the musicians to develop new performative skills and new forms of chamber music communication in a complex work where everything that happens takes place in the actual time of the performance.

As demonstrated by *Cartridge Music* and *Mikrophonie I*, the development of performercontrolled electronics can be characterized by a desire to make electronic music live, and to reintroduce humanness and performativity into a musical and electronic practice that is too often scarcely human. Humanness grants a certain imperfection that "symbolizes the quality of critical conflict within a practice that sustains the kind of humanness that depends precisely on a lack of perfection."<sup>57</sup> The use of performer-controlled electronics celebrates human actions, ephemeral moments, and active engagement. It places value on the qualities of immediacy, spontaneity, and uniqueness, and instills in the audience qualities of fear, expectation, and excitement. As a result, musical meaning is carried in the fleeting performance rather than in the work itself. This idea is highlighted in the works I discuss in the following chapter, where the performative use of the electronic devices is exploited for its forms of disorder, requiring the performers to strive for control in a performance environment where full control is unattainable.

<sup>&</sup>lt;sup>57</sup> Lydia Goehr, "Conflicting Ideals of Performance Perfection in an Imperfect Practice," in *The Quest for Voice: On Music, Politics, and the Limits of Philosophy* (Berkeley, CA: University of California Press, 1998), 135.

The composers and musicians that I discuss below are from a generation that has grown up immersed in popular culture with access to all sorts of musical genres beyond those propagated through institutional music training. As such, the use of feedback, guitar effect pedals, and contact amplification feature much more prominently than complex computer systems.<sup>58</sup> While this use of electronics, more typically associated with noise-based musical genres, may be unfamiliar to Western contemporary music, the history of Western classical percussion has always imported instruments and objects from other cultures. Importing devices built for other purposes, or designed for use with other instruments in other musical genres should be no different. Using these devices or techniques simply provide another way to incorporate new sounds into instrumental performance.

The manipulation of technology in performer-controlled electronics can be described as the deviation of technology, and it is a natural and required working process for artists in this field. Artists appropriate a new technology that has been designed with an original purpose by enlarging and deviating its use to expand artistic expression, creating an art form out of the technology itself. As presented through the examples above, the technologies that brought about a dislocation from live performance have enabled a shift in focus and a development of new practices.<sup>59</sup> Human presence is reasserted by challenging the very nature of the medium, and most importantly, by

<sup>&</sup>lt;sup>58</sup> Interestingly, the developments that characterize performer-controlled electronics are more often found in popular culture and underground music circles than in electronic music research institutions. The approach favoured by research institutions has been to electronically process a musician playing their instrument in the conventional manner, or to develop new digital instruments that can be programmed to produce any possible sound. Both of these approaches run into issues: the division of tasks between two people of the generation and control of sound is a problem, as the person generating the sound is disconnected from the final output; and music that is designed using electronically generated sound from computers suffers from the problem that one cannot actually touch and manipulate the generation of sound. (Ostertag, "Human Bodies, Computer Music," 14.)

<sup>&</sup>lt;sup>59</sup> Simon Emmerson, "'Losing Touch?': The Human Performer and Electronics," in *Music, Electronic Media and Culture*, ed. Simon Emmerson (Aldershot: Ashgate, 2000), 211.

creating music that would be impossible to make without the active use and treatment of performer-controlled electronic devices.

# 4. Case studies: Models for performer-controlled electronics

The use and development of a performer-controlled electronic practice has been explored by artists in various ways. There are no set rules that one must follow for an electronic performance situation to be deemed as performer-controlled, and the aim of this paper is not to define what is or is not performer-controlled. The case studies below elucidate different approaches that performers and composers have undertaken in an effort to regain control of and reinsert the performer into electronic performance situations.

First, I present the work of three musicians who have a developed a performer-controlled electronic practice, and who have each found a way to mold this practice to best suit their artistic needs. There are various other performers who have developed unique approaches to performer-controlled electronics that cannot all be discussed here. These include, among others, Levy Lorenzo,<sup>60</sup> a percussionist who works at the intersection of music, art, and technology, designing and inventing new electronic instruments that he performs in a variety of settings; Jean-François Laporte,<sup>61</sup> who designs large-scale performative installations built from hybrid instrument-electronic objects; and Katherine Young,<sup>62</sup> a performer and composer who has molded her performance practice around the incorporation of active amplification and a flexible electronic setup into her bassoon playing.

This section is followed by an investigation of the performer-controlled electronic features of three works that I have performed and collaborated closely on with the composers, and a discussion of how I have approached my performance of these works.

<sup>&</sup>lt;sup>60</sup> levylorenzo.com

<sup>&</sup>lt;sup>61</sup> totemcontemporain.com

<sup>&</sup>lt;sup>62</sup> katherineyoung.info

#### 4.1. Performers

#### 4.1.1. Andrea Young

Composer and performer Andrea Young<sup>63</sup> has developed a digital voice instrument using voice-controlled electronics to extend the functionality of the voice as an inaudible, live electronic interface.<sup>64</sup> Young's approach can be understood as a way of instrumentalizing her voice by exploring its performability and possibilities for the sonic manipulation of electronics. Young's system is designed through a network of possible interactions between the voice and computer implemented in Kyma from Symbolic Sound<sup>65</sup> in collaboration with sound designer Pete Johnston. The system "allows the singing voice to move away from the typically positivistic associations with voice and technology by expressing an "in-between" and dynamic interconnection of voices by providing a network of different signal paths."<sup>66</sup> This approach can be viewed as Young searching for a way to use the vocal skills that she has developed to control sonic properties that do not actually feature any sound from her own voice.

The signal path in Young's system features five outputs: acoustic voice, amplified/recorded voice, processed voice, voice-controlled synthesizers/samples, and vocal deconstruction/ reconstruction. The voice itself is the generator and is intrinsic to the sonic outcome of the first three outputs. Firstly, the acoustic voice output is the most immediate and located voice system, consisting of the entire vocal spectrum. Secondly, the amplification path captures and dislocates the voice, amplifying microsounds to make them larger than life. Thirdly, the digitally processed

<sup>&</sup>lt;sup>63</sup> "Andrea Young (Canada) is a composer and performer who performs an acoustic, amplified, processed and resynthesized voice, as well as a re-purposed sound-controlling voice enabled through feature extraction and data-driven live electronics. While her work relies on digital innovation, her musical output

relies on the integration of her digital interface with analogue and re-purposed electronic media." [andreayoung.ca]

 <sup>&</sup>lt;sup>64</sup> Andrea Young, "The Voice-Index and Digital Voice Interface," *Leonardo Music Journal* 24 (2014): 3.
<sup>65</sup> https://kyma.symbolicsound.com

<sup>&</sup>lt;sup>66</sup> Young, "The Voice-Index and Digital Voice Interface," 3.

voice can range from a compressed voice to extreme sonic transformation; the voice is distorted and morphed to become a new sound, but it remains in the sonic output.

The voice-controlled synthesizers/samples output occurs when vocal features are extracted and applied to signal-processing parameters and therefore have live control of the sound generator. Young's vocal features control the output of the electronic sound, and her voice itself can become imperceptible as a controller in this case. In her current work, the vocal features she has extracted for use as signal controls are "frequency, amplitude, brightness, breathiness, growliness, vibrato rate, vibrato depth and formants."<sup>67</sup> By extracting these features, the role of the voice is changed from sound source to information source, and each feature can be attached to the parameter of any possible sound.

Lastly, in the vocal deconstruction/reconstruction signal path, Young's vocal folds and breath generate sound, but the resulting sonic output is created by the separation of the signal into two paths: a pulse generator representing the frequency component, and a vocoder representing the spectral component. This allows Young to separate and further process singular components of her voice.

Young uses the results of her work with this electronic instrument system in a variety of applications as a composer and performer. Composition and performance feed into each other in her practice; compositional intentions help design the signal paths, while the behaviours of the signal paths help realize the compositions. Young has created various works that utilize the digital voice instrument, ranging from *Bocca* (2012), a work that evolves from amplified voice to a combination of voice and voice-controlled electronics before closing with purely voice-controlled

<sup>&</sup>lt;sup>67</sup> Ibid., 4.

sound, to *Exo/Endo: Voice-Infused Noise Machines* (2014), her largest-scale work for the digital voice instrument with accompanying singers, prepared turntables, electric bass, and cello.

The digital voice instrument allows Young to expand her experimental vocal practice into electronic performance through the adaptation and re-application of her skills into a hybrid performance situation. Young's development of the digital voice instrument can be viewed as an extreme extension of Robert Ashley's use of vocal features to control feedback in *The Wolfman*. Young considers the digital voice instrument as a repurposing of her voice—in a similar approach to the repurposing of the phonograph in *Cartridge Music*—hacking into or "creatively abusing" her voice as a form of practical exploration of voice-controlled electronic material.<sup>68</sup>

#### 4.1.2. Sabrina Schroeder

Sabrina Schroeder<sup>69</sup> is a Canadian artist who works primarily as a composer, but her practice as a performer has greatly influenced her approach to performer-controlled electronic composition. Schroeder develops performance systems using modified transducers and self-built devices to extend and amplify resonances of acoustic instruments, without the use of speakers or standard electronics.

Transducers are devices used to convert one type of energy into another. For example, in a loudspeaker, an audio signal in the form of electrical energy is converted into mechanical energy (vibrations of a speaker cone), which are then converted into sound waves in the air. Schroeder

<sup>&</sup>lt;sup>68</sup> Ibid., 5.

<sup>&</sup>lt;sup>69</sup> "Composer-performer Sabrina Schroeder integrates tactile transducers, live processing, and self-built mechanics into performance that digs into heavy sound spaces that are as much about body-feel as they are about audible sound. She's been part of composer-performer collectives creating scored and improvised music, a back-up-band coordinator for teens in mental health housing, and has taught on the faculty of iEAR (Integrated Electronic Arts) department at RPI and the Royal Northern College of Music. She is currently Assistant Professor at Simon Fraser University's interdisciplinary School for the Contemporary Arts." [sabrinaschroeder.com]

uses transducers—often bass transducers—attached to the skin of a bass drum (see Figure 12), the strings of a piano, and to wooden boxes, among other objects, sending waveforms and frequencies to them via a laptop, soundcard, and amplifier. The object acts as a resonating body, and the waveforms and frequencies coax out unpredictable behaviours from the objects producing a rich array of sounds.<sup>70</sup>



Figure 12: Sabrina Schroeder during soundcheck. La Sala Rossa, Montreal, 2018.

The waveforms and frequencies are sent from a transducer performance interface, a MAX/MSP patch developed with the programming and design support of Josiah Oberholtzer. Schroeder or another performer controls the interface via a midi controller, with a common model

<sup>&</sup>lt;sup>70</sup> Lisa Conway, "(Un)Traceable Sources: The Music of Sabrina Schroeder," https://www.musiccentre.ca/node/154724.

she suggests being the Korg nanoKONTROL2. In her scores, she describes this performance system as "live mechanics."<sup>71</sup>



Figure 13: Sabrina Schroeder, Stircrazer III. Bass transducers on piano strings.

What is interesting to note in Schroeder's case is the performer's regaining of control from the computer in the current interface model in comparison to earlier models. Schroeder's *Stircrazer* series of works for performer and live mechanics stems out of a modular set for solo performer that Schroeder developed for a performance at Chicago's Heaven Gallery.<sup>72</sup> The earlier interface models, such as the one used in *Stircrazer III* (2013), for piano and bass drums, feature a patch and instructions that appear relatively straightforward. One performer is at the piano controlling two transducers situated on the piano strings and one under on the sound board (see Figure 13),

 <sup>&</sup>lt;sup>71</sup> Sabrina Schroeder, *Stircrazer II: For Bass Clarinet Solo* + *Live Mechanics*, (self-published, 2016).
<sup>72</sup> Ibid.

along with a minimal amount of playing inside the piano and pedal dampening actions. A second performer controls transducers placed on two bass drums, positioned in wide stereo orientation on either side of the piano. The programming of the interface system for the work is organized into three main macro-states. The first two of these are each comprised of five sub-states, while the third has no sub-states. The performer activates shifts between these states as well as actions within them. The score clearly indicates the midi controller triggers that correspond to the different states.

The issue with this earlier model, as we discovered when I was workshopping *Stircrazer III* with Schroeder in 2016 as part of my piano project, is that a single trigger can generate a complex behavioural system in the interface, especially when different actions are superposed. This results in the performer quickly feeling as if they are losing control of the interface, no longer being able to recognize the corresponding sonic result to their performance actions. Similarly, the MAX/MSP patch is so complex that when we discovered errors in the programming, it was practically impossible to locate the error and attempt to fix it.

In this earlier model, the cause-and-effect relationship of action to sound was lost, giving the performer very little tactile connection to the interface. Essentially, we found that the interface was programmed to have too many possibilities, and as a result the performer was no longer able to identify and shape them as one does with an acoustic instrument or simpler electronic systems. In other words, the computer was assuming more responsibility than the performer to the detriment of the sounding result.

In Schroeder's more recent works, such as the updated version of *Stircrazer II* (2013/2016) and *Bone Games* (2016), a new version of the interface is used in which the performer has more triggers to control, but each trigger generates a single result. This places artistic agency back into the performer's control, as the performer is able to better identify the results of their actions. The

updated interface is designed in a way that allows it to be treated in a manner that more closely resembles a musical instrument; it can be explored for its capacities and limitations, and molded by the performer to best suit the performance situation.

Collaborating with other performers on works that Schroeder performs herself allowed her to discover aspects of the interface that did not translate effectively into notated music situations with strict time codes and chamber music communication between performers. Simplifying the role of the computer by removing the concealed processes of the interface and returning control of these processes to the performer allows the performer to acquire a certain tactile familiarity with the device, in a way that can be understood as a continued extension of an instrumental practice. Our collaboration on *Stircrazer III* helped us discover that this was a natural approach that was also more in line with the artistic concept of her works since the electronically generated sounds are amplified and filtered by acoustic objects.

### 4.1.3. Fernando de Oliveira Rocha

Brazilian percussionist Fernando de Oliveira Rocha addressed the issue of incorporating electronics into percussion performance through the creation of the *Hyper-Kalimba*, a Digital Musical Instrument (DMI) that he designed with the technical support of Joseph Malloch in 2008.<sup>73</sup> The *Hyper-Kalimba* consists of a kalimba augmented with sensors that can control various parameters of sound processing.

A DMI consists of two separate units, a control surface or gestural controller and a computer system that generates sound in real time. The gestural controllers recognize human gestures and transform them into data to be sent to the computer. Unlike acoustic instruments,

<sup>&</sup>lt;sup>73</sup> Fernando Rocha, "Works for Percussion and Computer-Based Live Electronics: Aspects of Performance with Technology" (Thesis, McGill University, 2008), 44.

performance gestures are not physically linked to sound production in DMIs, meaning that there is not an inherent fixed relation of cause and effect between gesture and sound. Any gesture can therefore be used to create any sound, and the process of coupling a gesture to a sound is referred to as mapping.<sup>74</sup>

Rocha addresses this rupture between movement and sound in a DMI by augmenting the kalimba to create a hyper-instrument that gives him control over additional sonic parameters to the ones the instrument can produce. This allows him to maintain the technique he has already developed with the instrument, as well as the inherent sound of the instrument. The sensors can capture gestures that are used to produce acoustic sounds on the instrument, accompanying gestures, or newly proposed movements. Rocha's approach is similar to Young's digital voice instrument, but adapted to and constructed for an instrument that is inherently less versatile than the voice.

Rocha designed the MAX/MSP patch for the Hyper-Kalimba himself, effectively constructing the instrument's characteristics that he can then adapt as necessary, and ensuring that the sensors added to the kalimba to not interfere with the instrument itself. It was important for Rocha to be able to maintain the melodic characteristic and natural sound of the kalimba, and complement the instrument's existing technique with the creation of new performance gestures.<sup>75</sup> This approach allowed him to use his existing skills on the instrument while also requiring him to master new performance gestures—an evolution that can be considered as a natural progression of his percussion practice.

The digital component of the Hyper-Kalimba is designed as an integral extension of the kalimba, and is unlikely to be applicable to another musical instrument without major

<sup>&</sup>lt;sup>74</sup> Ibid., 44-45. <sup>75</sup> Ibid., 46.

modifications to the computer interaction. Rocha was actively involved in the technological, compositional, and performance aspect in the design of the *Hyper-Kalimba*, requiring a profound understanding of the technological components involved that most performers will not develop.

Rocha developed his technological abilities as a way of reasserting control over electroacoustic works through the creation an instrument that he could master in a similar manner to an acoustic instrument. Rocha has since used the *Hyper-Kalimba* in various improvisational settings, and in self-composed and commissioned works, allowing him to maintain and foster technical coherency throughout his practice.

### 4.2. Forming my own practice: works and commissions

My own approach differs from Rocha's in that I have not set out to develop a new performative relationship with a single instrument through its electronic augmentation, but rather extend an already expanded percussion background through the incorporation of performercontrolled electronics. This approach is assembled from a deconstruction of conventional technique, and a resulting lack of coherency, through the exploitation of the intrinsic sonic characteristics of instruments, objects, and electronic devices, and their various possible combinations. The three works discussed below—*Message from the Lightouse* by Hanna Hartman, *The Threshing Floor* by Mauricio Pauly, and *Opal* by Michelle Lou—present a snapshot of various approaches to electronics into a post-percussive practice. Other works that have helped shaped my pursuits include: *Not one can pass away* (2015) by Sam Salem (b. 1982), for two object operators, tape, and video; *plastic disorder* (2016) by Santiago Díez-Fischer, for amplified saxophone, amplified percussion, and electronics; and *Patrulla reliquia*, for amplified piano and electronics, and *Its fleece electrostatic* (2012/15), for percussion and electronics, by Mauricio Pauly.

### 4.2.1. Hanna Hartman, Message from the Lighthouse (2009/16)

*Message from the Lighthouse*, a work for solo percussionist by Hanna Hartman,<sup>76</sup> can be considered as one of the simplest forms of performer-controlled electronics. The performer plays a highly amplified setup and triggers four pre-recorded tape tracks. Nonetheless, if we look closely, we can discover that the performance approach required can be more closely compared to how a singer adapts their vocal practice when using a highly amplified microphone, or to certain aspects of *Cartridge Music*.



Figure 14: Hanna Hartman, Message from the Lighthouse. Flower pots and knives setup.<sup>77</sup>

<sup>&</sup>lt;sup>76</sup> Hanna Hartman is a Swedish sound artist, composer and performer living in Berlin. She has developed a unique language that blurs the boundaries between sound installation and instrumental performance. Her compositions find new contexts for mundane objects, creating personalized environments in which these objects that are seemingly incompatible in their functionality come together to form a coherent sounding body. [hannahartman.de]

<sup>&</sup>lt;sup>77</sup> Hanna Hartman, *Message from the Lighthouse*, (self-published, 2009/16).

*Message from the Lighthouse* features a percussionist that acts more as an exciter or prober of sounds rather than a typical instrumentalist. The instrumental setup features a large clay flowerpot that is stuck inside of another, clasping various stainless steel knives in between the two pots, and allowing them to rebound freely when triggered by the performer (see Figure 14). The attacks and frequencies created by the bouncing and bowed knives are transmitted into the performance space via a contact microphone placed on the outer pot, allowing us to hear the inner reverberations that would otherwise go unheard. The pots are joined by the rubbing together of two chamotte bricks that create an underlying icy quality throughout the work, two congas that are prepared with double-sided tape and played with dragon mouth temple blocks, and a bass drum (see Figure 15). The drums act as a connective tissue to the tape sounds, highlighting the rhythmic and textural aspects of the recorded sounds.



Figure 15: Message from the Lighthouse. Full setup. 2017 recording session.

The instrument contraption built from the clay flowerpots and stainless steel knives is both central to the work itself as well as to its performer-controlled electronic characteristics. Hartman requires that this contraption be amplified with a specialized contact microphone, a *Schertler DYN* or similar.<sup>78</sup> This high-end microphone picks up the full range of frequencies transmitted from the knives through the flower pot, and amplifies them to a degree that can make the audience feel as if they are inside the flower pot themselves. The sounds created by the instrument would not be heard without the use of the microphone, or a microphone of such high quality. The sounds that are heard are therefore intrinsic to the newly created object of which the microphone is an essential component. This scenario is similar to Cage's approach in *Cartridge Music*, where the contact microphones and phonograph cartridges allow for the production of sounds that would otherwise go unheard. It can also be compared to a singer's use of extremely close microphone placement, which could either be using an air microphone or a contact microphone placed on the throat, to amplify and bring to life internal sounds that rely on amplification for their existence.

The extreme amplification system used in *Message from the Lighthouse* allows for the deconstruction and reconstruction of the object's sounding characteristics, through the decontextualization and re-contextualization of the object itself. As such, I discovered that I could approach the flower pot contraption, constructed though a process of instrumentalizing and creative abuse, in a similar manner as I approached my performance of *Mani. Gonxha* or works at the piano. Just as I had to learn and develop new techniques in the performance of those works, *Message from the Lighthouse* required me to discover the sonic characteristics of the flower pot contraption, its performability, and its possibilities for sonic manipulation.

<sup>78</sup> Ibid.

As I was preparing the work, I quickly realized that it would be useless to attempt to build and test the flower pot contraption without the required amplification. The manner in which one constructs the object—choosing the appropriate flower pots and knives—is fully reliant on being able to hear the sounds in their totality. I also realized that using a lower quality contact microphone hindered my progress, as I was searching for sounds that could not actually be produced without the correct amplification system. The electronic system of the contact microphone and loudspeaker, as well as careful frequency equalization on the mixer, is thus a fundamental component of the instrumental object.

In turn, I found that this construction influenced how I went about playing the object, and shaped the actions that I use in performing the piece. As an exciter and prober of sounds in this work, I discovered that I was responsible for triggering and shaping sounds rather than creating them. It felt as if the sounds were already inside the created object, and the electronic system simply provided me with the means to transmit them into audibility.

I found it fascinating that a work that featured a fixed interactive electronic element could enable me to feel very free. The use of a pre-recorded track is typically considered as one of the most restrictive forms of electroacoustic performance, since the performer is temporally fixed to the recording. However, this does not mean that a pre-recorded component cannot be used successfully. The problem with a pre-recorded component, as with any technology, does not reside solely with the medium but rather with the conception of its use.

Hartman's use of the pre-recorded tracks does in fact allow the performer quite a bit of freedom. Hartman requires the performer to react to the pre-recorded sounds, anticipate them, and even mimic the rhythm of a sound that appears later in the piece. The nature of the sounds used in the tape and the live performance makes for an organic interaction between the live and pre-
recorded aspects of the piece. Although the piece is performed with a stopwatch, the performer triggers the four pre-recorded tracks themselves, allowing for slight temporal shifts as necessary. Furthermore, there is no strict temporal alignment to the tracks, so the performer is free to fit their playing within the pre-recorded sounds as desired.

This demonstrates that a pre-recorded component does not have to be restrictive, but can actually be an effective performance tool. Jean Geoffroy compares the use of a pre-recorded track to a percussionist performing in an orchestra. The percussionist knows that their interpretation is fully influenced by what the orchestra will have played leading up to their entrance, and yet their contribution is vital to the continuation of the work. This does not signify that the musician disappears as an interpretative performer, but rather that one must take into consideration the sound and energy of the orchestra; or in our case here, the pre-recorded sounds. The performer's role is to provide a sense of relief and an intention to the pre-recorded sounds, and to, in essence, bring those sounds back to life.<sup>79</sup>

#### 4.2.2. Mauricio Pauly, The Threshing Floor (2014)

*The Threshing Floor* by Mauricio Pauly<sup>80</sup> is the work that led me on the path to integrate performer-controlled electronics into my practice. Pauly wrote the piece for my duo scapegoat with saxophonist Joshua Hyde; we premiered it in 2015 as part of the culmination of Pauly's year-long fellowship residency at the Radcliffe Institute for Advanced Studies at Harvard University. It has since become one of our trademark works that we have performed over 25 times across North America, Europe, and Australia. We first began workshopping the piece in 2013 in Manchester,

<sup>&</sup>lt;sup>79</sup> Geoffroy, "Le feedback dans la création musicale," 28.

<sup>&</sup>lt;sup>80</sup> Mauricio Pauly is a Costa Rican composer and performer based in Vancouver. He writes music for mixed ensembles that often integrates amplified instruments, performative electronics and prefabricated sounds. He is artistic co-director and co-founder of the UK-based ensemble Distractfold. [mauriciopauly.com]

experimenting with the integration of guitar effect pedals and different forms of feedback control and at our instruments. This period provided us with the opportunity to begin developing a tactile manipulation of these hybrid instrumental setups, and provided Pauly with a foundation for how he could incorporate performative electronics into his writing.

The resulting work incorporates the electronic component directly into our instrumental setups. Both performers control two effect pedals, a BOSS DD-6 Digital Delay<sup>81</sup> and a BOSS OC-3 Super Octave<sup>82</sup>, in addition to their highly amplified instruments and feedback production. The saxophonist performs on a tenor saxophone that is amplified using a contact microphone attached to the body of the instrument, and a basic dynamic microphone (eg. Shure SM57) pointed towards the bell of the saxophone. The percussionist performs on a frame drum that is placed on the skin of an upright kick drum, with two contact microphones (Hot Spot by K&K Sound) attached to the frame drum, and one capsule condenser microphone (Naiant X-X). The majority of the percussion part is performed with the hand and fingers on the frame drum, along with the occasional use of a small china cymbal, a superball, and a poplar dowel. The full setup is clearly detailed in the score (see Figure 16).

<sup>&</sup>lt;sup>81</sup> https://www.boss.info/ca/products/dd-6/

<sup>&</sup>lt;sup>82</sup> https://www.boss.info/ca/products/oc-3/



Figure 16: Mauricio Pauly, *The Threshing Floor*. Setup and technical diagram.<sup>83</sup>

As the diagram indicates, each performer has a personal mixer that allows them to control their individual amplification levels and equalization (EQ). The fine-tuning of levels and EQ influence the produced sounds in certain sections of the piece, such as the frequency of feedback pitches. This action can be considered as similar to a string player fine-tuning their instrument, only that feedback carries much greater levels of unpredictability. Each performer has a wedge-shaped loudspeaker placed behind them; this not only allows for the production and shaping of feedback due to the proximity of the microphone and loudspeaker system, but also maintains the localization of amplified sounds to each performer's positioning.

<sup>&</sup>lt;sup>83</sup> Mauricio Pauly, *The Threshing Floor*, (self-published, 2014).

The use of contact microphones on both instruments allow for the use of techniques and sounds that would be otherwise inaudible—as previously demonstrated by *Cartridge Music* and *Message from the Lighthouse*—such as the sticky opening of saxophone keys and the pressing and lifting of moist fingertips on the frame drum. Furthermore, Pauly and I discovered that the choice of contact microphones used very much contributed to the sound and aesthetic of the piece. The K&K Hot Spot microphones are relatively cheap microphones with limited frequency response, yet when we tried performing the piece with higher-end microphones we discovered that we were unable to replicate the sounds that we were searching for. Since the musical language of the work had been developed with the full setup of instruments and electronics, the inherent quality of the original microphones had become an essential and inseparable component of the instrument and the work.

Feedback is created and used in various forms throughout the work. The saxophonist creates feedback by approaching the bell of the saxophone to the dynamic microphone, using the body of the instrument as a resonating chamber to create feedback. He can alter the feedback frequency using the keys of the saxophone, a technique that he further developed in the work by Michelle Lou that I present below. In the percussion setup, feedback is produced in two ways. At the very beginning of the work, high amplification levels on the contact microphones result in feedback when the frame drum head is unmuted. I am thus able to shape and control this feedback by lifting my hand off the drum and simultaneously adjusting volume levels on the mixer. In this opening section, my feedback sounds are combined with saxophone multiphonics and feedback; I therefore adjust the EQ of the contact microphones to attempt to blend within the frequency range of the saxophone (see Figure 17).



Figure 17: The Threshing Floor. Opening, measures 1-8.84

Feedback is also created with the capsule microphone using the kick drum as a resonating chamber. For this, the capsule microphone is moved between the edge of the frame drum and the rim of the kick drum, exploring the different frequencies that can be created. Since this method of producing feedback is more volatile than with the contact microphones, Pauly only uses it in open sections where the two performers ebb and flow in and out of feedback tones, blended with pre-recorded tape tracks that give the impression of extending and resonating the live feedback sounds (see Figure 18).

<sup>&</sup>lt;sup>84</sup> Ibid.



Figure 18: The Threshing Floor. Feedback ebb and flow, measures 39-41.85

The feedback systems used behave very differently with each change of venue, equipment, and positioning, so I have found that I rely much less on replicating physical actions from one performance to the next and instead focus more on the quality of sound produced. This requires additional time during soundcheck to fine-tune all aspects of the setup, giving the impression that the instrument is somewhat redesigned for every performance. This in turn compels me to develop a deeper relationship with the setup, treating it as a single instrument with unique behaviours that I must shape and react to in real-time.

The effect pedals used in the work are similarly featured in various ways. The BOSS OC-3 Super Octave is used straightforwardly; it transposes a sound sent through the pedal down one or two octaves, blending the transposed sound with the direct sound to varying degrees depending on the pedal settings which are changed by the performers throughout the work. The octave transpositions are applied to both instrumental sounds—including sounds looped through the DD-6 pedal—and to feedback tones. Triggering the octave pedal on and off also resets and produces different feedback sounds, allowing for the performers to push the volume of feedback knowing that the octave pedal or another action will reset the feedback before the sound reaches a dangerous level. This is demonstrated in the excerpt below, where the amplification volume is so high that

<sup>&</sup>lt;sup>85</sup> Ibid.



feedback appears quite regularly, yet the instrumental and pedal actions control the volatile nature of the sound (see Figure 19).

The BOSS DD-6 Digital Delay is used in a more unique manner. In addition to using it for its looping function, Pauly exploits it for its inherent glitch that creates a stutter effect. This glitch, that has been fixed in the subsequent DD-7 model, is a recurring feature of Pauly's works from 2012 to 2016; he has used it in *Its fleece electrostatic* (2012) for violin, *Sky Destroys Dog* (2015) for electric guitar, *Patrulla reliquia* (2015) for piano, and *Charred Edifice Shining* (2016) for string trio. The tightness of the stutter, essentially created as an extremely short loop, is not fully controllable. One can aim for a shorter or longer stutter loop, but since the technique relies of the

Figure 19: The Threshing Floor. Measures 92-107.<sup>86</sup>

<sup>&</sup>lt;sup>86</sup> Ibid.

inherent glitch of the pedal it is by nature unstable, contributing to the aesthetic of chaos and volatility molded by the behaviour and limitations of the device. The stutter effect is featured in the central section of the work (see Figure 20), and the overdubbing of a stutter loop, as detailed in the saxophone part in measures 87-88, results in yet another kind of feedback.



Figure 20: The Threshing Floor. BOSS DD-6 stutter, measures 76-88.<sup>87</sup>

<sup>&</sup>lt;sup>87</sup> Ibid.

This use of the glitch in the DD-6, while perhaps unfamiliar to Western contemporary classical music, is nothing new. Pauly in fact borrowed it from the Japanese noise-rock band Melt-Banana after seeing them use it in a live show.<sup>88</sup> As I mentioned previously, this can be viewed as a continuation of the importing of instruments and objects into the domain of Western classical percussion, finding ways to incorporate new sounds into instrumental performance.

There is a certain aesthetic of dirtiness and imperfection that permeates *The Threshing Floor*. The sounds and behavioural tendencies of the hybrid instrumental-electronic system provide a level of unpredictability to the musical material. The sonic contamination that can arise because of these behaviours is embraced as a reaction against the sterile nature that electronic devices—not to mention classical instrumental performance—are designed for, providing a liveliness that can only be felt in live performance.<sup>89</sup>

It is notable that my first foray into the use of performer-controlled electronics was in a chamber music setting. Chamber music performance requires communication and consistency between the musicians for them to be able to effectively coexist and synchronize their playing. *The Threshing Floor* provided us with the ideal framework to maintain a chamber music connection while also embrace the inherent behaviours of the electronic systems used. The electronics are fully integrated into the instruments in way that expands their capacities but also preserves a performative relationship with the full resulting setup. Even though the electronics used in this piece are unpredictable at times, we found that we could maintain a certain degree of consistency in the sonic results that allowed us to stay connected as we would in acoustic chamber music without sacrificing the uniqueness of the electronic performance system.

<sup>&</sup>lt;sup>88</sup> The stutter features prominently in Melt-Banana songs such as *Lost Parts Stinging Me So Cold* from the 2003 album *Cell-Scape*, released one year after the BOSS DD-6 release in 2002.

<sup>&</sup>lt;sup>89</sup> John Richards, "Getting the Hands Dirty," *Leonardo Music Journal* 18 (2008): 26.

Pauly had suggested to us to rehearse with the electronic setup from the very beginning of our rehearsals, and that it would be useless to rehearse acoustically even if we were simulating the electronic actions. This advice was vital, as it is precisely what allowed us to develop the new techniques used in the work in the correct context. A musician would never learn a technique on a conventional acoustic instrument without listening to and adjusting the sounding result, and it should not be different when performing with electronics. This notion has been a driving force for me in my pursuit of works that integrate performer-controlled electronics, requiring the construction of an instrument and its respective work-specific techniques for each situation, but ultimately leading to much more rewarding and successful performance experiences.

#### 4.2.3. Michelle Lou, *Opal* (2017)

*Opal*, by Michelle Lou,<sup>90</sup> was also commissioned by and written for scapegoat, and while the work contains similarities to *The Threshing Floor* in Lou's use of active amplification and effect pedals as an integrated form of electronic performance, the manner in which she treats the materials is drastically different. Both performers use a larger collection of effect pedals in their setups, with the electronically-produced and modified sounds assuming greater importance throughout the work. The saxophonist uses a chain of seven pedals: a reverb, a BOSS DD-6, a MASF Raptio glitch/hold, a tremolo, a MetaSonix F-1 distortion, a loop station, and a compressor; while the percussionist's chain features five: a BOSS DD-6, a tremolo, an Iron Ether FrantaBit digital bit crusher/sample rate reducer, a looper, and a DigiTech Whammy. Certain pedals require specific models as indicated, while others are interchangeable. Again, both performers have

<sup>&</sup>lt;sup>90</sup> "Michelle Lou's work studies the possibilities of how strange form(s), functioning as behavior/as odd containers of strange objects/material can shape experiential time. In her recent work, she has begun to incorporate analog and D.I.Y. electronics, as well as edge towards computer based music and performance/installation pieces." [michellelou.com]

personal mixers, and the stage positioning is similar to *The Threshing Floor*, with the performers more-or-less facing one another with individual speakers positioned behind them facing out towards the audience.

Lou extends the use of saxophone feedback by requiring the performer to produce specific feedback pitches. Lou and Hyde worked together to develop a scale of feedback pitches that could be created through saxophone fingerings, resulting in a feedback technique that can be treated and exploited with similar parameters as other musical material. This treatment of the saxophone requires the performer to reconsider the way sound is produced by their instrument, since instead of blowing into the saxophone and fingering the keys to produce a sound, the pressing and lifting of the keys is combined with the movement of the bell towards and away from the microphone.

The percussionist performs on a collection of objects and devices that are all transformed through contact amplification and effect pedals (see Figure 21). This results in sounds that, for the most part, can seem disassociated from the objects that are producing them. Whereas *The Threshing Floor* integrates effect pedals as an extension of the instrumental setup, in *Opal*, pedals and other electronic objects assume greater responsibility for the creation of sounds themselves. The devices are thus de-contextualized and re-contextualized as instruments themselves within the framework of the piece.

For example, a small wooden box with two glass marbles placed inside is sent via a contact microphone through the FrantaBit pedal with settings that result in a high-pitched caustic and metallic sound. The contact amplification alone would scarcely produce any sound, thus relying on the FrantaBit to transform the object into a sounding instrument. The percussionist is required to gently roll the marbles in the box at three levels of activity: I—barely allowing the marbles to hit the sides of the box, II—marbles hit the sides about 30% of the time, and III—marbles hit the

sides about 60% of the time.<sup>91</sup> At such high amplification volume and piercing sound quality, the percussionist must manipulate the box in a very delicate manner that is far removed from any conventional percussion playing. The percussionist also uses two small threaded metal rods on the same box to create slow, uneven ticking sounds, as well as with different settings on the FrantaBit to create a deep underbelly of perforated sounds that are looped and layered through the second part of the piece. The saxophonist similarly loops and layers quiet quarter-tone feedback pitches a few minutes into the work to create a thick cloud of sine tone-like frequencies that is held throughout the rest of the piece, and that is at times complemented by sine tone frequencies performed by the percussionist using a basic smart phone application.



Figure 21: Michelle Lou, Opal. Percussion setup.

<sup>&</sup>lt;sup>91</sup> Michelle Lou, *Opal*, (self-published, 2017).

*Opal* also features the use of a telephone microphone pickup, that, as Lou describes in the score, "amplifies the bleep-bloop and whooshing sounds of electronics,"<sup>92</sup> and is used on a CD player, a television remote control, and a cellphone. The pickup captures the sound of an electronic object's operative functioning, subverting the intended use of the device to instead reveal its hidden, inner sounds. The CD player, rather than playing back an existing CD, is instead used for the swooshing sounds of its operation that are otherwise unheard, and the distinctive glitchy sounds that accompany the Play, Stop, and Fast-Forward buttons. Similarly, the remote is used for the various beeping sounds of the different buttons, and the cellphone for the noisiness that accompanies its background functioning. A greater number of applications and operations running on the cellphone—essentially overloading its functioning—produces a richer and louder resulting sound. The position at which the pickup is placed on the various devices will also affect the quality of the produced sound.

The pickup is featured in a section that requires precise synchronisation between the two performers playing inherently irregular devices, resulting in a combination glitching attacks, bright noises, and deep reverberations. The saxophonist controls various functions of the MetaSonix distortion, the Raptio glitch/hold, and the reverb pedals in conjunction with the percussionist pressing various buttons on the CD player, triggering DD-6 stutters with hits in the wooden box, changing FrantaBit settings, and using the Whammy to modify the remote control beeps (see Figure 22). The CD player, and in particular the Play button, results in sounds that often begin a split-second after being triggered, and a pedal such as the Raptio can produce very different results depending on what initial sound is captured by the device. With the actions unfolding rapidly, we had to rely on a greater use of visual cues to maintain synchronicity within the erratic nature of the

<sup>92</sup> Ibid.





Figure 22: Opal. Page 5.93

Vertical dotted lines indicate moments of synchronisation between the two performers.

The process of incorporating these devices into the unique performance situation of a work such as *Opal* or *The Threshing Floor* is comparable to the process I undertake to perform a work such as *Mani. Gonxha*. It requires the development of a musical and technical language that is specific to the nature of the objects used and the artistic intention of the work. It also demands a deep understanding of how the devices, such as a chain of pedals, influence or interfere with one another, much like one must not only understand the characteristics of individual instrumental techniques, but more importantly, the characteristics of techniques when they are combined with others.

<sup>93</sup> Ibid.

The performance actions used, including small movements on the wooden box and the control of buttons and knobs on the various devices and pedals, alter the performer's relationship to the sounding object. Minute movements can result in drastic sonic changes, and the performer loses the direct contact to the sounding object that they are accustomed to in instrumental playing, and that is maintained in works such as *Message from the Lighthouse* and *The Threshing Floor*.

I found that certain adjustments had to be made when I could no longer rely on the tactile feedback of the object I was manipulating. The main difference between the tactile feedback of an electronic object and an acoustic object is that the acoustic object provides a physical sensation that implies a sonic result to the performers. In the case of *Opal*, I had to place greater importance on aural feedback through more acute active listening, rather than rely on any sort of felt resistance from the sounding object. This required me to spend additional time with the objects and devices to track the relationship between a sound producing method or parameter adjustment and the resulting sound.

Since the notion of tactile manipulation is maintained even if tactile feedback is not, sonic changes and results can still be correlated to physical manipulations. As with more conventional instrumental situations, actions can be repeated to retrieve and reactivate fruitful sonic behaviours.<sup>94</sup> This is a skill that I cultivated through my focus on a post-percussive practice, and that has become invaluable in my pursuit of performer-controlled electronics systems. I have found that I can maintain a strong sense of control over the materials used by experimenting with the devices and discovering their behaviours, exploring their essential characteristics as it relates to the sonic material of the work.

<sup>&</sup>lt;sup>94</sup> Keep, "Instrumentalizing: Approaches to Improvising with Sounding Objects in Experimental Music," 119.

The scores to *Opal, The Threshing Floor*, and *Message from the Lighthouse* function more as maps of actions to be carried out rather than representations of the desired sounds. The music cannot be understood or even studied by only reading the score, it relies on the activation of objects in performance to bring it to life, reaffirming the importance of human presence in electronic music performance.

## **5.** Conclusion

#### 5.1. Possible responses to initial questions

In the introduction to this paper I proposed a few questions that arose as I began tackling the repertoire presented above. As a reflection on the preceding discussion, I can now offer possible responses to these questions.

1. How can a post-percussive practice inform the use and treatment of performercontrolled electronic devices?

As detailed in Chapter 2, a post-percussive practice signifies a deconstruction of Western percussion conventions to instead develop an approach that celebrates the unique (re)construction of an instrument and its technical language for each and every work. This requires performers to learn and develop work-specific techniques, and stretches their capacities for adaptability from one situation to the next. The integration of performer-controlled electronics into an instrumental setting can be understood as an extension of the potential of a post-percussive practice. It requires a similar approach by the performer in learning the language and behaviour of the electronic device as they would with an acoustic object, thus importing the device into the realm of an instrumental practice. Incorporating electronics allows for the further exploitation of an instrument's potential, or in the case of the already seemingly limitless world of percussion, it provides new instruments to exploit through their deconstruction and reconstruction.

2. What are the characteristics of an electronic device that make it performative in an extended-instrumental setting?

An electronic device must be able to be treated as a musical instrument for it to be brought into the realm of an instrumental practice. This does not mean that it will behave like a conventional musical instrument but rather that it must have an inherent materiality that can be explored. This materiality, and the limitations associated with it, is what allows a performer to develop a tactile relationship with the device. From here, a performer or composer can apply the processes of instrumentalizing and creative abuse to discover the performability of the device, as detailed in Chapter 3, and ultimately exploit its potential within an extended-instrumental setting.

3. How does a performer's relationship to their instrument change when electronic devices are incorporated?

The incorporation of electronic devices into an instrumental setting not only requires a performer to develop a relationship to the electronic device, but it also modifies their relationship to the previously acoustic instrument. Even with the use of simple contact amplification, one can no longer expect an instrument to behave in the same manner; new sound production techniques become available while others must be set aside, reformulating the artistic possibilities of the instrument. Furthermore, the incorporation and various treatments of electronic devices often contribute unpredictable or volatile sonic behaviours that a performer must learn to control within the confines of a system. The performer in this case must relinquish some of the control they are accustomed to having in acoustic playing, and instead embrace their role as an exciter or prober of sounds as they trigger and shape unique sonic behaviours. Most importantly, performers must recognize that with the incorporation of electronic devices, it is very rare that any two performance situations will ever be same, and that a performance relationship built upon flexibility and adaptability will lead to the most fruitful results.

I have found that my relationships to different hybrid instrumental-electronic setups are even more varied and eclectic than they are in a post-percussive practice. While my performance of works by Pierluigi Billone and those from the piano project introduced me to the notion of adaptability as a virtuosic skill, the incorporation of electronic devices in works such as those by Mauricio Pauly and Michelle Lou stretched this notion to the extreme, leading me to a position where I believe I have developed the abilities to tackle almost any performance situation that I encounter.

### 5.2. Final thoughts

The integration of performer-controlled electronics into an instrumental practice requires a personal approach that embraces the process of experimenting with objects, devices, and their various combinations, or in other words, "getting the hands dirty".<sup>95</sup> There is no substitute for spending time with the materials, exploring their sonic characteristics and discovering their unique behaviours, much like a performer does with an acoustic instrument. As performers such as Andrea Young, Sabrina Schroeder, and Fernando Rocha demonstrate, a performative electronic practice can be developed in various ways and lead to original and distinctive results.

A post-percussive practice introduces performance concepts—defamiliarization of instrumental technique, work-specific techniques, adaptability as a form of virtuosity, and exploiting the potential of an instrument—that can be applied to the use of performer-controlled electronic devices. While this signifies that percussionists perhaps have an advantage in incorporating electronics into their instrumental practice, I believe that these concepts provide a general approach that can be pursued by any musician.

I have found that the approach to electronics preferred in music conservatory institutions wrongly favours performance situations where performers play their instruments in the same way as they do acoustically while the electronics are controlled separately, often off-stage. This is usually done in an effort to make musicians comfortable by having them play their instrument as they are accustomed to, but it actually creates situations where performers feel powerless over the result. Instead, I believe that if performers are introduced to electronics using performance systems

<sup>95</sup> Richards, "Getting the Hands Dirty."

such as those previously described, they will discover that once they actually come into physical contact with the materials, using such devices as performance objects can be considered as an extension of their playing capacities. This will lead to richer and more rewarding experiences in performing with electronics that can then evolve into other hybrid instrumental-electronic situations.

As I continue to perform and collaborate with various composers and musicians on works such as the ones described previously, I am discovering that electronic devices are simply another tool that can be incorporated into my already extended musical practice. This project has led me to pursue collaborations with composers including Zeynep Toraman, resulting in a new work entitled *mountains move like clouds* (2019), and Sam Salem, whose work is still in progress, that are further stretching my capacities for the integration of electronics into my performance practice.



Figure 23: Reflection on the development of my performance practice.

The allure of this approach lies in the state of constant evolution that this hybrid instrumental-electronic practice finds itself in. The active use and manipulation of instruments, objects, and electronic devices stimulates performers and composers to develop new approaches to music-making by creating music that would be impossible to make otherwise. This contributes to the continued expansion of music performance possibilities, and ultimately reasserts the importance of human presence and live performance in an increasingly computerized world.

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