THESE DECORATED FRAGMENTS OF TIME: AN ORIGINAL COMPOSITION FOR
PIERROT ENSEMBLE AND ELECTRONICS

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My dissertation is a product of my interests. The combination of electronics with instruments plays a major role in my compositional output. *These Decorated Fragments of Time* may be described as a fruition of all my musical influences and research since I first began my doctoral degree three years ago. In that time, I have accrued experience in the reinforcement of live sound, working with various software applications, and promoting contemporary music by hosting and attending new music events.

I would like to acknowledge my committee chairs and their contributions to *These Decorated Fragments of Time*. I wish to thank Dr. Michael Pounds for his insight and historical knowledge concerning acoustics, recording technologies, and electronics. My time as an assistant in Dr. Pounds’ acoustics course served as a catalyst for my interest in sound diffusion, running live sound, speaker placement, and music perception, among other subjects. My dissertation could not have been possible without instruction from Dr. Pounds concerning computer programming, synthesis techniques, software possibilities, writing about electronic music, and electronic notation.

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contemporary gaming culture, composing scripts, web design, and the use of various software programs that focus on film editing and digital animation. With my newfound knowledge, I have expanded my artistic interest into the realm of visual and cinematic impact; how that impact affects an audience member’s experience is a subject I now think deeply about and when creating my sonic and visual art.

Additionally, I would also to extend a thank you to the other members of my dissertation committee, Dr. Ester and Dr. Crow. Without their time and energy this process would not be possible.
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CHAPTER 1: INTRODUCTION AND REVIEW OF LITERATURE

Introduction

The concept of music as decorated linear time has fascinated me since I first heard Tchaikovsky’s Symphony No. 5, which was the first art piece I discovered many years ago. I was deeply moved by the composer’s ability to manipulate musical emotion by controlling the psychological flow of time. Tchaikovsky’s musical themes and melodies seemed so carefully orchestrated and purposeful, almost colorful. The emotion I experienced conveyed the narrative being told, yet that narrative was abstract. It seemed to me that Tchaikovsky was conveying a story in which the narrative found autonomy with the listener, and I found that concept quite fascinating. Many years have passed since I first heard Tchaikovsky’s Symphony No. 5, and since that time I have become familiar with the techniques and styles of numerous composers.

These Decorated Fragments of Time explores the many timbres, colors, gestures, and textures of the Pierrot ensemble combined with fixed media (recorded sound) electronics and real-time processing. These Decorated Fragments of Time focuses on expanding the repertoire of the ensemble through the addition of the computer and distribution of the sound in a stereo field. My accompanying document examines works composed for Pierrot ensemble alone, for Pierrot ensemble with electronics, and for instrumental subsets of the Pierrot ensemble with electronics. In addition to investigating composers and pieces that are important precursors to my work, I also discuss my compositional processes and techniques.

I consider myself a composer interested in all musical genres and aesthetics. I am especially interested in amalgamating acoustic instruments with electronics, and discovering new sound processing techniques through the use of various audio software applications. Although I
have composed works for much larger ensembles, the Pierrot ensemble is the largest group I have composed for that uses electronics. Rather than focus more on the acoustic ensemble or more on the electronics, I composed this work with a sense of total cohesion. In other words, both aspects of the work manifest together as a single entity, with neither having more importance than the other.

The Pierrot ensemble, as a standardized chamber group, came about as a result of Arnold Schoenberg's landmark composition, *Pierrot Lunaire*. Since the premiere of this work in 1918, the Pierrot ensemble, named after Schoenberg's piece, has become one of the most important ensembles for 20th- and 21st-century composers of chamber music. Unlike string quartets and piano trios, which often only perform music of the 18th and 19th centuries, Pierrot ensembles are known for performing contemporaneous music, likely due, in part, to the lack of the same large body of repertoire available to these older standard chamber combinations.

The ensemble has been used in minimalism, serialism, spectralism, and some neo-romantic music. The typical Pierrot ensemble consists of voice, flute, clarinet, piano, violin and cello, plus optional percussion. All players are generally soloists with the ability to perform difficult pieces, including extended techniques. Players sometimes double on additional instruments, which further extends timbral possibilities. The ensemble has a unique range of timbres, and the combination of these timbres may sound dry, resonant, harsh, smooth, intimate, or even overbearing.

The work comprises eight movements. The odd movements (1, 3, 5, and 7) are for fixed media, and the even movements (2, 4, 6, and 8) are for acoustic instruments or acoustic instruments with electronics. Although the piece uses the entirety of the Pierrot ensemble in Movement 8, it only uses solo, duo, or trio instrumentation, plus electronics, in the earlier even-
numbered movements. The second movement is for solo flute with fixed electronics, the fourth comprises a clarinet and violin duo with live electronic processing, and the sixth movement combines a traditional piano trio with optional fixed electronics. The final movement consists of the full group, including soprano and percussion, but with no electronic accompaniment. Of the four fixed media movements, the first serves as an introduction, and the third, fifth, and seventh movements function as interludes between the other movements. Additionally, all of the fixed media movements, which include prerecorded and manipulated acoustic sounds, may be performed contiguously as a single eight-minute work.

My formal pre-planning is tailored to my stated purpose, which is to create a multi-movement, modular composition in which individual movements may be extracted as stand-alone works, or where larger subsets may be performed. The choice to use subsets of the Pierrot ensemble for many of the movements also makes it more generally available to performing chamber groups.

The laptop performer has the most control over the formal construct when the piece is performed as a continuous composition, since he or she is responsible for triggering the movements of fixed media that act as connectors for the other movements; the laptop performer may also trigger the fixed audio in the sixth movement if the performers wish. In the combined instrumental/electronic movements, an individual instrumentalist controls the electronics. This is accomplished through the use of custom-built software patches designed in Cycling 74’s Max; these patches are triggered by the use of a foot pedal.¹

When performed continuously, the duration of the work is approximately thirty minutes. Each movement that features fixed media exclusively is roughly two minutes long, while the

¹ Cycling 74’s Max is a computer software program designed by Miller Puckette in 1983.
movements containing instruments and electronics have a duration of around six minutes each. In the even numbered movements, I have employed different combinations of the Pierrot ensemble’s instrumentation, as Schoenberg did. The movements containing instruments function as stand-alone works, which is quite practical for conference purposes. This makes it easier to generate performances since a lengthy work is harder to get performed. The difficulty of this work is equal to or exceeds a graduate-level performance capability.

My time as a graduate student and instructor at Ball State University has certainly been the most beneficial to my musical growth, so it would be reasonable to mention how certain teaching and classroom experiences at Ball State have fostered my creativity and artistic development.

Acoustics is my most recent teaching/assisting position. This course changed my concept and approach to sound, and I should add, life. I often think about the many modes of vibrations that are constantly surrounding us in everyday life, how specific modes vibrate at particular frequencies, how the neck of a Helmholtz resonator acts as a piston, and how two opposing waves can combine into a standing wave. Teaching Ball State’s section of acoustics changed the manner in which I approach deep musical listening and certain elements of compositional approach, such as frequency orchestration.² Because of my new knowledge of decibel ratio, sound pressure level, and acoustics in large/small halls, my orchestration of acoustic music and electronic frequencies now seem more economic and purposeful.

My experience teaching music theory expanded my general interest in the subject, and as a direct result of this experience I have researched many techniques exercised by my favorite

historical and contemporary composers. A quick scan through movements six and eight of *These Decorated Fragments of Time* provides visual proof of my interests. Most importantly, Witold Lutoslawski’s controlled aleatory techniques provided me with new sonic, rhythmic, and textural possibilities for instruments and electronics.³

**Review of the Literature**

Electronic music and its hybrids/predecessors have a history that dates back to at least 1876. Alexander Graham Bell is credited with the creation of the phonograph, which is a precursor of the first round of electronic music. The phonograph recorded sound onto a rotating cylinder covered with foil or wax, and through this process the vibrations could be reproduced. Shortly after, circa 1897, Thaddeus Cahill invented the Telharmonium, in which rotating metal wheels created “pure tones” by electromagnetic process. By 1917, the first stage of electronic music had begun with the invention of the De Forest vacuum tube, which made possible new electrical circuits and tone-generating capabilities by taking a weak electrical signal and amplifying it. After 1945 when World War II ended, magnetic tape became commercially available. The availability of magnetic tape spurred the growth of *musique concrète* (the second era of electronic music), which began in France and was realized through recording technologies. *Musique concrète* is defined as a work that uses a recording medium, is directly composed using that medium, and is played through that medium as a finished product.⁴ During this same time, German composers were implementing twelve-tone and serial techniques in their music, and this ideology brought forth new methods of musical construction into the electronic world.

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Since the late 1980s and into the late 1990s, electronic music evolved through the use of digital technologies and computers that have a substantial amount of processing power. There are now many genres and sub-genres of electronic-based composition, which range from purely electronic to combinations of acoustic instruments and electronics. Music that combines live electronics with acoustic instruments is much less common than music that exclusively uses traditional instruments, and this created some difficulty for me when I was researching my proposal for a composition that combines electronics with the Pierrot ensemble. Although there are many purely acoustic works available for Pierrot ensemble, there is a lack of available literature that involves both electronics and the ensemble. The available compositions that incorporate electronics have been composed relatively recently by somewhat younger composers, and most of it is unpublished. I believe it is imperative to examine literature from the traditional repertoire, as well as non-traditional repertoire, that employs the expressive power of the Pierrot ensemble, whether electronics are present are not. Due to the lack of compositional literature that involves both the full ensemble and electronics, I reference works that integrate electronics with various sub-categories of instrumentation that are considered standard within the Pierrot ensemble.

Arnold Schoenberg’s monumental work *Pierrot Lunaire* must be mentioned as an influence for my dissertation. The instrumentation of the ensemble, which includes voice, flute, clarinet, violin, cello, and piano, as well as standard and non-standard doublings, was unique for that point in history (1912). The duration of Schoenberg’s work, approximately 35 to 40 minutes, is also an appropriate model for *These Decorated Fragments of Time*.

There are a few differences in my approach. I have included a percussionist, but only in the last movement. Second, my work includes far fewer movements than Schoenberg’s; each of
the three parts of *Pierrot Lunaire* has seven short songs, while my work has only eight movements. Finally, *Pierrot Lunaire* uses a variety of classical techniques, including canon, fugue, rondo, passacaglia, and free counterpoint. Although these types of forms and techniques have their place in some modern repertoire, I choose not to exercise them.

Christopher Chandler’s work for Pierrot ensemble and electronics, titled *Smoke and Mirrors* (2013), is a primary influence for my composition. *Smoke and Mirrors* is a work that takes advantage of amalgamated musical elements, mainly texture. However, one domain (acoustic or electronic) sometimes takes precedence over the other. Chandler developed most of his electronic material through the use of Max and fixed media.

Throughout *These Decorated Fragments of Time*, I use subsets of the Pierrot ensemble instrumentation. The second movement is composed for solo flute and electronics, so it seems logical that I examine a work that implements this combination. *Among Fireflies*, by Elainie Lillios, is a composition for solo alto flute and live-interactive electronics. This work was composed in 2010 as a commission for the Lipa Festival of Contemporary Music. Her interactive electronics are well constructed; the live electronics often sound as if they are fixed media, and fixed media tends to be more elaborately constructed as a result of unlimited time and resources available during its creation, compared to live electronics, which rely solely on software algorithms that process sound in real time. *Among Fireflies* avoids the all-too-common problem of meandering electronics with added instrumentation, and incorporates a high level of focus concerning panning (stereo placement) and texture in a live-interactive environment. *Among Fireflies* is a strict live processing and interactive composition that may be considered one of the top-tier electroacoustic pieces in the last ten years.
There are other recent works for Pierrot ensemble that deserve recognition and serve as major influences for *These Decorated Fragments of Time*. Mario Davidovsky’s work *Flashbacks* (1995) lacks any electronic component, but it nevertheless proves influential by means of rhythmic motive, texture, orchestration, and form. Many of the same observations can be made concerning Jorge Villavicencio Grossmann’s piece for Pierrot ensemble, titled *Sira* (2010). Much like Davidovsky’s *Flashbacks*, *Sira* is focused on the textural possibilities of the ensemble, but unlike Davidovsky’s avant-garde approach to harmony, Grossman finds grounding in certain pop-aesthetic influences, such as rock and punk. These two works do not directly inspire the electronic components, as they do not employ electronics, but they serve as models for the sonic possibilities of the Pierrot ensemble in a contemporary setting.

Several important publications aided my research for the electronic attributes of *These Decorated Fragments of Time*. Curtis Roads has two publications that lend themselves well to electronics, and instruments with electronics. Although it may seem a bit outdated, *The Computer Music Tutorial* (1996) contains useful information on synthesis techniques and signal processing that was crucial to my research. More recently (2015), Roads published *Composing Electronic Music: A New Aesthetic*, which bridges various contemporary approaches to attributes such as pitch, time scales, rhythm, and perhaps most essential, sonic narrative.

The two-part series *Electronic Music and Sound Design* (2009) discusses the theory and practice of Max. It focuses on synthesis techniques, programming, noise generators, filters, and control signals. Alessandro Cipriani and Maurizio Giri integrate perception, theory, and practical uses of real-time sound synthesis that one can manipulate in various genres. Although this is a two-part series, I have only referenced the first book for my dissertation.
Sound acoustics is an important science in the field of music composition. *The Science of Sound* by Thomas Rossing, Paul A. Wheeling, and Richard F. Moore discusses a wide range of technological developments in the field. I have referenced sections two and five of the book throughout my compositional process. Section two of the book focuses on sound perception and the measurement of sound, and it discusses sound pressure level, loudness, pitch, and timbre. Section five places attention on the acoustics of rooms, which includes auditorium acoustics, electronic reinforcement of sound, and various aspects of recording.
CHAPTER 2: COMPOSITIONAL APPROACHES AND TECHNIQUES

*These Decorated Fragments of Time* draws inspiration from some of my previous works, such as *Pyramids in South Mongolia* (2013) for solo alto flute and percussion; *Unfinished Narcissism* (2016) for flute, clarinet, alto saxophone, bassoon, and trombone; *Dead Wait* (2017) for wind ensemble, and *Hipster Hunter* (2017) for two-channel fixed-media electronics. The inspiration is derived from many of the techniques used in these works, and from how these techniques project intensity and pacing.

My compositional approaches may be considered a mosaic of multiple styles from the 20th- and 21st-century. This is not a unique or arbitrary method, because many contemporary composers have a comparable approach, although aesthetic styles and philosophies may differ greatly. Approaches include, but are not limited to, aleatory techniques, 12-tone methods, aggregates, extended techniques, crystalized formal processes, melodic units, and electronic programming. Some of these musical techniques are still rooted in 19th-century practice (such as melodic units), but the addition of electronics in *These Decorated Fragments of Time* provides a more extensive palette of musical materials to choose from.

The work is guided by gesture, timbre, and texture rather than by the traditional musical aspects of melody and motive. I have observed that many contemporary works (when incorporating electronics with instruments) employ gesture, timbre, and texture as their main compositional components, e.g. Christopher Chandler’s *Smoke and Mirrors*. Additionally, total focus on pitch content is unnecessary and often considered passé by many contemporary
composers—I choose to explore alternative methods, which provide unity through more abstract pitch and intervallic relationships.\(^1\)

The coloristic tendencies I derive from 12-tone rows come from both an intuitive source, as well as intellectual basis.\(^2\) Limited set-theory techniques and pitch organization are mostly used as a subordinate connecting function to the more important gestural and textural goals of my work, and as a direct result my pitch content plays a less important role in the overall construction of *These Decorated Fragments of Time*. However, my pitch and intervallic choices are not arbitrary, and are employed as elements of structural organization.

I am particularly interested in intervallic relationships that create a sense of stability for the listener, even if the intervallic properties are not apparent. I achieve this goal by means of 12-tone rows that are limited in their intervallic content.\(^3\) With this approach to interval content (the ordering of pitches through particular intervals), I have created a comprehensive and goal-oriented work that borrows from many systems, but allows for a great amount of variation.

Texture and gesture are the most important musical aspects of *These Decorated Fragments of Time*. Changes in density and register, articulated by pitch, rhythm, and additional sound from the computer, are components for textural organization. As the piece moves forward in linear time the correlation between the movements becomes apparent through transformations of texture; the space for new possibilities becomes larger. The unity of elements in musical texture is analogous with my concept of complete integration throughout the work.

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1 Intervals are defined as the space (number of semitones) between specific pitches.
2 A twelve-tone row is defined as a collection of twelve ordered pitches.
3 If arranged correctly, a row may be ordered in such a way that only particular intervals are present between adjacent pitches.
The limited aleatory techniques of Lutoslawski are present in Movements 6 and 8. His aleatory method enables microrhythmic organization and new sound combinations.⁴ These aleatoric moments allow the instrumental performers to play independently of one another in various tempos. The chance aspect in these sections comes from each independent line being uncoordinated with each other. When I use Lutoslawski’s technique in the traditional manner (how he originally used the technique) the performers may alter the rhythms, but not the pitches or the order of the notes. But, as in Movement 2, I also use variations of aleatoric composition which are more in line with John Cage’s method of indeterminacy, and less with Lutoslawoski’s techniques.⁵ These types of techniques manifest a sense of improvisatory music, while creating musical environments that may be manipulated for textural and sonic purposes.

Form is another important aspect of my work. During the pre-planning process I decided that the form would be generated through an additive approach. The word ‘additive’ is used to describe a multi-tier architecture in which all previous connective materials accumulate in a climactic way in the last movement. The form of These Decorated Fragments of Time may be thought of from two perspectives, macro and micro. From a macro, or top-to-bottom, perspective, the composition includes eight movements that use instrumental subsets of the Pierrot ensemble. Although the actual durations may vary, the overall macro-form appears below in Table 2.1.

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⁴ Stucky, 109.
Table 2.1: Movements 1-8.

<table>
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<tr>
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<tr>
<td>1. Fixed media interlude no. 1</td>
<td>2 minutes</td>
</tr>
<tr>
<td>2. Solo flute and electronics</td>
<td>6 minutes</td>
</tr>
<tr>
<td>3. Fixed media interlude no. 2</td>
<td>2 minutes</td>
</tr>
<tr>
<td>4. Clarinet and violin with electronics</td>
<td>6 minutes</td>
</tr>
<tr>
<td>5. Fixed media interlude no. 3</td>
<td>2 minutes</td>
</tr>
<tr>
<td>6. Piano trio, including violin, cello, and piano with electronics</td>
<td>6 minutes</td>
</tr>
<tr>
<td>7. Fixed media interlude no. 4</td>
<td>2 minutes</td>
</tr>
<tr>
<td>8. All instruments of the Pierrot ensemble, including flute, clarinet,</td>
<td></td>
</tr>
<tr>
<td>violin, cello, piano, and added voice and percussion</td>
<td></td>
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The micro-formal level focuses on the concept of connectivity, and those connections unite the work. For example, I use musical foreshadowing by inserting materials from later movements into earlier movements. The first movement, consisting of fixed media only, contains recorded and manipulated flute samples, sometimes so processed that one cannot recognize the sample as a flute. It foreshadows Movement 2, which contains solo flute and electronics. The electronics in Movement 2 mimic many of the gestures and timbres in a live processing environment. Musical material in Movement 3—also fixed audio—contains elements from the previous movements, and also anticipates the instrumentation of Movement 4, including sampled violin and clarinet. The purposeful integration of multiple connections continues until all eight movements are complete. The goal of this process is to create an organic reinforcement of sonorities which bind the form. Not only does this method represent the form, it represents the process.
CHAPTER 3: ANALYSIS OF MOVEMENTS TWO, FOUR, SIX, AND EIGHT

*These Decorated Fragments of Time* is an atonal work that is best described as a mosaic of freely applied compositional techniques. Most of my previous compositions are constructed using synthetic scales and referential collections; preferred scales and collections include the diatonic, octatonic, and acoustic scales. Although pitch content is important in these works, there are other musical attributes that contributed to their realization, such as texture and gesture. My approach to pitch content in *These Decorated Fragments of Time* has little to do with my previously preferred pitch collections, and instead is based on interval classes, completing the aggregate, and 12-tone rows; other important elements include extended techniques for acoustic instruments, gesture, texture, aleatory techniques, and melodic lines.¹

All of the even numbered movements are bound through an additive process. As the work progresses from each previous movement, the pitch ordering becomes stricter by repeating each note of the row in order, although pitch ordering never becomes absolute in every case. There are occurrences of repetition in pitch ordering (segments/repeated notes of the row), and freely composed material that does not use the row, but this depends on context and purpose, e.g. particular violin fingerings for double glissandos. All of the 12-tone rows in Movements 4, 6, and 8 implement the interval classes (ic) first presented in the aggregate of Movement 2 (ic 1, 3, and 4). This is done in order to provide continuity between the movements, while adding/subtracting particular interval classes for diversity of sound. Each movement adds additional instrumentation, which provides further opportunities for musical expression, i.e.

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¹ A twelve-tone row is defined as a collection of twelve ordered pitches, or a basic set that consists of the aggregate presented in a particular order. An aggregate is defined as all twelve pitch classes without regard to their ordering. Aleatory music involves some form of chance. Interval classes are the shortest span between two pitches—an interval larger than a six is equivalent to its inversion.
timbre, texture, aleatory techniques, and extended techniques. Aleatory techniques are present in Movements 2, 6, and 8. The aleatory methods in Movement 2 gradually become more complex and systematic as they are distributed throughout Movements 6 and 8, eventually reaching full fruition through Lutoslawski’s system of limited aleatory technique.\(^2\)

The following is an examination of pitch content, aleatory techniques, instrumentation, extended techniques, gesture, and interval classes. I highlight the musical attributes that are important to each individual movement, while tracing the continuity of the additive process. Below, Table 3.1 summarizes the important elements for each movement. Although these movements are accompanied by electronics, the influence and correlation of the electronics will be discussed in chapter 4.

Table 3.1: Movements, interval classes, instrumentation, aleatory technique.

<table>
<thead>
<tr>
<th>Movements</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval Classes</td>
<td>1, 3, 4</td>
<td>1, 3, 4, 5, 6</td>
<td>1, 2, 4, 5, 6</td>
<td>1, 3, 4</td>
</tr>
<tr>
<td>Aggregate/Row</td>
<td>Aggregate</td>
<td>12-tone Row (ic 1, 3, and 4 are maintained)</td>
<td>12-tone Row (ic 1, 4, 5, and 6 are maintained)</td>
<td>12-tone Row (ordered from the original aggregate in movement 2)</td>
</tr>
<tr>
<td>Aleatory Techniques</td>
<td>Yes (non-systematic)</td>
<td>No (melodic units are first presented)</td>
<td>Yes (non-systematic, plus limited aleatory technique, melodic units are present)</td>
<td>Yes (non-systematic, plus limited aleatory technique, melodic units are present)</td>
</tr>
<tr>
<td>Instrumentation</td>
<td>Flute</td>
<td>Bb Clarinet/Violin</td>
<td>Violin/Cello/Piano (violin maintained)</td>
<td>Vocalist/Flute/Bb Clarinet/Violin/Cello/Percussion/Piano (violin, cello, piano, clarinet, flute maintained)</td>
</tr>
<tr>
<td>Electronics</td>
<td>Yes</td>
<td>Yes</td>
<td>Optional</td>
<td>No</td>
</tr>
</tbody>
</table>

\(^2\) Witold Lutoslawski (1931-1994) is a Polish composer who is credited with creating an aleatory method that produces complex textures at the micro and macro level.
Movement 2

Movement 2 is composed for solo flute and live electronics. Movement 2 is unique from the other movements in that I derive my pitches from the aggregate, not a 12-tone row.\(^3\) The ordering of pitches is not strict, and I use all the notes of the aggregate freely. The aggregate is used to highlight ic 1, 3, and 4. In this manner, all adjacent pitches are separated by ic 1, 3, or 4, as shown in Figure 3.1.

Figure 3.1: Aggregate, Movement 2.

\[\text{ic 1,3,4}\]

Movement 2 comprises three sections (mm.1-9, mm. 11-30, and mm. 32-53); section one is separated from section two by measure 10, and section two is separated from section three by measure 31. Measures 10 and 31 have the same performance directions, which is to trigger an event and wait for ten seconds before moving on to the next section. Both of these measures are designed to delineate the three main sections.

Most of the musical ideas in Movement 2 are derived from mm. 1-9 (the first of the three musical units) and redistributed throughout the movement. The first section contains upward and downward sweeping gestures, aleatory techniques, motives containing subdivisions of the beat

\[\text{ic 1,3,4}\]

\(^3\) In the second moment, I believe the term aggregate is a more precise definition in comparison to a row, because the pitches are distributed freely within the movement after the interval ordering.
(triplets, quintuplets, and septuplets) and extended techniques, which include a multiphonic and a jet whistle.\(^4\) The second section (mm. 11-30) also contains sweeping gestures, aleatory, and motives consisting of subdivisions. The final section (mm. 32-53) incorporates these same musical features, but adds additional aleatory ideas, as well as singing while playing and whistle tones.\(^5\)

Gesture is very important in Movement 2. The tempo, performance directions, and contour of the opening gesture indicate its opening character, as shown in Example 3.1. The gesture in measure 1 is also unmetered, and the performance directions indicate that the gesture should be played very fast. The performer is instructed to hold the last pitch of the gesture (Eb) for six seconds before proceeding to measure 2. Directing the performer to hold the Eb delays the expected resolution; the resolution of the gesture is further interrupted by measure 2, finally resolving in measure 3. The contour of the upward gesture conveys a sense of introduction and provides a burst of energy and excitement that establishes the character of the movement.

Example 3.1: Opening upward sweeping gesture, Movement 2

\(^4\) My description of a sweeping gesture includes contour, physical movement, pitch, and dynamics. A multiphonic is defined as an extended technique on a monophonic instrument in which several notes are produced at once. A jet whistle is defined as a forceful and loud attack of air, creating a timbre that sounds like a jet.

\(^5\) Whistle tones are created by focusing a stream of air on the outer edge of the sound hole so that a slight whistle sound is made. Whistle tones are soft sounds based on the harmonic series.
The opening gesture consists of all the pitches of the aggregate except for the Bb. The Bb is used as the first pitch in the downward gesture of measure 3, resulting in an ordered alteration of ic 4 and 1, and providing resolution from measure 1, as seen in Figure 3.2. Notice that the pitch classes in the downward gesture comprise a heptachord, using only ic 1 and 4, which are two of the three interval classes of the aggregate for this movement.

Figure 3.2: Connective pitch, heptachord, downward gesture, ic 1 and 4, Movement 2.

Within the first section (mm. 1-9), measures 2 and 6 present the first examples of aleatory technique in Movement 2, but I continue these techniques into the second section for continuity. In measures 2 and 6, there are no specific pitches indicated, but the performer is directed to play random percussive key clicks in random rhythms, which extends the timbral possibilities of the flute as a percussive instrument—the flute is not a percussive instrument, but it performs percussive timbres.

The downward gesture in measure 3 also functions as one of the three main rhythmic motives that appear in all three sections, which includes the septuplet, triplet, and quintuplet, as shown in Example 3.2. Measure 7 contains both a triplet motive and a multiphonic extended technique. Measure 8 has both the triplet motive and a quintuplet subdivision of the beat.
Redistributing rhythmic motives provides familiarity through repetition. As each new section unfolds, the ear is drawn to repeated statements of the motives that are heard as dependent parts of a greater entity; comprehension starts with recognition, and recognition begins with the smallest part of a work, and despite change in pitch, each motive is recognizable as present throughout. Although the pitch content and contour of each repetition is varied, rhythm is central to my concept of motive. Thus, there is no need to restrict motives to intervallic relationships, or require that all the motives contain the exact same features.

Example 3.2: Main rhythmic motives, Movement 2.

In section two (mm. 11-30), measures 20 (shown below in Example 3.3) and 22 present a similar aleatory idea found in measures 2 and 6, but they now indicate specific pitches; the measure consists of the intervals used in the aggregate (ic 1, 3, 4, 1, and 3), and the directed time for performance of this measure (ca. 8”) is also aleatory, because it is highly unlikely that each new performer will play the measure in the exact time indicated.
Example 3.3: Measure 20, aleatory idea derived from mm. 2 and 6.

In addition to the aleatory techniques found in Movement 2, similar gestures and rhythmic motives from the first section are also present. Measure 19 contains an upward gesture similar to the gesture in measure 1, although the time signature indicates a 3/4 meter, as compared to the absence of meter in measure 1. Just like measure 1, measure 19 is followed by a measure of aleatory technique, which serves the same purpose as measure 2—delaying the resolution of the upward gesture. Instead of resolving the gesture afterwards (like the first section does), measure 21 presents an additional upward gesture in order to delay the resolution, which occurs as an unmetered downward gesture in measure 26, as shown in Example 3.4. Additionally, the rhythmic motives introduced in the first section return in the second section.
Example 3.4: The second section, common rhythmic motives, Movement 2.

In section three (mm. 32-53) all of the musical attributes from the first and second sections are maintained, but I have added new extended techniques. In addition to the multiphonic, which is first presented in section one, I have added whistle tones and singing while playing. These two techniques are added for continued development of timbre and color.

To extend the flute techniques even further and create polyphony on a solo instrument, I have directed the performer to sing/grunt/grumble on specific pitches while playing a C#5, which occurs in mm. 42-46 (Example 3.5). The results for this will vary from performer to performer. The timbres created by this technique will be quite unique each time due to the aleatory nature of the performance directions. The performer has a choice of vocal/syllable possibilities from which
to choose, and depending on the performer, their natural voice will vary quite drastically, resulting in distinctive timbres with each performance, although the texture will be similar each time. I would like to point out the voice is also present in Movements 1, 3, 4, 7, and 8. In each movement, the voice is treated percussively, extending the textural complexities of each movement; this technique foreshadows the aleatory measures for voice in Movement 8.

Example 3.5: Further extended techniques, singing and playing, Movement 2.

Movement 4

The instrumentation of Movement 4 consists of a duo for Bb clarinet and violin. The movement has both similarities to and differences from Movement 2. Obviously, there are two instruments instead of one, which provides new polyphonic and timbral possibilities, in addition to moments of pitch simultaneities. Instead of completing an aggregate, like Movement 2 does, I use a 12-tone row for pitch content. The aggregate in Movement 2 contains ic 1, 3, and 4, and Movement 4 retains those interval classes for continuity, but adds ic 5 and 6 for diversity in sound.
Figure 3.3: Prime and retrograde forms of the row, Movement 4.

Example 3.6 shows that the opening gesture of Movement 2 is replicated in Movement 4 (m. 1); both gestures are implemented as introductory material. Unlike Movement 2, however, the opening gesture of Movement 4 uses a row.

Example 3.6: Open homophonic gesture, Movement 4, free use of pitches.

Movement 4 is composed more melodically, and with individual lines having more importance than motivic gestures.\(^6\) Measures 1-8 use the pitches freely, just as Movement 2 does. Beginning in measure 9 the melodic lines do not regularly diverge from the original pitch.

\(^6\) In this case, melody represents a sequence of pitches that are purposely composed in a manner that implies greater importance, as compared to the remaining musical material.
ordering of the row, whether the row is in prime or retrograde form. However, there are moments of freely composed material that do not follow strict pitch ordering, such as (specific gestures) mm. 19 and 43, and (repetition of pitches) mm. 27-29, as shown in Example 3.7.

Example 3.7: Violin gesture, repeated pitches, unordered pitches, Movement 4.

The first melodic line—performed by the clarinet—is located in mm. 9-19, and it strictly follows the prime form of the row, as shown in Example 3.8. An accompaniment, constructed of free material, is performed by the violin, although the violin does occasionally borrow pitches from the melody. The prime form of the row repeats in strict ordering (mm. 19-21), juxtaposing the two instruments. I alternate prime and retrograde forms of the row in mm. 21-26 (retrograde), 22-35 (prime), 36-38 (retrograde), and 38-43 (prime).

Example 3.8: Melodic idea in clarinet (top voice), prime form, strict ordering, free accompaniment in violin (bottom voice), Movement 4.
Movement 6

The instrumentation of Movement 6 is violin, cello, and piano. The violin is maintained from Movement 4. Each instrument is polyphonic, and this provides more opportunities for moments of dense texture and vertical sonorities.

The row in Movement 6 contains ic 1, 2, 4, 5, 6. The interval classes 1, 4, 5, and 6 are maintained from Movement 4; ic 2 is exclusive to this row (Figure 3.4). Unlike Movement 4, Movement 6 introduces transpositions of prime and retrograde forms, which sometimes elide, or are used simultaneously. In some cases, common tones connect the beginning and ending of rows. Below, Table 3.2 outlines the different versions of the row.

Figure 3.4: Movement 6, new row, ic 1, 2, 4, 5, and 6.
Table 3.2: Rows and row forms, elisions, common tones, aleatory technique, Movement 6.

<table>
<thead>
<tr>
<th>Measure Numbers</th>
<th>Row form</th>
<th>Beginning/ending pitches for rows</th>
<th>Elision</th>
<th>Common tone</th>
<th>Aleatory material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4</td>
<td>P0</td>
<td>Ends with C</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>5-9</td>
<td>P7</td>
<td>Begins with G</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>9-11</td>
<td>R5</td>
<td>Begins with C/Ends with Bb</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>11-13</td>
<td>P5</td>
<td>Begins with Bb</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>13-14</td>
<td>R5</td>
<td>Begins with C/Ends with Bb</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>14-15</td>
<td>P7</td>
<td>Begins with C</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>14-18</td>
<td>P7</td>
<td>Same</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>19-19</td>
<td>P0</td>
<td>Begins with C</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>19-21</td>
<td>P0</td>
<td>Same</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>19-24</td>
<td>Free Material</td>
<td>N/A</td>
<td>N/A</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>25</td>
<td>P0/with free material</td>
<td>Begins with C</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>25-27</td>
<td>P0/with free material</td>
<td>Same</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>27-28</td>
<td>P7/with free material</td>
<td>Begins with C</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>28-30</td>
<td>P7/with free material</td>
<td>Same</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>30-33</td>
<td>P5/with free material</td>
<td>Begins with Bb/Ends with C</td>
<td>yes</td>
<td>no</td>
<td>Yes/not systematic/plucking strings inside piano</td>
</tr>
<tr>
<td>36</td>
<td>R5</td>
<td>Begins with C/Ends with Bb</td>
<td>no</td>
<td>no</td>
<td>Yes/systematic/limited aleatory technique</td>
</tr>
<tr>
<td>36</td>
<td>P5</td>
<td>Begins with C/Ends with D</td>
<td>yes</td>
<td>yes</td>
<td>Same</td>
</tr>
<tr>
<td>37</td>
<td>P7</td>
<td>Begins with C/Ends with D</td>
<td>no</td>
<td>no</td>
<td>Same</td>
</tr>
<tr>
<td>37</td>
<td>R7</td>
<td>Begins with D/Ends with C</td>
<td>yes</td>
<td>yes</td>
<td>Same</td>
</tr>
<tr>
<td>37-38</td>
<td>P7</td>
<td>Begins with C</td>
<td>yes</td>
<td>yes</td>
<td>Same</td>
</tr>
<tr>
<td>39-43</td>
<td>Aggregate (P0)</td>
<td>Begins with C</td>
<td>no</td>
<td>yes</td>
<td>The row is treated as an aggregate, all 12 pitches are present</td>
</tr>
</tbody>
</table>

As in Movement 4, Movement 6 contains melodic lines, and sometimes homophonic melodies are performed by the violin and cello together, as presented in Example 3.9. The presence of two instruments performing lines in tandem is more prominent than the single line
melodies in Movement 4. The lines in Movement 6 are constructed of more pitches than those in Movement 4, and those pitches span a larger register than a single instrument.

Example 3.9: Homophonic melodic lines, violin and cello, Movement 6.

There are four occurrences of the melodic lines in Movement 6. The first is in mm. 11-13 (see Example 3.9), and each subsequent occurrence is subject to variation in pitch, rhythm, and length. The triplet rhythmic motive is derived from the original rhythmic motives in Movements 2 and 4 to provide continuity. Notice that the first occurrence contains two variations of the triplet subdivision—three eighth notes in one quarter note, and three sixteenths in one eighth note. I extend the latter into the next melodic line, mm. 13-15, which is also located in Example 3.9. The third melodic line occurs in mm. 15-18 and does not use the triplet rhythmic motive, but instead slows down the surface rhythm by using quarter notes instead of subdivisions of the beat, as shown in Example 3.10.
Example 3.10: Third occurrence of the melodic line, Movement 6.

The melodic line comes full circle in mm. 39-43. The beginning of it (mm. 39-40) is excerpted in Example 3.11. The line only contains one triplet subdivision (three eighths in the space of a quarter), and holds longer note values, while the piano provides accompaniment with large intervallic leaps, all in simple rhythm, a thin texture, and with no further subdivisions of the beat.

Example 3.11: Final occurrence of the melodic line, mm. 38-40, Movement 6.

Non-systematic aleatory techniques are first introduced in Movement 2 to extend the textural, timbral, and percussive possibilities of the flute. Movement 4 does not employ these
techniques but instead focuses on melodic ideas. In addition to incorporating melody, as Movement 4 does, Movement 6 also builds upon the non-systematic aleatory techniques first presented in Movement 2, through Lutoslawski’s limited aleatory method. Lutoslawski’s process creates specific textures through microrhythmic complexity and variety. Lutoslawski’s system permits chance to function at the smallest level of microrhythm. In Lutoslawski’s method, chance does not affect the order of pitches; I have altered this concept only in measure 36, which has randomly plucked piano strings. The aspect of chance is derived from the intersecting individual rhythmic and gestural lines provided to each performer in the ensemble, in which each performer is directed to play at different tempos. This process creates a cloud of notes, that when performed, may sometimes differ on the microrhythmic level, but has an overall textural identity that sounds similar in each performance, as shown in Example 3.12.

Example 3.12: Limited aleatory technique, m. 35, Movement 6.

Measures 35-37 (see Examples 3.13-3.15) implement the controlled aleatory method, which creates unique textures by means of tempo alteration, repetition of each line, and pitch
simultaneities created by the vertical and horizontal planes. Each performer is instructed to play at different tempos. The violinist is responsible for repeating his/her part a designated number of times, then cueing the remaining ensemble before proceeding to the next measure. The remaining instrumentalists repeat their lines until the violinist provides a cue, which is timed in seconds. Once the violin cue is established, the performers then observe the violinist for an additional cue that leads the ensemble directly into next measure. Out of the three measures of aleatory, measure 35 has the thickest texture due to the held sustain pedal in the piano, in which the pianist is instructed to play pitches in the lowest register while plucking the strings inside the piano. When combined with the violin and cello lines, the texture covers a large register span. Measure 36 does not continue the string plucking technique, although the measure does contain dense chord structures performed with the sustain pedal held.

Example 3.13: Measure 36, continued limited aleatory, Movement 6.

Finally, measure 37 (Example 3.14) contains the least saturated individual lines of the three aleatory measures, and as a result the measure contains the thinnest texture of the three. I consider these three measures to be the climax of the movement, which finds resolution in the
thinning of the textures as each aleatory measure is performed in order. This is not an arbitrary process, because those three measures are designed to transition the materials back to the main melodic idea (mm. 39-44), which ends the movement; this is displayed in Example 3.15.

Example 3.14: Measure 37, continued limited aleatory, Movement 6.

Example 3.15: Final melodic idea in Movement 6, thinner texture, large leaps in the piano.

Movement 8

Movement 8 consists of all the members of the Pierrot ensemble, plus an added percussionist. In addition to using a row comprised only of the interval classes found in
Movement 2, I have also included many musical attributes found in the three previous even numbered movements, such as aleatory techniques, motivic/melodic units, voice, strict pitch ordering used in tandem with free materials, and a variety of row operations, including prime, retrograde, and inversion. All previous instruments, plus an added vocalist (in this case soprano) and percussionist, naturally create further opportunities for polyphony, more complex timbres, and additionally, forms of human expression (vocalist).

There are six new instruments in Movement 8: soprano, concert bass drum, tam-tam, triangle, marimba, and gong. Each of these instruments offer new timbres, and I use their unique colors for building anticipation and accentuating important moments of interest and/or terminal points, as shown in Example 3.16.\(^7\) For example, the bass drum tremolo in mm. 38-40 crescendos, building anticipation and foreshadowing the important point of arrival on the downbeat of measure 40. The chord clusters in the piano and the high Ab in the soprano further emphasize the importance of the arrival point through register; the vocalist sings in her high register, while the piano creates a dense texture in its highest and lowest registers.

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\(^7\) Terminal points may be compared to cadential areas in common-practice theory.
Example 3.16: Bass drum, accentuating an important moment, Movement 8.

Overall, the vocalist is used less melodically—as traditionally done—and more gesturally. At times the vocalist is directed to speak syllables instead of singing them, use glissandi to signal moments of critical interest, and hold sustained notes in sections of aleatoric instrumental activity, as we see in Example 3.17. In this movement, the vocalist is not a soloist, but rather an additional performer who blends in with the timbre and texture of the rest of the ensemble at any particular moment.
Example 3.17: Aleatory techniques, extended techniques, sustained vocal pitches, Movement 8.

The aleatory directions/boxes in the above figure are influenced by the aleatory examples in Movement 2. This type of aleatory is less systematic than Lutoslawski’s controlled aleatory system, but nevertheless provides unique textures that are improvisatory in nature. I would like to point out that these examples of aleatory techniques function on multiple levels of abstraction. For example, the bass drum is directed to perform random rhythms at a triple-piano dynamic...
level, acting as a textural pallet that floats in the background of the musical activity (Example 3.18). All instruments that are not playing aleatory passages are in the foreground of the texture, and direct the piece forward in linear time, while the aleatory passages produce a static texture, i.e. the musical background. In some cases of aleatory passages, the vocalist becomes a background of activity, while the instrumentalist(s) plays sustained notes.

Example 3.18: Vocalist as static aleatory background, Movement 8.
Measure 73 uses controlled aleatory writing, just as in mm. 35-37 in Movement 6. The texture created in this measure is rather dense due to the tremolo bowing of multiple strings in the cello and the sustained chord clusters in the piano. The text is sung, spoken, and fragmented, placing further emphasis on the musical line of the vocalist, which occupies the musical foreground. After measure 73, there is a 1/4 measure of rest, just like mm. 37-38 in Movement 6. The measure of rest serves the same function as the measure of rest in Movement 6—as a point of reflection after a plethora of musical activity, leading the listener out of the climax of the movement and into the final measures, which end the movement.

Movement 8 is the culmination of all previous even-numbered movements. Each movement (in numerical order), builds upon the attributes of the previous movement. New 12-tone rows are introduced in each movement, and each row adds additional interval classes, except for Movement 8, which returns to the three interval classes used in Movement 2. All of the even-numbered movements are connected through an additive process in which all the musical materials/methods are further developed and explored as the work progresses, reaching a climax in Movement 8. Finally, each movement increases the number of acoustic instruments employed, reaching the full complement in the final movement.
CHAPTER 4: ELECTRONIC ELEMENTS AND FURTHER ANALYSIS

In chapter 3 I provided evidence of the additive process that connects Movements 2, 4, 6, and 8. Within chapter 3, I focused my attention on the most important aspects of this compositional process, which include the use of 12-tone rows, pitch orderings, textures, interval classes, motives, melodic units, and aleatory methods. In chapter 4, I discuss my approach to the odd-numbered movements (1, 3, 5, and 7), the software used, and the samples/found sounds that were reimagined and electronically sculpted, creating a sonic narrative that may be defined as a chain of events, which unfold through cause and effect, plus experimentation.¹

In this chapter, I also discuss how I integrate the electronics and instruments in Movements 2, 4, and 6 by means of custom-designed Max patches. Each patch is designed to extend the characteristics and combined possibilities of the instruments with the computer. The artistic and compositional approach to creating Max patches is less experimental than shaping and processing audio files in a fixed media environment; one has to consider that the purpose of creating algorithms in Max is to complement the instruments, and inversely the instruments should react to the algorithms. This procedure binds the electronics with the instruments as a unit. Otherwise, the integration of the two will not seem logical or cohesive.

Movements 1, 3, 5, 6, and 7: Fixed Media

Movements 1, 3, 5, and 7 are composed for fixed audio only; optional fixed audio is also triggered in Movement 6. All sounds are recorded and altered by some type of filter, plug-in, or software sampler.² My process of altering audio files or samples and then shaping those sounds

¹ According to Curtis Roads, musical meaning and narrative are products of expectation; the listener creates their own narrative.
² Filters are used to amplify, pass, or attenuate particular frequency ranges.
is partially guided in real time using a controller.\textsuperscript{3} I use the controller as a performing instrument, but only in the studio during the recording process; this is unlike my approach to the electronics in Movements 2 and 4, which are controlled in real time with a controller through Max. The odd-numbered movements are constructed through a bottom-up approach. I begin with an initial idea, composing each movement by adding a feature at a time, and making my aesthetic choices by repeated close listening. Through this process, some sounds are refined, as others are dismissed. The identity of all odd numbered movements is crystalized through this method of compositional approach. The implementation of this method is not unlike similar approaches in visual art, where the composition reveals itself as the artist proceeds. There is a constant interaction between myself—as a sonic artist—and the tools/software/hardware I choose to exploit, creating an environment only restricted by the software applications available to me, and my imaginative limitations.

When working with fixed media exclusively, my compositional preplanning is provisional, and may be altered at any stage in the process. Below, in Figure 4.1, I have provided a tree structure that maps out my general approach to sound design in a fixed audio setting; this diagram represents a tentative process only—there are many directions in which the sonic materials may develop and evolve.

\textsuperscript{3} In the domain of digital audio, a controller is a human interface device which allows the user to control a digital audio workstation or other digital audio applications.
Figure 4.1: Hierarchy within an imperfect tree structure, abstract compositional approach.

The above diagram represents a loose compositional approach to designing fixed audio; this is a three-step process. I begin with the computer and a digital audio workstation (DAW); I then use my controller to perform many of my sound objects in a studio setting. After a large amount of experimentation creating and manipulating materials, I accumulate all of the sound objects I find interesting; this is labeled as the surface structure in the diagram. The abstract

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4 In this context, the word “perform” is used to describe a human being physically pressing keys on a controller (in a studio setting), adding a human element to the methods of recording, shaping, and processing of sound objects. A digital audio workstation (DAW) is an electronic device or application software used for recording, editing, and producing audio files.
structure section of the diagram represents the final stages, in which I order the sound objects into some type of form; that form depends on repeated listening, pacing, and the characteristics inherent to each sound object. Compositional preplanning—even if tentative—is fundamental for organization and economy, but the equipment and software used are equally important.

Electronic music is very closely related to the equipment and software on which it is made. I organized my materials through actions mediated by specific tools. The shaping and manipulating of individual sound objects is realized through a few particular software applications. These software applications allow me to construct, deconstruct, or rearrange sonic materials. Additionally, micro control of amplitude, envelope, and subtraction/addition of frequencies through filters are also implemented through various software applications.

Within the odd-numbered movements, the software program Kontakt is used for many purposes. Kontakt’s sample library is quite extensive, and I use it in combination with other sample libraries. To take advantage of the samples and articulate my concept of overall connectivity throughout These Decorated Fragments of Time, I chose to use particular samples (that reappear) taken from Kontakt’s free libraries and three additional libraries, Hollywood Strings, Signal, and Djemko Epix Drum Ensemble. For example, within the movements of fixed audio, I chose to apply a repetitive and pulsating rhythmic preset—referred to as Looped Tonals—taken from the Signal sample library; this sample is considered a trope of cinematic film scoring, in which moments of intensity are highlighted by repetition, creating a sense of tension through constant background activity.

In addition to using preset samples already available, Kontakt’s software sampler allows one to create more complex sounds through the instrument effects rack. The effects rack allows one to apply an effect(s) to a prerecorded audio file or preset. Each sample, or recorded audio
file, is uploaded into Kontakt’s software sampler, which allows the building of more advanced sampler instruments. I used the effects rack to add delay (around 100 milliseconds) and reverb to the pulsating sample I mentioned (Looped Tonals), which furthers the complexities, creating a larger sound with a slap echo effect that mimics a non-absorbing and reflective environment.

Within the software sampler interface there is an option for various signal processing algorithms. The algorithm called Tone Machine is an option I use to process many of my prerecorded audio files. This granular processing algorithm splices and interprets digital samples into smaller chunks of sound, but the true appeal of Tone Machine is that the algorithm impresses a sense of pitch upon sampled material, which allows one to highlight important interval classes or pitch content within the electronics. One can still apply various processing methods to Tone Machine within the effects rack; options include the further control of speed, pitch shifting, envelope, and formants.\(^5\)

Movement 6 for piano trio has both instruments and optional fixed electronics. My goal is to realize a movement that moves forward as a single entity, in which the electronics reinforce the instrumentalists, and vice versa. The process for creating the optional audio files was mediated through the effects rack in Kontakt exclusively, beginning with the convolution reverb option. At quarter note equals fifty, the tempo for Movement 6 is somewhat lethargic, and I use convolution to mimic this particular quality. Convolving the abstracted MIDI realization—created in Finale—upon itself creates an atmospheric complex sound that mimics the parts performed by the instrumentalists; the atmospheric sound comes from the impulse response,

\(^5\) Formants are defined as the spectral peaks of the sound spectrum. In this case, Kontakt is using the term formant to describe a formant filter, which mimics particular characteristics of the human voice.
which is created by sound radiating outward from a source, then reflecting around the room.\textsuperscript{6}

The final result is a movement that sounds much larger by virtue of overlapping the input and output signals, adding delay and reverb through convolution (Example 4.1).

Example 4.1: Kontakt, software sampler effects rack, convolution option.

\begin{center}
\includegraphics[width=\textwidth]{example41.png}
\end{center}

The software application Absynth (see Example 4.2) is a program that uses methods of sound synthesis to build sounds from the ground up, beginning with an oscillator. Although these synthesis capabilities are at my disposal, I chose to use Absynth’s preset sounds. Most of the preset sounds are quite atmospheric and heavily processed, which I find useful for highlighting

\textsuperscript{6} Finale is a music notation software program developed and released by Makemusic. Finale allows one to bounce their composition into an audio file through a MIDI realization. MIDI is an acronym for Musical Instrument Digital Interface. MIDI connects devices that make and control sound, such as synthesizers, samplers, and computers.
electronic phrasing, or moments of importance. In some cases, I use presets to orchestrate, and then I can use the controller to change the register. In this manner, I can adjust the octave at which the sample is played back, and add higher or lower frequencies to any sound(s), depending on personal preference. This process allows me to combine adjusted samples with other presets or recorded audio, thus creating more complex sounds that span larger frequency ranges. During the process of recording into Pro Tools, I make sure that each incoming sample from Absynth has headroom to work with, which usually is around -12 to -15 dB. By reducing my incoming levels, I allow myself the ability to adjust the output amplitude, in order to reduce the possibility of distortion or clipping, and creating additional control for orchestrating my sounds within the digital audio workstation (Pro Tools).

Example 4.2: Absynth interface.
The digital audio workstation (DAW) is the environment in which I visually arrange all my sound objects, once I have acquired all the materials needed. My DAW of choice is Pro Tools, which is developed and sold by Avid Technologies. Pro Tools allows one to use other digital instruments within its platform, i.e. Kontakt and Absynth. Most of the basic functions of Pro Tools are controlled within the edit or mix windows. The edit window displays audio tracks, master tracks, instrument tracks, and provides graphical presentation of any information recorded, imported, or processed. The mix window displays each track’s channel fader, allows for amplitude adjustment, and includes panning placement. Within the edit window, I rearrange and edit my sound objects, as well as automate amplitude and other parameters, as shown in Example 4.3.

Example 4.3: Pro Tools, edit window, graphical representation of information
When compared to the construction of my Max patches, my compositional approach to fixed audio is more organic and experimental. I construct and borrow my materials from Kontakt and Absynth. I use many of the presets available with Absynth and Kontakt. Additionally, I use Kontakt to process my own recorded sounds. By minimizing the number of software programs used, my collection of sounds throughout Movements 1, 3, 5, and 7 are unified.

**Movements 2, 4, and 6: Max/MSP**

Movements 2, 4, and 6 combine instruments with electronics. Creating live electronics requires the use of an additional program—in this case, Max/MSP. Max is a visual programming language that is particularly useful for the research needs of artists, educators, composers, and computer programmers, to name a few. Max is a modular program, which allows one to create system networks that perform particular multimedia tasks, such as live processing. The basic structure of Max, and its counterparts, is that of a data-flow system. Patches (Max algorithms) are designed by arranging and connecting objects (building-blocks) within the visual canvas. The objects act as separate and individual programs within themselves, which can accept typed arguments.\(^7\) The basic Max objects are mainly used for the manipulation of MIDI data with basic commands, so I chose to focus on the MSP (Max signal processing) objects and signal flow to build algorithms for live electronics.

**Movement 2**

The electronic component in Movement 2 is entirely live-processed flute and contains no samples. However, the repetition of the Loop Tonal sample from the Signal library, that I used in

\(^7\) An argument (parameter) is an independent variable that contains data, or codes.
Movement 1, inspired me to create a processing algorithm for Movement 2 that is repetitious on the surface, even while in a state of constant flux, as shown in Example 4.4.

Example 4.4: Max patch for Movement 2.

The patch is subdivided into three main sections, one of which is encapsulated into a subpatch labeled “p phase mod.”\(^8\) The signal flow in the subpatch should be traced from the top to the bottom. I begin with an oscillator object called phasor~; the tilde marks any object as a DSP (digital signal processing) object.\(^9\) The phasor~ object generates sawtooth wave signals at a

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8 A subpatch is an algorithm that has been encapsulated within a Max patch; this is usually done to keep sections of a patch separate and manageable.

9 To reiterate, Max objects are the building blocks of Max patches, and a Max patch is the visual canvas on which one’s algorithms are created.
desired frequency.\textsuperscript{10} I chose to use the phasor\textasciitilde object as a low frequency oscillator (LFO).\textsuperscript{11} This type of oscillator creates rhythmic variation of signals, and is often used to modulate another component’s value. To continue my concept of constant fluctuating frequencies, I chose to combine a chain of objects that will provide random frequencies to the phasor\textasciitilde object, as shown in Example 4.5.

Example 4.5: Random manipulation of the phasor\textasciitilde object, Movement 2.

The above chain of objects begins with a metronome at 1000 milliseconds, or 1 second, randomly selects numbers within specific range, converts the numbers into an audio signal, filters the signal, and connects to the LFO, or phasor\textasciitilde. This chain of objects manipulates the LFO and produces random frequencies.

\textsuperscript{10} A sawtooth wave is a type of sound wave that contains both the even and odd harmonics of a fundamental frequency.
\textsuperscript{11} A low frequency oscillator (LFO) is an electrical signal that functions below, or close to 20 Hz, which is the accepted lowest frequency of human audibility. The average human hearing range spans from 20 to 20,000 Hz.
The LFO is then connected to a series of rate~ objects.\textsuperscript{12} The rate~ objects are used to create subdivisions of the frequency of the LFO. For example, if I were to place an argument of 2 into the rate object, the signal would move twice as slow, and if the argument was 0.5, then it would move twice as fast. When a chain of rate~ objects are implemented, ramps at different rates are created, and these eventually change the timbre at different rates (see Example 4.6).\textsuperscript{13}

Example 4.6: Chain of rate~ objects, Movement 2.

![Diagram of rate~ objects]

The different signals from the rate~ objects are converted from ramping signals into various pulse waves by implementing \textgreater~ and \textless~, which Example 4.7 displays.\textsuperscript{14} Located below the \textgreater~ and \textless~ objects are multiplier objects (*~). These objects act as amplifiers for the signal and determine the amount of frequency variation of the oscillators that follow.

Example 4.7: Multiplier objects, Movement 2.

![Diagram of multiplier objects]

\textsuperscript{12} In Max, the rate~ object is designed to time-scale the output of the phasor~ object.
\textsuperscript{13} A sawtooth wave (phasor~) ramps upward then sharply drops; these are referred to as ramps.
\textsuperscript{14} Pulse waves are asymmetrical waves with duty cycles other than 50%.
The pulse signals from the LFO modulate the frequencies of the oscillators they are connected to, and the oscillators are connected together in a way that results in phase modulation, as Example 4.8 shows.\textsuperscript{15}

Example 4.8: Additional oscillators, Movement 2.

In the example above, the rect\~ and cycle\~ oscillators are randomized further by crossfading between the two oscillators. The object chain created to do this involves an integer box, a rand\~ object, and a scale\~ object (see Example 4.9).

Example 4.9: Cross fading object chain, Movement 2.

\textsuperscript{15} Phase modulation is defined as variations in phase for carrier oscillator. The phase of a sound wave denotes a particular point within a wave cycle of a repetitive waveform.
After creating a close representation of the sound I initially envisioned in the subpatch, I then chose to manipulate the signal flow with a set of delays; I consider this to be the second part of the patch, shown in Example 4.10.

Example 4.10: Delay lines, tapin~, tapout~, delay~, Movement 2.

The tapin~ object works with the tapout~ object to create discrete echoes through a tap delay algorithm. The tapin~ object acts like a buffer, and stores the incoming signal. An argument determines the amount of signal stored in milliseconds. The tapout~ object extracts the original signal at a specified time(s) from the tapin~ object. There are two sets of delays, which are used to affect both the left and right channels individually. I have attached two additional delay objects (delay~ objects). I use both delay~ objects to set up feedback loops, with each channel feeding into the opposite channel for a “ping-pong delay” effect. The amount of delay in the delay~ objects are being modulated, so the delay time is constantly changing. I am sending LFO signals into the delay objects to modulate the delay time.

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16 An audio buffer captures and holds audio until needed.
The third section of the patch consists of an ordered series of triggers (events being turned on and off) that allow the performer (flute) to activate the audio at specific times, which are notated in the instrumental score. To partition the audio signal into discrete events, I use the counter object, which outputs a current count of bangs. The counter object is connected to select objects, which send out bang messages when the input matches the argument. The select objects turn the sound on and off, and control biquad~ objects. I attach select object signal networks to a filtergraph~ object, which provides a graphic interface for controlling these filters. The filtergraph~ controls two biquad~ filter objects that shape the frequency content of the signals in the left and right channels. The output sliders (gain~ objects) control the amplitude before the sound is sent to the ezdac~ object (digital-to-analog converter), as shown in Example 4.11.

Example 4.11: Filtergraph, filters, amplitude output, Movement 2.

Movement 4

The instrumentation of Movement 4 is Bb clarinet and violin, and the overall texture of the movement (without electronics) is thin. I chose to create a patch (see Example 4.12) that

17 In Max, a bang message informs another object to perform its main task.
provides electronic accompaniment in order to thicken the texture. My goal is to manipulate gestural attacks through an array of reverb and delay objects, eventually creating a dense texture that builds upon the signal with the final result being a dense wash of sound that forms from the generating resonances in the sound.\footnote{\textit{\ldots}}


The overall signal flow of the patch is best explained through a description of the order of events, or triggers. There are nine triggers total, and their particular order of operation defines the patch’s purpose (see Table 4.1).

\footnote{\textit{\ldots}}
Table 4.1: Order of operations, triggers.

<table>
<thead>
<tr>
<th>Sel 0</th>
<th>Sets the system to default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sel 1</td>
<td>Begins the recording process, records the Bb clarinet and violin</td>
</tr>
<tr>
<td>Sel 2</td>
<td>Stops the recording process of both buffers</td>
</tr>
<tr>
<td>Sel 3</td>
<td>Opens the analyzer object and plays back the clarinet recording when violin attacks are detected, signal is running through a delay chain</td>
</tr>
<tr>
<td>Sel 4</td>
<td>Closes the analyzer and fades out naturally</td>
</tr>
<tr>
<td>Sel 5</td>
<td>Starts the phasing process, between the two instruments</td>
</tr>
<tr>
<td>Sel 6</td>
<td>Fades out, artificial fade out through onepole filter</td>
</tr>
<tr>
<td>Sel 7</td>
<td>Restarts the phasing process, fades back in</td>
</tr>
<tr>
<td>Sel 8</td>
<td>Stops the phasing process and fades out, ending movement 4</td>
</tr>
</tbody>
</table>

The first section of the patch contains a series of objects that record, hold, and stop the recording process. The trigger designated as ‘sel 0’ initializes the parameters and sets up the patch for the beginning of the movement. The second trigger (sel 1) begins the recording process and records the incoming audio signal from the instruments through two microphones (one for each instrument) and the record~ objects.\(^{19}\) The recording process is initiated by a performer (in this case, the violinist), who presses a MIDI foot controller each time a cue number is presented in the score. The recorded audio is stored in two buffer~ objects, until needed, as shown in Example 4.13.\(^{20}\)

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\(^{19}\) The record~ object takes an MSP signal and writes it into the buffer~ object designated by the object's argument.

\(^{20}\) The buffer~ object in Max stores incoming audio for direct, or later use.
Example 4.13: Recorded and stored audio, Movement 4.

The recorded audio is contained in two buffers because I transform each instrument’s incoming signal separately. Since each buffer has a default of 20000 milliseconds (20 seconds), a timer object must be implemented in order to crop the buffer according to the difference in time between the second trigger (sel 1) and the third trigger (sel 2). In other words, the buffer will be 20 seconds long, regardless of the actual duration of time recorded. The third trigger (sel 2) stops the recording of both instruments; this process is achieved with the trigger object, which is located below a receive object (r two).

Select 3 (trigger 4) begins a new section of the patch. This trigger plays back the original Bb clarinet recording when a violin attack is detected. The process in which this is realized is located in the subpatch labeled p delay chain (see Example 4.14).

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21 Cropping audio describes the method of abstracting a portion of audio stored in a buffer.
When sel 3 is pressed, the trigger object (t 1) opens the gate~ object and initiates the analyzer~ object, which analyzes the violin attacks and initiates playback of audio in buf1 (the clarinet’s stored audio). To add to the complexity of the event and extend the audio playback through repetition, I then run the signal through a delay chain using the tapin~ and tapout~ objects; all signals are eventually manipulated through an array of reverb objects. Select 4 (sel 4) closes the analyzer, stops the process, and allows the audio to fade out naturally.

The sixth trigger (sel 5) begins playback, using the groove~ objects, of the opening gesture that was recorded in both buffers. The first statement of the gesture is in its original form, but a gradual phasing process begins through the use of the drunk object.\textsuperscript{22} The drunk object allows one to create a randomly varying number within specific parameters. The output of the drunk object will be a random number between 0 and 99 that will always be within 5 of the previous number; if the last number was 15, then the next number will be between 10 and 20. In this way a certain amount of stability is established, and parameters are not jumping around in an uncontrolled manner.

\textsuperscript{22} I am using the term phasing to describe the change in speed of two audio signals relative to one another, randomly controlling rates with the drunk object.
extreme or unwanted fashion; the drunk object is visually located in the middle of the subpatch, as shown in Example 4.15.

Example 4.15: Random phasing and panning, subpatch, p panning chain, Movement 4.

The above subpatch contains another subpatch labeled p panning, which controls the overall panning of the audio and randomly pans the signal in a stereo field. This is a truer form of randomness that fluctuates between the arguments 0 and 99. The random object will randomly provide a placement in the stereo field within these arguments. I attached a onepole~ filter to minimize any extreme fluctuations; the filter allows the panning to “slide” smoothly into the next random parameter, as shown in Example 4.16.
Example 4.16: Random panning, subpatch, p panning, Movement 4.

The seventh trigger (sel 6) fades out sel 5 with an artificial fade created through a onepole filter. The onepole filter creates a smooth control signal that gradually moves to zero, to avoid stopping the audio abruptly or creating a click sound as the audio stops.

All signals are passed through a series of multipliers that are connected to two ‘p freeverb’ subpatches, as shown in Example 4.17. These two subpatches consists of a series of gen~ freeverb objects that, when combined together, create a deep wash of sound that brings out resonances within the sound. Within each subpatch, the series of reverb objects are passed through a biquad~ object, which acts as a low pass filter—the higher frequencies are attenuated.
Example 4.17: Reverb chain, subpatch, biquad filter, Movement 4.

The eighth trigger (sel 7) reinitiates the phasing process presented earlier in the order of events (sel 5). The last trigger (sel 8) stops the process and fades out naturally, just as sel 4 does. All signals are heard through the dac~ object, or digital-to-analog convertor.

**Movement 6**

Movement 6 is composed for piano trio and optional fixed audio; the audio files are not processed in any manner in real time. This patch functions as a trigger patch, in which a laptop performer is responsible for initiating the order of operations from the soundboard. In moments of limited aleatory technique, the ensemble must be focused on physical cues provided in the performance directions, e.g. head nods. The ensemble’s cues have to be executed while performing on instruments, and the additional electronic triggers may or may not be overwhelming or burdensome in a live performance; for this reason, I suggest that the ensemble use a laptop performer to control the optional electronics.

The patch is separated into three sections, like the patch for Movement 2. The first module is constructed to control the options for triggering six discrete events. The second module is an encapsulated subpatch labeled ‘p messages’. Within the subpatch I have created five additional subpatches, each of which houses messages that provide control directions for
each triggered audio file. The function of the third section is to store audio files in the buffers until they are played back. Lastly, the signal’s output/amplitude is scaled with the gain~ object, and then sent out of the computer through the ezdac~ object (see Example 4.18).

Example 4.18: Patch for Movement 6.

The first module of the patch provides methods of control using the computer keyboard. This is accomplished with the key object; this object allows the tracking and output of various ASCII key-codes from the computer keyboard. Within the select object, the number 32 is designated for the spacebar, 105 correlates to the I key, 114 to the R key, and 27 is designated for the escape key. Each one of these keys and their designated codes are used for a specific
purpose. The spacebar begins the next cue (event), the R and I keys are used to reset/initialize the patch, the escape key toggles the digital-to-analog convertor (dac) on and off. The key numbers are set as arguments within the select object; the select object then outputs a bang when the input matches. The counter object counts upward from zero and outputs the current count. This information is passed to an additional select object, which is then connected to six send objects (s event). A send object will send any information passed to it to a receive object. The send objects (Example 4.19) transmit bang messages to trigger specific events.

Example 4.19: Module one, Movement 6.

The subpatch, labeled “p messages,” is where the control parameters of the triggered fixed audio files are located. The control parameters either initiate or stop playback of the audio files. This subpatch is shown in Example 4.20.
Example 4.20: Subpatch, event 0, Movement 6.

For example, event 0 (above) fades the output gain to zero over one second. The semicolons in the message send messages to specific receive objects. Notice that the second chain of the messages contain the arguments sfplayer1 through sfplayer5. These designate receive objects that are connected to the sfplay~ objects, which then play the audio files. The sfplay~ objects play audio files from the computer’s disk (see Example 4.21).

Example 4.21: Sfplay~ objects, Movement 6.
I consider Example 4.21 to be the third module of the patch. The receive object at the top of each module receives the information from the subpatch, which is then automatically banged with the loadmess object. The loadmess object outputs a specific message as soon as the patch is opened. In this case, a message of ‘1’ is automatically sent into the right inlet of the sfplay~ objects when the patch is first opened. This message establishes the speed of playback of the audio buffer—a speed of 1 means that the audio plays back at the speed in which it was recorded, resulting in no pitch change. Each sfplay~ object is connected to two send~ objects; these assure a stereo output. PlayerOut 1 sends to the left channel, and playerOut 2 is sends to the right channel. Both signals are multiplied and scaled, and then sent out the dac~ object, which outputs the audio.

Chapter 4 highlights my compositional approach to the electronics involved in *These Decorated Fragments of Time*. There are two branches of electronic approaches discussed, which include fixed audio and programming. The fixed audio section discusses my procedure to shaping sound objects, the software used to produce the audio product, and how the structure is crystalized through a cause and effect method of formal construction. All of the movements for fixed audio (1, 3, 5, and 7) are connected through use of similar sound objects, processes used to manipulate the sounds, and various presets abstracted from sample libraries.

The second section of chapter 4 explains in detail the signal flow and programming procedures of three Max patches created for Movements 2, 4, and 6. The first patch ( Movement 2) uses phase modulation to produce random fluctuations in timbre and time. In Movement 4, the patch is constructed so that each trigger further builds upon the information received from the previously triggered event in the movement; this process creates a wash of sound that is hardly recognizable from the original source, i.e. trigger one. The patch in Movement 6 only triggers
previously composed audio files, which are controlled by a laptop performer, instead of an instrumentalist. The live and fixed electronics, along with instruments, combine in a multidiscipline work that is a synthesis of contemporary genre and style.
CHAPTER 5: CONCLUSION

These Decorated Fragments of Time is my first work for multimedia, i.e. live and fixed electronics combined with instruments. The entire process has been challenging on many levels, but has heightened my interests in programming and sound sculpting. This work began nearly one year ago, and has gone through multiple drafts. I prepared the original score with paper and pencil only, and with each additional draft my processes became more systematic and purposeful. This is the first work I have composed that makes use of the software program Max, combines both fixed and live electronics with instruments, and uses the Pierrot ensemble. I chose the Pierrot ensemble as a medium for its historical value to contemporary music, unique combination of timbres, and to add to the literature of the ensemble; I do not know of another work that is constructed in this manner for the Pierrot ensemble.

The most challenging facet of this piece was the programming aspect of Max. Through trial and error, the purpose of each patch unfolded, because I did not initially have any experience or understanding of how to reach my goals through Max. I read and examined most tutorials available with the program, focusing on the MSP (Max-signal processing) tutorials. I also reached out to other composers and technologist/programmers who were already familiar with Max, and borrowed ideas. I deconstructed their patches so that I might better understand the signal flow of each module, and how those modules are combined to create an algorithm that fulfills a particular purpose. My goal is to become more fluent and capable within the Max ecosystem so that I can expand my artistic boundaries and logically teach the program in the future.

Many of my other pieces provide the audience with a fundamental narrative, usually expressed in the program notes. These Decorated Fragments of Time does not provide any type
of clear and functioning narrative. I want the audience to apply their own narrative to the work. I believe narrative is found with individual sounds coming into being and then forming complementary or opposing relationships with other sounds. This approach frees me from imposing musical meaning on a work that only I have sincere agency with. To the listener, sounds within themselves can impose, signify, and evoke moods. There are referential sound samples that project the listener into encounters with spaces, people, and things—how narrative works. There are no extra-musical ideas involving politics, religion, social exploits, or cultural agendas. Like an abstract painting, this work conveys patterns of texture, rhythm, tone, and juxtaposition; these patterns help convey the narrative, whatever that narrative may be to the listener. In this sense, narrative is a story created by the listener through constructs derived from their experience of the world.

This piece is intended to be performed by graduate-level or professional-level performers. Each movement with instruments presents its own challenges. Movement 2 for solo flute requires the performer to play difficult extended techniques and a few virtuosic musical lines that may be too difficult for an undergraduate performer. Movement 4 instructs the violinist to perform double glissandi, tremolos over multiple strings (arpeggios), and passages in sync with the clarinet. Movement 6 for piano trio is challenging as a unit; measures of limited aleatory technique require the performers to focus on visual cues, so that the trio is in constant communication. Movement 8 is composed for the full Pierrot ensemble plus a percussionist. The vocalist is asked to perform aleatory techniques, extended techniques (such as glissandi), and keep very strict time with the other members of the ensemble; the lack of melody also challenges the traditional notions of voice usage in the world of art music. Although this work is challenging, I hope the performers find satisfaction in the process.
Overall, this experience was quite rewarding. My only goal was to become more capable with technology and add to the literature of the Pierrot ensemble. Although this is my first work for instruments combined with electronics, I will continue to develop this style/approach to audio and composition.
Appendix 1: Important compositions

Christopher Chandler. *Smoke and Mirrors* (2013), Pierrot ensemble and electronics.


Arnold Schoenburg. *Pierrot Lunaire* (1912), Pierrot ensemble.

Bibliography


These Decorated Fragments of Time

An eight movement work for Pierrot ensemble and electronics

Chad Powers 2018
Program Notes

These *Decorated Fragments of Time* is a work for Pierrot ensemble and electronics. The work is constructed in eight movements. There are four movements of fixed media, and three movements of instruments combined with electronics—movement eight consists of only instruments. The odd numbered movements (1, 3, 5, and 7) are composed for fixed audio, and are used as interludes between the even numbered movements. Movements 2 and 4 combine instruments with live electronics, and the sixth movement contains optional fixed audio electronics.

This work adds to the literature of the Pierrot ensemble in a unique manner. This is a modular work that may be played in its entirety, or one may combine particular movements to form individual works.

All of the odd numbered movements may be combined to form a single work for fixed audio. Additionally, the even numbered movements may be combined to form a larger work, or each movement may be extracted and performed on its own.

To my knowledge, there is not another work for Pierrot ensemble composed in this fashion.
Performance Notes

Instrumentation: Mezzo-soprano, Flute, Clarinet in Bb, Violin, Cello, Percussion (marimba, gong, tam-tam, orchestral bass drum, triangle), Piano, Electronics

Special Notation:

Gradually fade into nothing. –○

Air to overblow gliss – Embouchure gliss. Use only embouchure (don’t finger) to gliss upward

Foot pedal symbol – Score pedal corresponds to Max/MSP patch

Unmetered time signature – This symbol indicates there is no specific time signature.

Playing and singing – Sing the bottom pitches while playing the top pitch.
Whistle tones – Play the fundamental frequency (pitch) while adding any harmonics of the fundamental.

Acceleration – Accelerate for a specific duration.

Speaking (vocalist) – Speak the text in the duration provided. No specific pitch.

Aleatory technique boxes – These boxes provide specific directions for aleatory techniques.

Additional Notes

Movement 1: Fixed audio

Movement 2: Flute and electronics

All aleatory technique directions are clearly outlined in each direction box. Durations are located above each box.
Multiphonic fingerings are suggestions only, and each fingering suggestion is located above the multiphonic.

The circles with numbers represent each triggered event in specific time. Each time a circle is present, the performer should press a foot pedal to activate the electronics.

The word acceleration means just that, to accelerate the tempo in a certain amount of seconds. After each measure of acceleration the performer should play the next measure *a tempo*.

The markings placed adjacently to the whistle tone directions suggest non-specific harmonics above the fundamental frequency (pitch).

When *playing and singing*, any syllable is acceptable, grunts and grumbles are welcomed.

**Movement 3: Fixed media**

**Movement 4: Bb clarinet, violin, and electronics**

All aleatory technique directions are clearly outlined in each direction box.

The circles with numbers represent each triggered event in specific time. Each time a circle is present, the
performer should press a foot pedal to activate the electronics. I suggest that the violinist should control the order of events, i.e., press the foot pedal.

The duration of dyads performed by the violin will sometimes have to be performed by changing bowings—this is ok. In fact, changing bowing direction at any point in the work is ok. I am mainly concerned with the resulting effect. Bowings are suggestions only.

**Movement 6: Violin, cello, piano, and optional fixed electronics (possible laptop performer)**

This movement involves limited aleatory techniques based off Witold Lutoslawski’s method. The directions are defined clearly within each measure that involves limited aleatory technique. It is important that the ensemble is in sync for these measures. The violinist should cue the ensemble—this is clearly defined in the directions of each said measure.

The circles with numbers represent each triggered event in specific time. Each time a circle is present, the performer should either press a foot pedal to activate the electronics, or have the laptop performer control the triggers from the laptop; either way is acceptable and at the choice of the ensemble. The visuals abstractly represent the electronics.
Movement 7: Fixed Audio

Movement 8: Mezzo-soprano, flute, Bb clarinet, violin, cello, percussion (marimba, gong, tam-tam, orchestral bass drum, triangle), piano

This movement does not contain any electronics.

All aleatory technique directions are clearly outlined in each direction box. After each direct box, the performer should play *a tempo*.

The **vocalist** should approach this work more as gesturally, and less melodically. When aleatory techniques are required, the directions are clearly outlined in each box. The ‘x’ is designated for speaking. All defined pitches should be sung with as little vibrato as possible.

Glissandos are either specific in their pitch destination, or should simply follow the contour if no designated pitch is available.

The direction *slightly flat* means just that—the arrival pitch should be performed slightly flat.

The percussion part is composed on a grand staff. At no time is the **percussionist** playing two instruments
at once. Specific directions for changing instruments are clearly outlined in the score. Particular stage set-up is the performer’s choice—whatever is easiest.

The flute is required to perform an air to overblow glissando; this technique is performed by beginning with air, and then gradually move to sound while overblowing. Multiphonic fingerings are suggestions only. Closing the mouthpiece with the whole mouth performs a tongue ram.

The pianist should perform the glissando inside the middle crossbar. In measure 72, the pianist should cue the ensemble. Clusters should be performed in the general contour suggested in the score.

Technical notes

These Decorated Fragments of Time requires the following equipment for performance:

- Computer with at least 1GB of ram
- Cycling 74’s Max/MSP version 7 installed on the computer (obtain the patches from the composer-chadpowers6@gmail.com)
- Audio interface
- One USB foot pedal
- Four microphones
- One stage monitor if needed
At least two loudspeakers set in a stereo configuration

This work may be performed in two ways—with performers controlling all the electronics, or the electronics triggered by a sound engineer located by the mixer. In any case, the laptop performer should control balance levels between the amplified instruments and live/fixed electronics.

Please contact the composer for any question - chadpowers6@gmail.com

Website – cwpowersmusic.com
Flute and Live Electronics

These Decorated Fragments of Time: Movement 2

Chad Powers
2018

Score

p

\( \begin{array}{c}
\text{Flute} \\
\text{Electronics}
\end{array} \)

\( \begin{array}{c}
\text{very fast} \\
\text{c. 6”}
\end{array} \)

\( \begin{array}{c}
\text{accelerate c. 4”} \\
\text{ord} \\
\text{d = 70}
\end{array} \)

\( \begin{array}{c}
\text{play random} \\
\text{percussive} \\
\text{attacks in} \\
\text{random rhythms}
\end{array} \)

\( \begin{array}{c}
p \\
f
\end{array} \)

\( \begin{array}{c}
f \\
p \\
mf
\end{array} \)

\( \begin{array}{c}
1 \text{ begin electronics,} \\
\text{let render for c. 6”} \\
\text{then play gesture}
\end{array} \)

\( \begin{array}{c}
\text{Fl.} \\
\text{Elec.}
\end{array} \)

\( \begin{array}{c}
\text{c. 3”}
\end{array} \)

\( \begin{array}{c}
\text{play random} \\
\text{percussive} \\
\text{attacks in} \\
\text{random rhythms}
\end{array} \)

\( \begin{array}{c}
p \\
f
\end{array} \)

\( \begin{array}{c}
f \\
p \\
mf
\end{array} \)

\( \begin{array}{c}
\text{Fl.} \\
\text{Elec.}
\end{array} \)

\( \begin{array}{c}
c. 10”
\end{array} \)

\( \begin{array}{c}
\text{electronics only,} \\
\text{begin m. 11 when} \\
\text{electronics have} \\
\text{almost faded}
\end{array} \)

\( \begin{array}{c}
\text{ord} \\
a \text{ tempo}
\end{array} \)

\( \begin{array}{c}
p
\end{array} \)

\( \begin{array}{c}
\text{Fl.} \\
\text{Elec.}
\end{array} \)

\( \begin{array}{c}
c. 10”
\end{array} \)

\( \begin{array}{c}
\text{electronics only,} \\
\text{begin m. 11 when} \\
\text{electronics have} \\
\text{almost faded}
\end{array} \)

\( \begin{array}{c}
\text{ord} \\
a \text{ tempo}
\end{array} \)

\( \begin{array}{c}
p
\end{array} \)

\( \begin{array}{c}
\text{Fl.} \\
\text{Elec.}
\end{array} \)

\( \begin{array}{c}
c. 10”
\end{array} \)

\( \begin{array}{c}
\text{electronics only,} \\
\text{begin m. 11 when} \\
\text{electronics have} \\
\text{almost faded}
\end{array} \)

\( \begin{array}{c}
\text{ord} \\
a \text{ tempo}
\end{array} \)

\( \begin{array}{c}
p
\end{array} \)

\( \begin{array}{c}
\text{Fl.} \\
\text{Elec.}
\end{array} \)

\( \begin{array}{c}
c. 10”
\end{array} \)

\( \begin{array}{c}
\text{electronics only,} \\
\text{begin m. 11 when} \\
\text{electronics have} \\
\text{almost faded}
\end{array} \)

\( \begin{array}{c}
\text{ord} \\
a \text{ tempo}
\end{array} \)

\( \begin{array}{c}
p
\end{array} \)

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These Decorated Fragments of Time: Movement Two

Fl.

Elec.

percussive attacks, play in any order as fast as possible in c. 8" ord

a tempo

very fast c. 4"

ord

a tempo

c. 10"

electronics only, begin m. 32 after c. 10"
These Decorated Fragments of Time: Movement Two

Fl. play C#5 while singing lower pitches on an syllable, grunts and grumbles welcomed

Elec. electronic texture becomes thicker until the end of the piece
These Decorated Fragments of Time: Movement Two

Fl.

Elec.

Fl.

Elec.

Fl.

Elec.

stops the process, let electronics fade out
These Decorated Fragments of Time: Movement 4
Bb Clarinet, Violin, and Live Electronics

Chad Powers
2018

Bb Clarinet

Violin

Electronics

Score

very fast
c. 5”
ord
$\frac{d}{100}$

wait for electronics to nearly fade out, then move to the next measure
play random percussive attacks in random rhythms

c. 5”

sets system to default

begin recording

stop recording

opens analyzer, plays recording and records instrumental attacks

ord

%a tempo

opens analyzer, plays recording and records instrumental attacks

quick gliss

begins phasing

Transcribed

Bb Cl.

Vln.

Elec.

Bb Cl.

Vln.

Elec.
These Decorated Fragments of Time: Movement Four

12

Bs. Cl.

12

Vln.

12

Elec.

16

Bs. Cl.

16

Vln.

16

Elec.

20

Bs. Cl.

20

Vln.

20

Elec.

6 fades out

7 beings phasing again
These Decorated Fragments of Time: Movement Four

36 stops the process and fades out
These Decorated Fragments of Time: Movement 6
Violin, Cello, Piano, and Optional Fixed Electronics

Chad Powers
©Chad Powers Music 2018

\( \frac{J = 50}{p} \)

\( \frac{\text{Violin}}{\text{Cello}} \)

\( \frac{\text{Piano}}{\text{Electronics}} \)

swells, metallic shimmers, delayed piano

delayed, manipulated strings, swells continue

rising piano

end event 1
arpeggio, this is a textural effect

quick gliss

ppp

f

fff

low drone continues, crash symbols, swell

end event 2

shimmering tones, mechanical timbres, this is a textural effect

mechanical timbres with reverb
These Decorated Fragments of Time: Movement Six

faint shimmering tones
Pluck random strings inside the piano. Play random pitches, rhythms, and tempos.

Continue randomness within the aleatory measure, but now add suggested pitches (bass clef).

event 3 will continue into aleatory measure (35), the laptop performer or instrumentalist (whoever chooses to trigger events) should trigger event 4 on 2nd repeat of aleatory
These Decorated Fragments of Time: Movement Six

repeat x 2

Vln.

\( \text{q} = 90 \)

\[ \text{repeat until violin cue} \]

\( \text{excessive bow pressure, scratching sounds} \)

Elec.

event 4 - contains plucked piano, this will continue throughout event 4

Pno.

\( \text{repeat until violin cue} \)

\( \text{repeat until violin cue} \)


repeat x 3

Vln.

\( \text{q} = 70 \)

\( \text{repeat until} \)

\( \text{event 4 - contains plucked piano} \),

this will continue throughout event 4

\( \text{cue c. 3"} \)

Vc.

\( \text{q} = 100 \)

\( \text{violin cue} \)

\( \text{accelerate} \)

Pno.

\( \text{repeat until} \)

\( \text{violin cue} \)

\( \text{repeat until} \)

\( \text{violin cue} \)

\( \text{repeat until} \)

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\( \text{violin cue} \)

\( \text{repeat until} \)
These Decorated Fragments of Time: Movement Six

ord
a tempo

\( \sum \) delayed strings, convolution, swells

steady and quiet

L.V., until silent
let electronics fadeout completely
These Decorated Fragments of Time: Movement 8
Pierrot Ensemble and Percussion

Chad Powers
2018

Time is a human construct void of emotion......

C. 10" - speak slowly, retard, cue ensemble into next measure
\( \text{\textcopyright Chad Powers Music 2018} \)
These Decorated Fragments of Time: Movement Eight

Sop.:

Fl.:

Bs Cl.:

Vln.:

Vc.:

Perc.:

Pno.:

improvise key and tongue clicks, tongue pizzicatos, other percussive techniques in random registers

ppp aleatory

bd (bass drum)

improvise rhythms, play very lightly, floating in background

ppp
These Decorated Fragments of Time: Movement Eight

improvise random rhythms and pitches in the lowest registers

improvise random rhythms and pitches in the lowest registers

improvise random rhythms and pitches in the highest registers, play all pitches staccato
These Decorated Fragments of Time: Movement Eight

Sop.

Fl.

Bs Cl.

Vln.

Vc.

Perc.

Pno.
These Decorated Fragments of Time: Movement Eight

These decorated fragments

To gong
These Decorated Fragments of Time: Movement Eight

Soprano (Sop.)

Flute (Fl.)

Bass Clarinet (B♭Cl.)

Violin (Vln.)

Viola (Vc.)

Percussion (Perc.)

Piano (Pno.)

spoken

Time is a human
These Decorated Fragments of Time: Movement Eight

Soprano

Flute

Bass Clarinet

Violin

Viola

Percussion

Piano
These Decorated Fragments of Time: Movement Eight
These Decorated Fragments of Time: Movement Eight

Sop.:

Fl.:

Bb Cl.:

Vln.:

Vc.:

Perc.:

Pno.:

Ah!
These Decorated Fragments of Time: Movement Eight

Sop. mf

Fl. mf

Bs Cl. mf

Vln. mf

Vc. arco

to gong

gong L.V. to bd

Perc.

Pno. p
perform a glissando inside the middle crossbar

L.V.
These Decorated Fragments of Time: Movement Eight
These Decorated Fragments of Time: Movement Eight
These Decorated Fragments of Time: Movement Eight
These Decorated Fragments of Time: Movement Eight

Sop.

Fl.

B♭ Cl.

Vln.

Vc.

Perc.

Pno.

to mrb (medium mallets)
These Decorated Fragments of Time: Movement Eight

mumble random phrases, rhythms, pitches, and non-pitches

Fl.
mf

p

Vln.

p

mf

Vc.

p

mf

Perc.

mrb

p

Pno.

mf
These Decorated Fragments of Time: Movement Eight

Soprano:

Flute:

Bassoon:

Violin:

Violoncello:

Percussion:

Piano:
<table>
<thead>
<tr>
<th>Instrument</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>Sop.</td>
<td></td>
</tr>
<tr>
<td>Fl.</td>
<td></td>
</tr>
<tr>
<td>B♭ Cl.</td>
<td></td>
</tr>
<tr>
<td>Vln.</td>
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<td>Vc.</td>
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<tr>
<td>Perc.</td>
<td></td>
</tr>
<tr>
<td>Pno.</td>
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</tbody>
</table>

These Decorated Fragments of Time: Movement Eight
These Decorated Fragments of Time: Movement Eight

Sop.  
\[ \text{\textit{time!}} \]

Fl.  
\[ \text{\textit{These ra!}} \]

Bs Cl.  
\[ \text{\textit{These ra!}} \]

Vln.  
\[ \text{\textit{These ra!}} \]

Vc.  
\[ \text{\textit{These ra!}} \]

Perc.  
\[ \text{\textit{These ra!}} \]

Pno.  
\[ \text{\textit{These ra!}} \]
These Decorated Fragments of Time: Movement Eight

time is a human construct, void of emotion, a construct of control, in which we follow blindly.....

De co ra ted ra! Fragments of!

Ah!

state only once, apply exaggerated retard, "a tempo"
on Ah!

repeat until vocalist cue

Ah!