

A SURVEY OF PERFORMANCE PRACTICE OF ELECTROACOUSTIC MUSIC FOR
WIND BAND GRADES 2-3

By

Frank Perez

Submitted to the graduate degree program in Music and the Graduate Faculty of the University
of Kansas in partial fulfillment of the requirements for the degree of Doctor of Musical Arts.

Chairperson Dr. Paul Popiel

James Barnes

Dr. Martin Bergee

Dr. Paul Laird

Dr. Matthew O. Smith

Date Defended: May 11, 2015

The Dissertation Committee for Frank Perez

Certifies that this is the approved version of the following dissertation:

A Survey of Performance Practice of Electro-acoustic Music for Wind Band Grades 2-3

Chairperson Dr. Paul Popiel

Date Approved: May 11, 2015

ABSTRACT

Electro-acoustic music for wind band is an emerging genre among contemporary composers that incorporates and blends an electronic soundtrack and cues with traditional wind instruments. Conductors may be required to understand and to acquire new skills when preparing this literature including becoming comfortable using headphones to follow a “click track” metronome and an audio track with the electronic sounds while conducting in performance. To integrate electronic sounds with live musicians, the conductor must have a comprehensive understanding of the technologies involved. These challenges and considerations may discourage conductors from programming electro-acoustic repertoire. Yet there is a wealth of excellent new music in this genre that would be beneficial for students and enjoyable for audiences. There is a need to have appropriate models illustrating how these various elements work independently and how they are brought together and used to build a sequential rehearsal progression. This paper will examine how to effectively navigate through the technology requirements as they relate to rehearsal preparation and performance of three grade 2 to 3 wind band works: *Paper Cut* (2010) by Alex Shapiro and *Coil* (2014) and *The Machine Awakes* (2012) by Steven Bryant. As technology continues to make it easier to integrate electronic sounds into electro-acoustic music, the process will become more seamless. Composer Steven Bryant states, “we will no longer talk about ‘electro-acoustic’ music” but simply accept it as a “standard possibility.”

CONTENTS

CHAPTER	PAGE
I. INTRODUCTION AND PURPOSE	1
Statement of the Problem	2
Purpose	3
Delimitation	3
II. OVERVIEW OF ELECTRO-ACOUSTIC LITERATURE	4
Electro-acoustic Defined	4
Historical Context of Electro-acoustic Music for Wind Band	6
III. OVERVIEW OF TECHNOLOGY REQUIREMENTS EXPLAINED	10
IV. <i>THE MACHINE AWAKES</i> BY STEVEN BRYANT	16
V. <i>PAPER CUT</i> BY ALEX SHAPIRO	22
VI. <i>COIL</i> BY STEVEN BRYANT	31
VII. CONCLUSION	35
REFERENCES	36
APPENDICES	37
A. Recommended Equipment	37
B. Diagram of Recommended Setup	39
C. List of Composers and Websites	40
D. List of Electro-acoustic Works for Wind Band by Grade Level	41
E. Interview Questions and Interviews	42
Alex Shapiro	44
Steven Bryant	49

Christopher Stark 52

Chapter I: Introduction and Purpose

Electro-acoustic music for wind band is an emerging genre among contemporary composers that incorporates and blends an electronic soundtrack and cues with traditional wind instruments. Through the use of computer software and synthesizers, composers are exploring a new and expanded range of timbres and effects. These new sonic colors enrich the traditional sound palette of composers by helping them devise “original sounds that can’t be produced by musicians” (Shapiro, 2014, p. 9). Composer Edgard Varèse purported that electronically generated sounds can “free music from the tempered system” and added, “You can generate something ‘live’ that can appear or disappear instantly and unpredictably” (Schuller, 1965, p. 35-36). Using electronics can help “achieve the exact nuance we have in our head as the composer” (Schuller, 1965, p. 10). Composers can exercise much more control and precision over a sound by changing its envelope (i.e. times of attack, sustain, decay, release, equalization, delay, phasing, chorus, reverb, etc.). Further, electronically created sounds can far exceed the pitch range of traditional wind instruments. They can also contribute a rhythmic complexity to literature for developing bands (grades 2-3), which would otherwise be beyond an ensemble’s technical capabilities (Shapiro, 2014, p. 10).

However, the blending of traditional wind instruments with electronic sounds introduces new challenges regarding performance practice as conductors prepare, rehearse, and perform this new literature. Conductors must have a comprehensive understanding of how the electronic sounds are incorporated into the score and must know the technical requirements of the software and hardware resources needed to successfully bring those sounds into a live and interactive setting. They need to have appropriate models illustrating how these elements are brought

together to effectively prepare, rehearse, and present this new and developing wind band repertoire.

Problem Statement

Incorporating electronic sounds with traditional wind band instruments can provide many performance-practice challenges for the conductor and ensemble. Conductors may be required to acquire new skills when preparing this literature including becoming comfortable using headphones to follow a “click track” metronome and an audio track with the electronic sounds while conducting in performance. While some electro-acoustic music does not require the use of a click track, conductors may be asked to follow a pre-recorded, rhythmic track being projected through floor monitor speakers on stage or through a hot spot speaker (small, personal speaker) located beside the podium. In other approaches, a synthesizer or computer may be used to trigger electronic sounds individually as they occur in the score. With any of these, to integrate electronic sounds with live musicians, the conductor must have a comprehensive understanding of technology. The conductor must understand how a sound system works, including how use a mixing console and how it is used to coordinate and route the sound from the computer and from the audio interface to the conductor and musicians on stage and to the audience in the hall. Depending on the technology requirements of a piece, conductors may also need to have an awareness of MIDI, synthesizers, and microphones. Regardless of whether there is a audio technician available to help with setup and management of equipment, having this understanding will save much rehearsal time and will help increase the effectiveness of rehearsals and polish of the final performances. These challenges and considerations may discourage conductors from programming electro-acoustic repertoire. There is a need to have appropriate models illustrating

how these elements work independently and how they are brought together and used to build a sequential rehearsal progression.

Purpose Statement

The purpose of this research project is twofold: to investigate the use of electronics in grades 2 to 3 (level of difficulty) wind band literature and to encourage conductors to program electro-acoustic repertoire by providing a guide to three introductory level pieces into this genre.

Through these topics, I will additionally examine how to effectively navigate through the technology requirements as they relate to rehearsal preparation and performance.

Delimitation

This research study is delimited to the study of three representative electro-acoustic compositions for wind band from grades 2 to 3: *Paper Cut* (2010) by Alex Shapiro and *Coil* (2014) and *The Machine Awakes* (2012) by Steven Bryant. Each composition uses a different approach to integrate electronic sounds into the composition and presents its own unique challenges. The study of these three pieces will provide a guide for conductors and an aid in transferring and applying these concepts and strategies to other pieces that incorporate electronic sounds.

Chapter II: Overview of Electro-Acoustic Literature for Wind Band

Electro-Acoustic Defined

The *Oxford Dictionary of Music* defines electro-acoustic music as “music produced or altered by electrical means” (Electro-Acoustic, 2015). The electronic sounds may be generated by electronic instruments such as synthesizers or created by computer software. Recorded samples may be altered and manipulated using computer software. “Electronic music” is a term that is often used synonymously with electro-acoustic music; however, the two must remain as distinct entities. Electronic music refers to music conceived and composed solely in an electronic medium. In contrast, electro-acoustic music involves an electronic soundscape combined with traditional acoustic instruments in live performance. For example, composer Alex Shapiro uses samples of whale songs in her piece *Immersion* (2012). According to Arielle Saiber, it encourages composers to use “sound sources we could never have heard without the aid of technology” and adds that “humans can jam with marine life, solar flares and inanimate objects” (Saiber, 2007, p. 1617). Sounds can also be synthesized and manipulated electronically as in Steven Bryant’s *Coil*. “Composers can produce music that challenges our sense of time, space and language as never before” (Saiber, 2007, p. 1617). Any combination of acoustic and electronic elements may be termed “live-electronic music” and for this reason, a more specific designation is usually given, such as “music for instruments and tape,” or “music for voice and live electronics” (*Oxford*, 2015).

Electro-acoustic music for wind band brings electronic sounds into a composition to be performed alongside traditional wind band instruments. The electronic elements used in composition are usually composed and crafted separately from the rest of the score. This is

mostly due to the fact that the composer will sit down with the computer software, synthesizer, sampler, or digital recorder to design each electronic sound element to be used in the composition. However, this does not mean that composers exclude these sounds from the compositional process of the piece. Composers such as Alex Shapiro will spend time discovering and inventing sounds to create a sound palette that she can use organically in her composition and will offer sounds beyond ones offered by traditional wind band instruments both tonally and rhythmically (Shapiro, 2014, p. 10).

One of the early pioneers of electro-acoustic music, Karlheinz Stockhausen, defines six areas of electro-acoustic performance practice: a) recording technique, referring to sampled sounds and instruments; b) amplification technique referring to the speaker setup; c) transformation technique, referring to how the sound of an amplified instrument is manipulated through a computer processor; d) technique of “pre-formed” music, referring to *musique concrète* and other prerecorded music; e) electronic musical instruments themselves; and f) combination of all electro-acoustic possibilities (Stockhausen, 1996, p. 75). A conductor’s role is not to create the electronics but simply to integrate them artistically into the ensemble’s performance. Conductors are most often provided with the sounds that have been pre-recorded or pre-configured by the composer.

Composer Alex Shapiro further defines three methods that contemporary composers of electro-acoustic wind band music use to incorporate electronic sounds into their works: “The first is the simplest and the one that I choose for each of my works: using a pre-recorded audio track that will reliably playback via a free application such as *iTunes* or *Audacity* on a laptop or even an antiquated shiny object known as a CD” (Shapiro, 2014, p. 10). The second method is more interactive. This method involves using a software program, such as *MaxMSP*, which can

trigger and manipulate the pre-recorded sounds in real time by attaching a microphone to an acoustic instrument. The third method is, in a sense, a combination of the two previous ones where electronic sounds “are individually triggered in real time by someone at a laptop or MIDI controller” (Shapiro, 2014, p. 10). This may be the most organic method of integration as the musician deploying the electronic sounds sits within the ensemble as one of its members.

Historical Context of Electro-Acoustic Music for Wind Band

The first recorded composition for electronics and wind band is *Déserts* by Edgard Varèse (1883-1965). He first composed the traditional instrumentation between 1949 and 1952 and later composed, recorded and added the electronic “interpolations” between 1952 and 1954. As Olivia Mattis notes, “The historical significance of this work is generally seen to lie in the fact that it was the first work of the ‘father of electronic music’ to use recorded sounds” (Mattis, 1992, p. 557). The premiere of the complete electro-acoustic work was in December 1954. It was part of the first stereophonic broadcast in French radio history (Mattis, 1992, p. 557). *Déserts* is scored for fourteen winds, five percussionists, piano, and electronic tape with pre-recorded sounds. The three electronic track segments, or “interpolations,” alternate with the acoustic instruments and are never heard simultaneously. The audio engineer plays the magnetic tape with the “organized sounds” (as referred to by Varèse) starting on beat four of measure 82 (notated OS). After stopping the tape, the ensemble reenters in measure 83 (see musical example 1). Since the acoustic instruments and electronic track do not play simultaneously, rehearsal preparation is simplified. The score only indicates where these interpolations should be inserted and does not notate the melodic, harmonic nor rhythmic content of each. The technology needs for *Déserts* are also very basic: it requires only a tape player and two speakers. In fact, Varèse notes that the piece may be performed with or without the electronic track.

Musical Example 1, *Déserts* mm. 80–83

Musical score for *Déserts*, measures 80–83. The score includes parts for Piccolo, Flute, Bass Clarinet, Horns (with Sordano and closed/open mutes), Trumpets, Trombones, and Cymbals/Toms. The tempo is marked as quarter note = 100. Dynamics include *pp*, *sf*, and *ff*. The key signature has one sharp (F#).

Some of the early compositions for electronics and wind band for developing ensembles, grade levels 2 to 3, incorporate electronic sounds in a similar manner as Varèse's *Déserts*. Some examples include: *Captain Video* (1982) by film composer Jay Chattaway (see musical example 2) and *Voices of Water and Spirit* (2000) by Craig Thomas Naylor (see musical example 3). Chattaway includes only the indication of when to start playback of the electronic sounds (see musical example 2). In example 3, Naylor indicates over measure 1, "10 seconds preview–Water Sounds." He takes it a one step further by rhythmically notating the sounds of the frogs.

Musical Example 2, *Captain Video*, Jay Chattaway, mm. 1–5

Musical score for *Captain Video*, measures 1–5. The score includes parts for Snare Drum, Bass Drum, Cymbals, Concert Toms, and Condensed Score (Piano). The tempo is marked as quarter note = 104. Dynamics include *ff* and *fp*. The key signature has one sharp (F#).

Musical Example 3, *Voices of Water and Spirit*, Craig Naylor, mm. 1–5

The musical score for measures 1-5 of 'Voices of Water and Spirit' is presented in 4/4 time. It features an electronic track at the top, indicated by a wavy line and labeled '10 Seconds Preview - Water Sounds'. Below this, the percussion part includes Wood Block, Triangle, Sus. Cym., and Shaker or Maracas. The frog sounds are notated on staves for Pacific Chorus Frog, Spotted Frog, Leopard Frog, Bull Frog, Wood Frog, Western Toad, and Frog Drum. Individual croaks are noted for the Pacific Chorus Frog and Bull Frog.

In the last five years, electro-acoustic music for wind band has evolved to include a more substantive role for the electronics. Regardless of the specific approach to integration, composers have moved away from simply alternating the electronic sounds with acoustic instruments to a much more organic and interactive role in which both are played simultaneously and more dependent on each other. Thus, the electronic track becomes an extension of the instrumentation for their pieces. Moreover, they involve a much greater level of detail compared to earlier works. The track is included in the score and notated using standard notation, much like the other acoustic instruments in the ensemble. If they cannot be assigned a pitch, they are notated rhythmically, or in some cases, they are given a brief description in the score (Shapiro, 2014, p.11). Because of this increased role, electro-acoustic music now requires a designated person/musician to sit behind a computer or tablet and mixing console to coordinate the electronics and balance the volume of the track with the wind band (C. Stark, e-mail interview, April 29, 2015)..

In Steven Bryant's *The Machine Awakes*, the electronic track is divided into three separate cues or sections each triggered from a computer and played through the loudspeakers at designated places indicated in the score. Shapiro's *Paper Cut* requires that the ensemble stay synchronized with the track throughout the entire piece by using a metronomic click track in much the same manner as a film score is performed and recorded. *Coil* by Steven Bryant uses a

MIDI keyboard—with the help of a computer and pre-programmed sequencing software—which provides more flexibility and control of tempos. Indeed, in their discussions of how electronic sounds are combined with acoustic instruments, both Shapiro and Stockhausen mention an approach whereby the computer triggers the various cues based on the feedback received from a specific instrument. In his interview, Bryant alludes to evolution of electro-acoustic music. He states, “I expect (and hope) that technology will continue to become simpler and more powerful, to the point that we no longer talk about “electro-acoustic” music, it’s [*sic*] simply a standard possibility of music, and no one bats an eye when a piece calls for electronics” (S. Bryant, e-mail interview, April 23, 2015). As composers continue to explore this greatly expanded sonic palette and conductors become more adept in preparing and presenting such works, the level of electro-acoustic interaction will become more organic and seamless.

Chapter III: Overview of Technology Requirements Explained

Performing electro-acoustic music for wind band requires equipment ranging from a simple stereo speaker setup to large arrays involving computer audio software, digital audio interfaces, microphones, floor monitors, hot-spot speakers, and personal monitor systems for the conductor. Although composers strive to offer an accessible, non-threatening setup, having a comprehensive understanding of the equipment needed can help the conductor gain insight into funding requirements, rehearsal and performance practice, logistics, and how to train the musician coordinating the electronics. Additionally, the conductor will learn terminology necessary to better communicate with the audio engineer should there be one available to assist with the technology component. To ensure successful rehearsals and performances, it is highly recommended that the conductor/sound engineer purchase the appropriate equipment and have ample lead-time to test it with the electronic track. Otherwise, it is conceivable to waste an entire rehearsal trouble shooting the technology.

The simplest level of integrating electronics with acoustic instruments corresponds with the first of three methods composer Alex Shapiro writes about in her article (Shapiro, 2014, p. 10). The electronic sounds are pre-recorded onto a single, long running track that is the same length as the entire piece. They are predetermined, designed, and recorded by the composer so that they playback exactly the same each time the piece is rehearsed and performed. This is the approach that most composers are gravitating towards as it makes their work accessible to a wide variety of band programs with limited knowledge of electronics or availability of equipment.

Steven Bryant's piece, *The Machine Awakes*, is a perfect illustration of the most basic setup: two powered speakers, a small mixing console and a playback device. The audio signal

path would start with the playback device sending the signal to a mixer with two speakers connected to it that are placed on stage either in front or behind the ensemble. It bears noting here that some speakers are “passive” and some are “powered,” otherwise known as “active.” Passive speakers have no independent power source and depend on drawing power from the mixer or a separate power amplifier to boost the audio signal. However, not all sound mixers are equal: some have a power amplifier built in. If your speakers are indeed “powered,” they supply their own power and can be used with any mixing console.

Once the playback equipment is in place, the speakers can be placed—preferably on speaker stands for clarity of sound—behind the ensemble. This facilitates a more organic blend with the acoustic instruments. This also has the advantage of allowing the musicians to better hear and synchronize with the recorded track. Placing the speakers in front of the ensemble has the advantage of providing a little more clarity to the audience, but may also result in some loss of the aforementioned blend. With this arrangement, placing two to four floor monitors around the ensemble (two in front facing into the ensemble and two behind the percussion section) can help the ensemble to better hear the track.

Most mixers can divide the audio signal from the playback device into two stereo signals, sending one stereo feed to the floor monitors and one stereo feed to the speakers facing the audience. Both volume levels may be adjusted independently. If one is not accustomed to working with digital mixing consoles, a non-digital console is preferable for simplicity and quicker learning. It is also important to consider the placement of the playback device and mixing console in relation to the band. The best position may be behind the audience so the sound engineer can properly balance the track with the band.

If you are setting up the sound system specifically for this performance (i.e. your sound equipment is not built into your performance space), you should also account for the appropriate length of cabling necessary to have the mixer and playback device setup in the audience space away from the stage. Some rooms/auditoriums may already have a sound system built in. In this case, the house speakers may be permanently located and you will need to use floor monitors for the band to be able to hear the track. Most auditoriums have 1/4-inch jacks in connector boxes on the floor of the stage where the monitor speakers can be plugged in and most speakers have a “pass-through” jack in them where you can connect another monitor speaker to the first one so that you chain them together and have one monitor in the back and one in the front of the ensemble.

The next level of complexity introduces a click-track (i.e. a metronome for the conductor) as in Alex Shapiro’s *Paper Cut* and Steven Bryant’s *Coil*. This method is becoming more common as more composers are choosing to use this method. It involves playback of two tracks simultaneously. One track has both the click and the electronic track for the conductor and the other consists of the electronic track alone, which is routed to the audience and the ensemble. This necessitates a computer and a digital audio interface capable of sending out two stereo signals (four output jacks) that can be routed to two different locations (conductor headphones and stage speakers). Most playback devices, including computers, have only a single stereo output jack and are not capable of sending out two different stereo signals. The digital audio interface makes it possible for the click track to be sent to the conductor’s headphones independent from the electronic track being sent to the ensemble and the audience. Usually the main electronic track is in stereo and the click track may be mono or stereo. Therefore, the digital interface needs to be capable of sending out four output signals.

The digital audio software installed on the computer must also be capable of playing multi-channel audio through a digital interface. Digital recording applications such as *Cubase*, *Logic*, *Pro Tools*, etc. have this capability and can be configured to use most digital audio interfaces on the market. Once the audio software is chosen, both the track with click and the track without the click are imported into the program and aligned so that they are synchronized during playback. It is important to remember to configure the digital audio interface to the software, which may not occur automatically. In your software program you can select your output or playback device (audio interface) and specify which outputs on the interface will be used for each track. For example, the prerecorded track is assigned to outputs channels one and two while the click track is assigned to output three and four. Composers Steven Bryant and Thomas Rex Beverly use computer programs such as *Ableton Live* or *MaxMSP* to program their sounds and do not give the conductor a choice of which software program to use. These two programs make use of the multi-channel output capabilities and also incorporate a click track.

Signal routing can be the most challenging. It is best to take output of the normal soundtrack into a mixing console so that the sound engineer can adjust the volume faders to balance the track with the ensemble. Some mixers will accept an XLR (3-pin microphone cable) or 1/4-inch TRS (tip-ring-sleeve) connection coming into each channel on the board. It is important to know what type of input jacks are on the backside of your mixer for each channel and which types of output jacks are installed on your digital interface box. This way you can be prepared with the appropriate cable types. Another suggestion would be to use tape and a pen to label each channel on the mixer with the name of the appropriate input.

For ease of rehearsal and comfort for the conductor, it is very important that the conductor be able to adjust the volume of the click track independently from the volume of the

monitors. To facilitate this, it would be advisable to use a small personal mixer (two to six channels) that has an option to use headphones or an in-ear monitor amplifier for headphones (see Appendix A). Ideally, the mixer or an in-ear monitor amplifier will both use XLR microphone inputs/outputs as this type of cable is preferable in helping to eliminate unwanted noise because of the length of cables.

When purchasing a mixing console, consider buying one with six or more input channels. In the case of *Paper Cut*, the composer also suggests using microphones to amplify the various paper sound effects played by the ensemble musicians. There are two basic types of microphones commonly used. Condenser microphones require “phantom power,” a very small electrical charge thus making them very sensitive. Dynamic microphones do not require phantom power, but, in turn, are not nearly as responsive as condenser microphones. Steven Bryant’s *Ecstatic Waters* also calls for a single clarinet to be amplified using a microphone in order to trigger the electronic sounds running through the computer software.

After the equipment is assembled and working properly, it is important to diagram your setup-up so that you can remember how everything is assembled and connected. Steven Bryant recommends that you have a duplicate computer and audio interface ready just in case your first computer fails during performance. Along these lines, it is advisable to restart the computer and digital audio interface before each rehearsal so that their memory is cleared and reset. It is equally necessary to defragment the computer’s hard-drive and turn off the Wi-Fi, Bluetooth, notifications, alarms, screen savers, and energy saving options (especially ones that put the hard drive to sleep). This will also help avoid interruptions and free up your computer’s resources to allow your audio to run more smoothly. It is important to ensure that the audio software and the audio interface drivers are compatible with your computer’s current version of its operating

system (Windows, Mac) version. It is best to refrain from upgrading any of these items until you have the time to research to make sure there are no reported problems with compatibility after you upgrade. Indeed, sometimes having the latest software/drivers can cause serious problems that you might not have time to fix rapidly when preparing for rehearsal or the performance.

The basic equipment needs for performing electro-acoustic music for wind band are: a computer, digital audio interface, mixer, two to four floor monitors, two speakers for the house, a small mixer, or in-ear monitor amplifier for the conductor, a pair of condenser microphones, headphones and enough microphone cables to cover the distance between the stage and placement of the mixer/computer behind the audience. It is important for the conductor become comfortable operating all of the equipment and to practice setting it up (see Appendix B). This will not only help save time in trouble shooting but also gives the conductor insight into rehearsing a piece and on how to communicate with the sound engineer or student assigned to help.

Chapter IV: *The Machine Awakes* by Steven Bryant

Steven Bryant describes his piece:

The Machine Awakes is the sound of something not human (but of human hands) - something not entirely organic, but most definitely *alive*—waking for the first time. From the opening swirling textures, we sense the first hesitant sparks of thought, attempting to find form and coherence. This new machine—sentient, aware—comes fully awake, possessed of emphatic self-determination and unfathomable purpose (Bryant, 2010).

Gorilla Salad Productions (ASCAP) published *The Machine Awakes* in 2012. It is dedicated to Arris Golden, Band Director at Gravelly Middle School in Cary, North Carolina, who led the commissioning consortium of twenty-one middle schools and high schools. He conducted the world premiere on May 10, 2012 at Cedar Ridge High School in Hillsborough, North Carolina. It is listed as Grade 2 to 3 and is included in the state festival list for the New Jersey Music Educator's Association (NJMEA) and the list for the St. Lawrence County Music Educator's Association, New York. The duration of this piece is five minutes (Bryant, 2012).

Composer Biography:

Steven Bryant was born in Little Rock, Arkansas in 1972. He is active as a composer and conductor. He is the son of a music educator and has played and studied saxophone as well as composition. He studied composition with John Corigliano at The Juilliard School, with Cindy McTee at the University of North Texas, and with Francis McBeth at Ouachita Baptist University.

Bryant has developed a substantial catalog of works including works for orchestra, band, chamber and electro-acoustic ensembles. He won the National Band Association's William D. Revelli Composition Contest for *Ecstatic Waters* in 2010 (electro-acoustic piece for wind band), *Suite Dreams* in 2008, and *Radiant Joy* in 2007. Bryant is also a founding member of the

composer-consortium BCM International with composers Eric Whitacre, Jonathan Newman, and James Bonney. He maintains an active website and blog where he posts updates, recordings, perusal scores, and news about his music (Miles, 2014, p. 496).

Technology and Rehearsal Challenges:

The Machine Awakes requires a very basic technological setup and integrates electronic sounds by providing a prerecorded soundtrack containing three separate cues or segments that can be played back or “triggered” individually at the appropriate time in the score. Bryant has developed a free, stand-alone application for the iPad, Android and computer (PC and MAC) platforms that makes it very easy and practical to play each of the cues. The audio engineer can simply press a button to play each cue at the appropriate time indicated in the score. Once the playback device is chosen, the sound from this device is connected (routed) to a sound mixer located out in the audience where the sound engineer can adjust the volume of the prerecorded track and balance it with the acoustic ensemble. From the mixer, the sound is routed to two speakers in front of the ensemble facing the audience. If the playback device is connected to a stereo input on the mixing console, then the mixer will likely preserve the stereo image of the audio track. Otherwise, if the playback device is connected to two separate input channels on the mixer, take note to pan the first channel all the way to the left using the pan knob and second channel all the way to the right. Choosing this forward placement of the speakers will require that floor monitors are added facing into the ensemble to facilitate the musician’s ability about hear, sync and follow the track. The mixer may also send the signal to a “hot spot” (speaker) for the conductor that can usually be mounted on a microphone allowing the conductor to easily adjust the volume to better hear and follow the track. However, with this particular piece, choosing to place the speakers behind the ensemble may be the best approach to blending and

integrating the track with the acoustic ensemble. This allows the conductor to better hear the balance and the audience to hear a more integrated sound. This would also eliminate the use of floor monitors and would be recommended if they were not available.

Rehearsal and Preparation:

The composer has designed three “cues” or segments of a pre-recorded track. The score indicates that the first two cues are “free” and not intended to be in sync with the acoustic instruments. The third cue provides a solid rhythmic track with a strong pulse that helps the conductor and ensemble to maintain vertical alignment with the track.

The first cue enters in measure two. The composer describes this section (measures 2-5) as a “swirling, chaotic, rising mass of clarinets” (Bryant, 2010). Bryant keeps the melodic ideas in the band simple, constructing them mostly in stepwise motion and repeating them frequently to make them more accessible to developing musicians. The electronic track moves at varying speeds and it is not metrically tied to the band. During this section, the ensemble is better served by watching the conductor closely and ignoring the electronic clarinet sounds coming from the track. This is an example of adding rhythmic complexity to a work that is beyond the skill level of the ensemble (Shapiro, 2010, p. 10).

The composer dedicates a staff in the score to notate the electronic track using standard musical notation. For example, the beginning of the first cue is notated by a trill on G3 followed by an ascending scale that ends with the trill on G4. This gives the conductor a clear marking of when the electronic track begins and ends (measure 5). Measures in which the electronic track is not playing are left blank in the score. The next prerecorded cue is indicated to enter in measure 8 and is similar to the first. For both of these two cues to be deployed or triggered at the appropriate time, the audio engineer sitting at the mixing console with the computer or iPad

needs to be following the conductor and the ensemble using a second conductor's score. This must first be worked out between the conductor and the engineer and prepared before rehearsals with the ensemble begin. Careful attention must be given by the engineer to balance the sound of the track with the ensemble (see musical example 4).

Musical Example 4, *The Machine Awakes*, Steven Bryant, mm. 1–5

Unlike the first two cues, the challenge with the third cue, which begins in measure 28 is that the “electronic groove” (as described by the composer in the score) is rhythmically inflexible. In preparing this section (measure 28 through the end of the piece) it may be wise to rehearse the ensemble with a metronome in order to help keep steady time before rehearsing it with the track. Most young ensembles will have the propensity to speed up this section as they feel the excitement of the track. The “electronic groove” provides a steady tempo using sixteenth notes. While this is clearly notated in the score using standard notation in the first three measures, the composer uses an arrow and text to describe the continuance of the groove. At measure 45, the electronic track continues the groove (which is no longer notated) and adds “deep percussive hits” to reinforce and sync with the bass drum and timpani (see musical example 5).

Musical Example 5, *The Machine Awakes*, Steven Bryant, mm. 28–36

The musical score for Musical Example 5, *The Machine Awakes*, by Steven Bryant, measures 28–36. It is written in 2/4 time and features five staves: Euphonium (Euph.), Trombone (Tba.), Electronic (Elec.), Timpani (Timp.), and Snare Drum (SC) and Bass Drum (BD). The Euph. and Tba. staves are mostly empty. The Elec. staff has a 'CUE 3' diamond and two annotations: 'Electronic groove begins...' and '16th-note groove continues'. The Timp. staff has a 'hard mallets' annotation and a 'ff' dynamic. The SC and BD staves have 'ff' dynamics.

In measure 49, the focus of the electronic track turns to reinforce the upper woodwinds and trumpets. Composers may choose to reinforce the bass line or other key instruments using an electronic voice to give the students a greater sense of rhythmic security and also a pitch reference to help with intonation. The notation of these lines also functions in much the same way as when composers include cues for other instruments into a part. They are meant as a reference point to help the ensemble stay together with the track (see musical example 6). Beginning in measure 53 the composer chooses to double the bass line in the composition to strengthen it and add stability.

Musical Example 6, *The Machine Awakes*, Steven Bryant, mm. 45–52

The musical score consists of seven staves. The Tuba part (Tba.) is in the bass clef and features a melodic line starting with a forte (f) dynamic. The Electronic part (Elec.) is in the treble clef and includes two distinct sections: 'Deep percussive hits (sync with Bass Drum and Timpani)' and 'Sustained string sounds, reinforcing the upper Woodwinds'. The Timpani part (Timp.) is in the bass clef and provides a rhythmic accompaniment. The Snare Drum (SC) part is in the treble clef and includes a 'choke' instruction. The Bass Drum (BD) part is in the bass clef and provides a steady rhythmic pattern. The Glockenspiel (Glock.) part is in the treble clef and features a melodic line. The Maracas (Mar.) part is in the treble clef and provides a rhythmic accompaniment. Dynamics range from piano (p) to fortissimo (sfz).

The recommended approach for rehearsing this piece is as follows. First, play the recording of the piece for the ensemble while they follow their individual part so that they become aware of how their part fits and how the electronic track contributes to the overall sound of the piece. Second, rehearse the ensemble as you would any other piece. Third, rehearse with a metronome, so that the ensemble gets used to playing with a track that has a fixed tempo; and lastly, rehearsing the ensemble with the electronic track. The conductor should be comfortable navigating the track to find rehearsal letter markings to know where to start and stop rehearsing. In the simplest of setups, the conductor plays the track from an iPad connected to a sound system in the rehearsal room with the speakers directly behind the ensemble. Depending of the volume needed for the ensemble to clearly hear the track, it may be necessary to give the percussionists or back row of your ensemble ear plugs to protect their hearing.

Chapter V: *Paper Cut* by Alex Shapiro

Composer Alex Shapiro writes:

What do teenagers like? Video games, TV and movies. What do all these media have in common? Music! I was thrilled to have a chance to add to the educational band music repertoire, thanks to the American Composers Forum's terrific *BandQuest* series. In my desire to compose something relevant to younger players, I decided to create a piece that sounds somewhat like a movie soundtrack, to which the musicians can imagine their own dramatic scene. I also thought it would be fun to make kids themselves part of the action and so *Paper Cut* has the band doing choreographed maneuvers that look as compelling as they sound. In fact, the band members don't even play their instruments until halfway into the piece.

Music isn't just melody; its rhythm and texture as well. The unusual element of the paper and the myriad sounds that can emerge from something so simple offer a fresh view of what music-making can be and opens everyone's ears to the sonic possibilities found among every day objects.

With a nod to environmentalism, *Paper Cut*, might even remind people to avoid waste and recycle. Players can collect paper that would have otherwise ended up in the trash and bring it to rehearsals. The piece might even be therapeutic, as students can take out their aggression by ripping up bad grades and even test scores.

Although *Paper Cut* was composed with middle schoolers in mind, it's also suited to more advanced musicians, since the paper techniques and the skill of playing against a prerecorded track are interesting for all ages. I'm delighted to introduce a new approach to concert wind band repertoire and I hope that conductors and band members have as much fun with the piece as I had creating it (Shapiro, 2010, p. ii).

The American Composers Forum commissioned *Paper Cut* (2010), which is part of the *BandQuest* series distributed exclusively by Hal Leonard Corporation. It is listed as Grade 3 and it is included in the music festival list for the St. Lawrence County Music Educator's Association, New York. The duration of this piece is five and one-half minutes.

Composer Biography:

Alex Shapiro was born in New York City in 1962. As a composer, she is known for her electro-acoustic music. She studied at The Juilliard School and Manhattan School of Music with Ursula Mamlok and John Corigliano. Shapiro has scored for feature films, television, and documentaries in Los Angeles. She was presented with the Mu Phi Epsilon fraternity's highest distinction, the Award of Merit in 2011 for her innovative use of new technologies in her

compositions. Shapiro is an advocate for other artists and has been active as the concert music representative on the American Society of Composers, Authors, Publishers, Board of Review and served on their Symphonic and Concert Committee. She served on the Board of Directors of the MacDowell Colony, and is past President of the Board of Directors of the American Composers Forum, Los Angeles Chapter. She has presented workshops on electro-acoustic music and social media at both the 2013 Midwest Clinic in Chicago, IL and the 2014 Texas Music Educators Association in San Antonio, TX (Shapiro, 2010, p. ii).

Technology and Rehearsal Challenges:

Paper Cut requires a slightly more complex (yet still accessible) technology component than *The Machine Awakes*. In addition to a mixing console and speakers, the technological requirements also include the use of a digital audio interface with at least four channels of output, two or more microphones (to amplify the paper sound effects used in the composition), and a computer with software capable of multi-channel playback (*Cubase*, *Digital Performer*, *Logic*). It is important to note that most free programs such as *Audacity* or *Garage Band*, are not capable of multi-channel playback. It is also recommended to place the mixing console and computer out in the audience/back of the auditorium so that the sound engineer can properly mix the electronic track and microphones volumes with the acoustic ensemble. Both software and audio interface must be able to support the playback of two stereo tracks: the pre-recorded electronics track that goes to the audience (passed through the mixing console) and the pre-recorded track with metronome click that goes to the conductor (directly from channels three and four on the audio interface). The mixing console can also further divide the audio track that goes to the audience and send the same signal to the floor monitor speakers surrounding the ensemble so that the ensemble can hear the track as they perform. The composer supplies both of these

stereo tracks and they must be imported into the software program and aligned so that they playback in perfect synchronization. Additionally, the conductor will need headphones to hear the second track containing the “click” metronome in order to help the ensemble sync with the pre-recorded electronic track. If the computer is placed close to the podium, the conductor may be able to use USB powered headphones, otherwise, they will need a separate personal in-ear monitor amplifier for the headphones or a small four to six channel mixer next to the podium. This gives the conductor the ability to control the volume of the click-track in the headphones. This personal mixer can also send the click track signal back to the drum set player to help him or her stay in sync with the track and the conductor. The headphones will need to be over the ear, closed back headphones such as studio headphones to isolate the track from the acoustic ensemble (same concept can be applied to the drum set player’s headphones). Some conductors will wear the headset over one ear (not both) to better hear the ensemble (see Appendix B). Earbuds allow much of the “outside” sound to interfere with the sound coming through the headphones making it less isolated and more difficult to hear.

Before rehearsals begin, it is important to make sure you have all of the necessary components for proper playback of the electronic track and also all of the correct and appropriate length of cabling. The various devices (mixer, audio interface, speakers, etc.) may not all require the same type of cable plugs and jack; you may need to use adapters. The most common plugs are: 1/4-inch TRS cables (similar to a guitar cable) and 3-pin XLR microphone cables. The digital audio interface also needs to be connected to the software. The software must be told which inputs/outputs are being used. Each digital audio software program has a place for “device setup” in which the audio interface being used can be selected and also a place where the “output” connections can be specified for each track. Once everything is connected and working

properly it is important that the software settings are saved and mixing and audio interface inputs/outputs are labeled and the cables are color-coded using electrical tape or colored rubber bands. All of this work on the front end will go to ensure that their signal path is easily traced and the set up is easily reproduced.

For ease of performance and rehearsal, it is important to have an audio engineer (can be a musician in the ensemble) that can help with managing the computer playback of the pre-recorded audio tracks. This person will also need to have a score and be familiar with how the pre-recorded track is integrated into the score. The score to *Paper Cut* makes it very easy to follow the pre-recorded track. Each rehearsal number has corresponding time markings with the track that are labeled in minutes and seconds. Some audio programs will allow you to “bookmark” each place in the audio track that corresponds with rehearsal letter. This is very helpful in rehearsal when the conductor needs to start at a particular section of the piece. Most audio software is capable of providing a timeline in minutes and seconds over the pre-recorded audio track. The composer also provides a staff for the electronic track in the score that is treated much like any other instrument with standard notation indicating melodic, harmonic, and rhythmic elements from the electronics track. Rhythmic cues are provided to help the composer and ensemble know what to listen for to stay together. Electronic sounds that cannot be fully notated are described using short descriptions above the track. For rehearsal purposes, the audio setup can be greatly simplified. All that is really needed is the pre-recorded track with click. The speakers can be set up on stands directly behind the ensemble (near the percussion section so that they can hear the pulse). This enables the ensemble to hear the track and stay in time with it. The full setup, including amplifying of the paper effects used in the composition, can be saved for the dress rehearsals.

Paper Cut opens directly with the electronic track. The conductor is provided with six free metronome clicks before the electronic track enters in measure one. This allows the conductor ample time to show a preparatory beat for the beginning of the piece. Beginning in measure two, the paper effects begin. They include: freely tapping fingers on a crumpled ball of paper, slowing tearing the paper, rhythmically tapping the paper, holding the paper by the edges and snapping it in rhythm, fast short rips, crumpling, crescendo rip, rubbing the crumpled paper ball on the floor, clapping with the flat sheet between palms of hands, and firmly tapping on the paper with one hand. It is best for the conductor and the ensemble to rehearse these paper sound effects individually and determine the proper technique for achieved the best sound out of each effect. This will help with uniformity of sound and also with keeping everyone in time. Based on personal experience, it is best to “work the paper” slightly before using it to perform by rolling it a couple of times in opposite direction so that it has more malleability. For consistency of sound, it is important that every musician use the same weight of paper (20lb copier paper is best). Each musician should start with three to four pieces of paper. If two microphones are available, you may consider placing them inside the ensemble seating setup and above the heads of the musicians so that they can pick up all of the paper sound effects. If four microphones are available you may place one each in the percussion, saxophone, trombone and clarinet section. During performance, the sound engineer will need to make volume adjustments and “mute” the microphone channels whenever they are not amplifying the paper effects. It is always recommended to mark in the score the volume number of the fader on the mixing console so that the engineer can quickly make necessary adjustments to get the same balance each time.

In measures 1-17, the paper effects are notated rhythmically (duration is notated in whole notes) and are easy to coordinate and align with the prerecorded track (see musical example 7).

Musical Example 7, *Paper Cut*, Alex Shapiro, mm. 1–6

The score for Musical Example 7 consists of five staves. The top four staves are for the Drum Set, Crash Cymbals, Snare Drum, and Bass Drum. Each of these staves has a cue box in measure 4 that reads: "CRUMPLED BALL: quietly tap fingers on ball randomly, and slowly raise above head" with a dynamic marking of *p*. The fifth staff is the Electronic Track, which contains a melodic line with a "bell-like sound" indicated by a dashed line and a slur in measure 5. The measures are numbered 1 through 6 at the bottom.

The composer provides musical cues in the electronics track to help the conductor and ensemble keep their place. For example in measure 12, the composer indicates, “Syncopated PULSE begins,” and in measure 16 four “Low hit on downbeat” (see musical example 8). The conductor may wish to have the ensemble mark these cues in their parts. Also consider rehearsing sections such as this without the pre-recorded track and with the help of a metronome so that the ensemble has practice keeping rhythmically accurate before putting this together with the track.

Musical Example 8, *Paper Cut*, Alex Shapiro, mm. 7–14

The score for Musical Example 8 shows the Electronic Track (El. Trk.) from measures 7 to 14. In measure 11, there is a "slurp sound" indicated by a slur. In measure 12, a timecode "00:38" is present, followed by the instruction "Syncopated PULSE begins". The score includes a treble and bass clef staff with various musical notations and dynamics.

In measure 18, the paper effects become more rhythmically complex and the ensemble may want to rush the rhythm. In measure 26 the electronic track foreshadows the next section of rhythmic paper effects played by the ensemble in measure 28 and the cues are also clearly marked in the score. The theme is played here by the electronics track in whole notes and half notes making it easier for the ensemble and conductor to align with the track. The conductor can point this out to the players to help give them a reference.

Measures 32-27 require much patience from the ensemble in crumpling and tearing the paper for the long durations indicated in the score. Careful attention must be given to making sure that the effects are performed slowly to fill the indicated time and to ensure that there is enough paper to tear for the duration of the entire effect. Again at rehearsal 37, we see the electronic track moves in half notes making the rhythm and pulse very clear to the ensemble. In each of the three previous sections there is an element of call and response between as the various sections in the ensemble alternate rhythms. Careful consideration must be taken to ensure that the composite rhythm of all of the paper effects remains even and with equal volume.

The first entrance with acoustic instruments begins in measure 53. The composer gives the ensemble a reference for tempo by using the electronic track to clearly mark the subdivision of the beat using an ascending two-measure sequence in eighth notes leading to the downbeat of measure 53, this also includes three beats of clearly marked eighth notes in the electronics track (see musical example 9). Here again, the overhead microphones should be muted during this section using the “mute” or the “on/off” button for the two channels on the mixer used for the microphones. These instructions should be written into the score to remind the engineer to do this.

Musical Example 9, *Paper Cut*, Alex Shapiro, mm. 50–54

Measure 53 is also where the drum set part is introduced. To help keep this part aligned with the band and track, it is recommended that the drum set player be given the track with the click to practice ahead of time and to have it going through a headset during rehearsal and performance.

The section between measures 53-71 alternates between 4/4 and 6/4 time signatures. The composer uses eight notes in the first measure of every 4/4 section to help give the ensemble rhythmic anchor to help them keep their place with the pre-recorded track. To preserve clarity and rhythmic precision (measures 35-71) over the pre-recorded track, it is important that the articulation by the acoustic instruments is not lost during this section.

In measure 72, the composer provides the musicians playing the sound effects on paper four measures of rest to give them time put down their instruments and to prepare for their entrance in measure 76. This is the same time that is given before the ensemble's entrance with acoustic instruments in measure 53. Measure 80 has the drum set part playing sixteen notes to help reinforce the vibraphone part and also to help the instruments sustaining whole notes with the subdivision. Measure 76 incorporates all three tonal elements used in the piece: prerecorded

electronic track, paper effects and acoustic instruments. The sound engineer and the conductor will need to work together to find an overall good sound balance of all three elements going out to the audience.

Chapter VI: *Coil* by Steven Bryant

Steven Bryant describes his piece:

Coil began when I took a Tesla Motors Model S electric car for a test drive. It's a fantastic car and a fascinating company, though I didn't want to depict the drive itself in music. Instead, it provided the spark to explore the company's namesake, inventor Nikola Tesla, and in particular the sonic possibilities of his famous Tesla Coils. These buzzing, intense sounds led to composing this groove-entrenched combination of the power of the symphonic band ensemble with abundant samples of actual Tesla Coils and other electrical sounds, performed by a keyboardist in the ensemble.
(Bryant, 2010)

Coil is a very rhythmic and gestural piece. The composer establishes a rhythmic groove that is repetitive and provides a call and response interaction between the band and the electronic sounds. It also introduces sound effects including flutter tonguing in the flute and trumpet parts, glissandi in the trombones, and various percussion effects, such as the use of sand paper, which mimic the sounds created by the electronics. *Coil* was commissioned by the Bishop Ireton Symphonic Wind Ensemble and conductors Randall Eyles and Gary Whaley in honor of the 50th anniversary of Bishop Ireton High School. The world premiere was given on October 11, 2014 by the Bishop Ireton High School Wind Ensemble. Gorilla Salad Productions (ASCAP) published *Coil* in 2014. It is listed as a Grade 3. The duration of this piece is five minutes.
(Bryant, 2010)

Technology and Rehearsal Challenges:

Composer Steven Bryant offers two different methods of integrating the prerecorded electronic sounds (track) with the acoustic instruments of the wind band. The first is much like the approach used in Shapiro's *Paper Cut* in which the prerecorded electronics track and accompanying click track are played on the computer using a digital multi-channel audio software program. Steven Bryant has preprogrammed the software program *Ableton Live* with

all of the sounds required in the piece. All the conductor needs to do is to download the work file for *Coil* and the free thirty-day trial version of *Ableton Live*. The software is configured to route the stereo track through channels one and two on the audio interface out to the mixer and channels three and four directly to the conductor's headset. This is the same audio configuration used in *Paper Cut* (with the exception of microphone use).

The second method is a bit more organic and treats the electronic sounds like another instrument in the ensemble and does not bind them to the strict time of the click track. It requires the use of an electronic keyboard controller (88-key electric piano with MIDI capabilities). This method does not require a digital audio interface, headphones, and personal mixer. For the MIDI keyboard to function properly, the following options must be turned on under the MIDI preferences: Track, Sync and Remote. The composer provides a "Keyboard (Electronics)" instrument part for the keyboard player using standard notation. Assigned keys on the piano trigger the electronic sounds. The performer does not have to do anything special other than load *Abelton Live* file provided by the composer and connect the keyboard to the computer and play the written keyboard part (see musical example 10).

Musical Example 10, *Coil*, Steven Bryant, mm. 1-11

NOTE: the notated pitches do not necessarily correspond to the pitches that will sound from the electronics. Do not use the notes in the Keyboard part as reference for the harmony of other instruments, or as a guide as to what the keyboard part will sound like. In other words, you can't play this on a Piano and expect it to sound right.

♩ = 134

* (NO SOUND)
Press this key before the piece begins.
This will insure the proper sounds are loaded for the beginning of the piece.

10

The composer explains, “the notated pitches do not necessarily correspond to the pitches that will sound from the electronics. Do not use the notes in the Keyboard part as a reference for the harmony of other instruments, or as a guide as to what the keyboard part will sound like.” (Bryant, 2014). It is important to note that the sounds will be coming out of the computer and not the keyboard. In fact, the volume of the keyboard itself should be set to zero. Each section in the score is clearly marked with measure numbers in *Ableton* to help facilitate rehearsals. The conductor should also mark these regions in the score and mark which key on the keyboard is specifically assigned to trigger sound patch (collection of electronic sounds) associated with each section.

There are several ways of connecting the computer to the sound system on stage. The simplest would be via a direct box that will take the stereo 1/8-inch output from the computer, amplify the signal and convert the connection into either an XLR microphone type cable or 1/4-inch cable that can be sent to your mixing console in the auditorium or directly to a sent to powered speakers on stage. The speakers can be placed behind the ensemble so that the entire ensemble can hear the electronic sounds and the conductor and audience can hear a more organic blend. This may require some minor adjustments to the EQ to help the electronics track sound clear to the audience especially as the band begins to play.

The keyboardist will need to practice the electronics part with the computer attached to become accustomed to hearing different sounds than the ones notated on the page. It is important that throughout the piece the keyboardist play the full value of each note to ensure that the electronic sound effects play properly. Throughout the piece, the electronics track provides many downbeats that coordinate with the sound of the Tesla Coil. The keyboardist will need to ensure that these downbeats are precise to help the rest of the ensemble to stay together.

The first section of the piece, measures 1-29, opens with the various parts alternating riffs and accented notes that must be clearly articulated so that they properly fit together. Careful attention must be given to accents and note lengths. This section also introduces flutter tonguing into the flute and trumpet parts. This effect must be practiced individually and together as a section to achieve both clarity and uniformity. The challenge will be achieving an immediate response of the flutter tongue to help make the effect very tight and clear.

The next section, measures 41-59, introduces a waltz-like section, which changes the feel of the piece and can make it challenging for the saxophones and oboes to stay together. Entrances that occur on the offbeat should be articulated cleanly so that can be heard clearly (ex. measure 46). The glissandi in the trombones should last for two beats and end together on beat four of measure 63 to help preserve uniformity and time. The section beginning in measure 75 is more lightly scored than the previous section and is less rhythmic and more reflective in nature. The patch change for the keyboardist that occurs on the downbeat of measure 77 happens quickly and must be played on time in order for the computer to load the new sound patch needed for the next section. In measure 92 the bass clarinet, bassoon and baritone saxophone enter with a new melody that is sparse and syncopated. Careful attention will need to be given to rhythm to ensure that this melody and the electronics align. The trumpet and first euphonium also enter with the same melody in m 106. The next section, beginning in measure 115, begins the recapitulation. The same strategies as the first A section can be applied here.

Chapter VII: Conclusion

Electro-acoustic music is one of the newest and most exciting frontiers for both the band and orchestral mediums. Composers are exploring new sonic colors through electronics that expand the traditional palette beyond that offered by acoustic instruments. As technology improves, composers are increasingly able to incorporate electronic sounds into their compositions in an easier, more organic, and seamless manner, thus reducing the challenges in rehearsing and performing this new repertoire. Conductors must acquire new skills such as learning how to conduct with a click-track and how to effectively rehearse and integrate the electronic sounds with the acoustic ensemble. They need to have appropriate knowledge and models illustrating how the technology elements work independently and how they are brought together.

In her interview, Alex Shapiro describes our current and future society as “visual,” one in which “everyone is staring at screens all the time.” She elaborates by saying that composers try to find “artistic experiences that will resonate with audiences” and “actively engage” them (A. Shapiro, e-mail interview, April 13, 2015). Steven Bryant describes in his interview, that, “more and more composers are incorporating electronics in their works. If you ignore it, it’s like ignoring an entire family of the ensemble” (S. Bryant, e-mail interview, April 23, 2015). He explains that in the future, we will “no longer talk about ‘electro-acoustic’ music,” but simply accept it as “a standard possibility of music, and no one bats an eye when a piece calls for electronics.”






REFERENCES

- Bryant, S. (2012). *The Machine Awakes*. [Band Score] Little Rock: Gorilla Salad Productions
- Bryant, S. (2014). *Coil*. [Band Score] Little Rock: Gorilla Salad Productions
- Bryant, S. (2015, April 23). Email Interview.
- Electro-acoustic. In *Oxford Music Online*, Retrieved April 10, 2015, from <http://www.oxfordmusiconline.com>
- Matthis, O. (1992). Varèse's Multimedia Conception of Déserts. *The Music Quarterly* Vol. 76 (4); 557-583
- Miles, Richard, (2014), Teaching Music Through Performance Vol. 10, pp. 396-397, Chicago Il. GIA Publications
- Saiber, A. (2007). The Changing Profession. *The Polyvalent Discourse of Electronic Music* Vol. 122(5)
- Schuller, G. (1965). Conversation with Varèse. *Perspectives of New Music* Vol. 3 (2); 32-37
- Shapiro, A. (2010). *Paper Cut*. [Band Score] Kentucky: Activist Music
- Shapiro, A. (2013). *Tight Squeeze*. [Band Score] Kentucky: Activist Music
- Shapiro, A. (2014). The e-Frontier: Electro-acoustic Music, Multimedia, Education, and Audiences in the Digital World (Part 1). *WASBE World* (2); 8-13
- Shapiro, A. (2014). The e-Frontier: Electro-acoustic Music, Multimedia, Education, and Audiences in the Digital World (Part 2). *WASBE World* (3); 8-12
- Shapiro, A. (2015, April 13). Email Interview.
- Stark, Christopher. (2015, April 29). Email Interview.
- Stockhausen, K., & Kohl, J. (1996). Electro-acoustic Performance Practice. *Perspectives of New Music*, Vol. 34 (1): 74-105
- Varèse, E. (1949). *Déserts* [Musical Score] New York: G. Ricordi.

APPENDIX A

Recommended Equipment

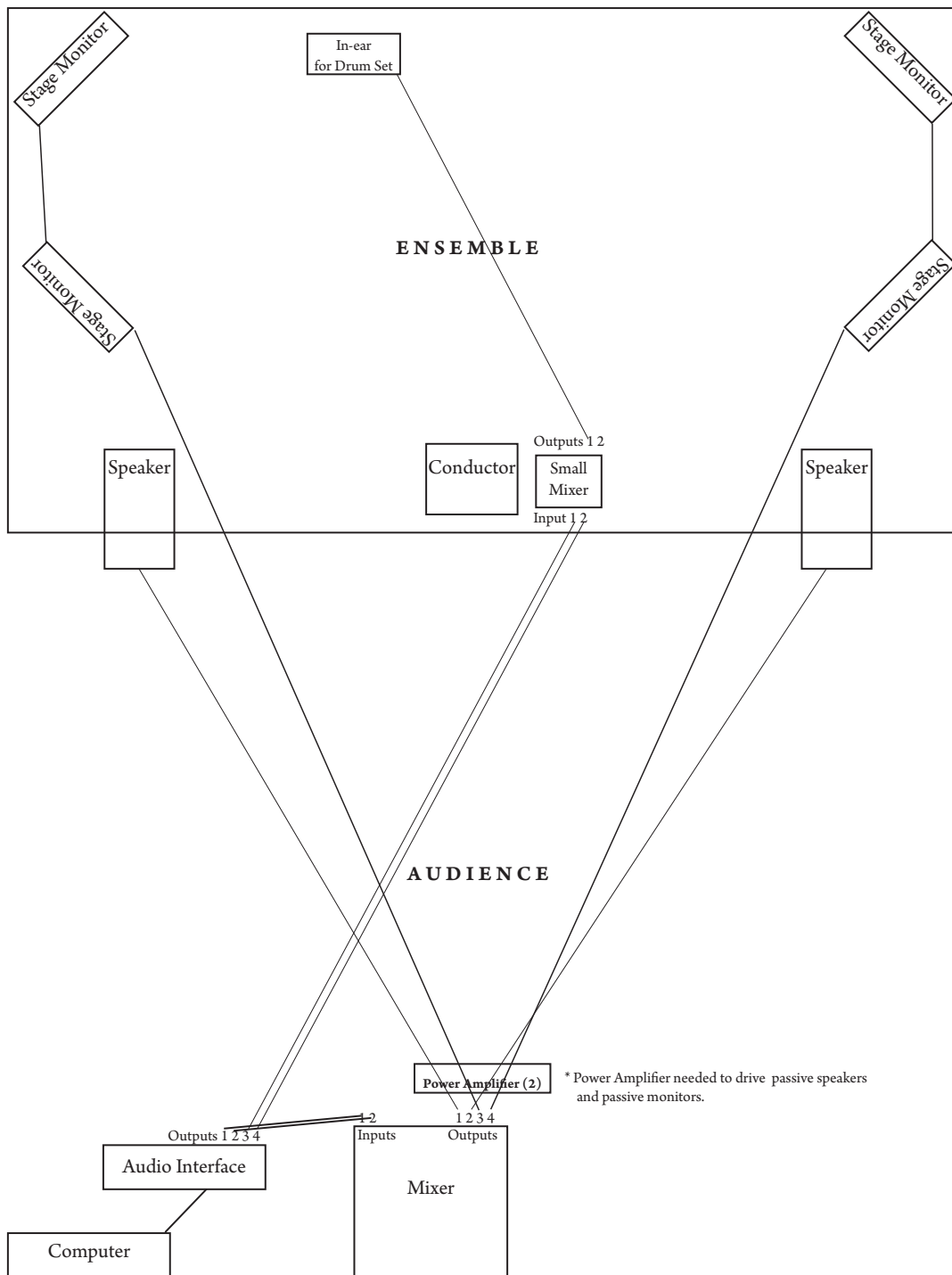
 <p>http://www.sweetwater.com/store/detail/UltraLite3Hy</p>	<p>MOTU UltraLite-mk3–Audio Interface</p> <p>*Used for <i>Paper Cut & Coil</i> (click track version)</p>
 <p>http://www.sweetwater.com/store/detail/CubaseA8Edu</p>	<p>CUBASE–Multi-channel Audio Software</p> <p>*Used for <i>Paper Cut</i></p>
 <p>http://www.sweetwater.com/store/detail/MG16</p>	<p>Yamaha MG16–Sixteen Channel Mixer</p> <p>*Used to mix full band with the electronic track.</p>
 <p>http://www.sweetwater.com/store/detail/NU4-6000</p>	<p>Behringer iNuke NU4-6000–Power Amplifier</p> <p>*Powers one stereo pair of passive speakers and one stereo pair of passive floor monitors. Check with your vendor to make that the amount of power is sufficient to drive your passive speakers</p>
 <p>http://www.sweetwater.com/store/detail/B205D</p>	<p>Behringer Eurolive B205D–Hot Spot Monitor</p> <p>*Hot Spot speaker for the conductor to monitor the electronic track</p>

 <p>http://www.sweetwater.com/store/detail/K12</p>	<p>QSC K12 Powered Speaker</p> <p>*Self-powered speakers can be used as both speakers and floor monitors</p>
 <p>http://www.sweetwater.com/store/detail/MDR7506/</p>	<p>Sony MDR-7506 – Closed Back Headphones</p> <p>*For the conductor listening to the click track</p>
 <p>http://www.sweetwater.com/store/detail/MG06</p>	<p>Yamaha MG06 – Six Channel Mixer</p> <p>*For the conductor to use beside the podium for volume adjustment of click track in headphones or hot spot monitor</p>
 <p>http://www.sweetwater.com/store/detail/PowerPlay1</p>	<p>Behringer Power Play P1</p> <p>In-ear Monitor Amplifier with Dual Inputs</p> <p>*For the drum set player to hear click-track</p>
 <p>http://www.sweetwater.com/store/detail/CleanBoxPro</p>	<p>ART Clean Box Pro</p> <p>Direct Box</p> <p>*Used to convert and route the sound from the computer to the mixer – used to amplify the sound from the computer in <i>Coil</i></p>

Images used with permission from Sweetwater.com

APPENDIX B

Diagram of Recommended Setup



APPENDIX C

List of Composers and Their Websites

Larry Austin	http://cemi.music.unt.edu/larry_austin/LAWorks.htm
Mason Bates	http://www.masonbates.com
Thomas Rex Beverly	http://www.thomasrexbeverly.com
Steven Bryant	http://www.stevenbryant.com
Jay Chattaway	http://www.barnhouse.com/composers.php?id=-201
James M. David	http://www.jamesmdavid.com
Donald Erb	http://www.presser.com/Composers/info.cfm?Name=DONALDERB
Jeffrey Hass	http://magneticresonancemusic.com/
Jerker Johansson	http://www.arrpubco.com/concert.html?author=40
Daniel Montoya	http://danielmontoyajr.com
Martha Mooke	http://www.marthamooke.com
Craig Thomas Naylor	http://www.swanriverpress.com
Alex Shapiro	http://www.alexshapiro.org
Christopher Stark	http://www.christopher-stark.com

APPENDIX D

List of Electro-acoustic Works for Wind Band by Grade Level

Title	Date	Composer	Gr	Publisher
Mothership (9:00) – <i>Rental</i>	2011	Bates, Mason	N/A	APHRA Music (Rental)
Sea-Blue Circuitry (13:00) – <i>Rental</i>	2010	Bates, Mason	N/A	APHRA Music (Rental)
Rusty Air in Carolina (13:00) – <i>Rental</i>	2006	Bates, Mason	N/A	APHRA Music (Rental)
X-ing (14:00) (solo electric viola and concert band)	2012	Mooke, Martha	N/A	Vener Music Publishing
Velocity Meadows (11:30) (solo oboe, chamber winds, electronics and video)	2015	Stark, Christopher	N/A	Sommerso Publishing
Augenblick (13:30)	2008	Stark, Christopher	N/A	Sommerso Publishing
Déserts (25:45) – <i>Rental</i>	1949/54	Varèse, Edgard	N/A	Boosey & Hawkes
Captain Video w/CD <i>optional</i> (3:45)	1982	Chattaway, Jay	1.5	William Allen Music Co.
Machine Awakes, The (5:00)	2012	Bryant, Steven	2/3	Gorilla Salad Productions
Garage Band for Symphonic Winds and iOS Devices (4:45)	2015	Montoya, Daniel	3	Underwater Theme Productions
Voices of Water and Spirit (8:20)	2000	Naylor, Craig Thomas	3	Swan River Press, Inc.
Paper Cut (5:00)	2010	Shapiro, Alex	3	American Composers Forum
Ringing Rocks (6:00)	2011	Beverly, Thomas Rex	3.5	Thomas Rex Beverly
Missing Man w/CD sound effects (3:00)	2005	Johansson, Jerker	3.5	Arrangers Publishing Company
Coil (5:00)	2014	Bryant, Steven	3/4	Gorilla Salad Productions
Immersion 3 mvmts. (23:00)	2011	Shapiro, Alex	4/5	Activist Music
Quadrants: Event/Complex No. 1 w/tape (9:00)	1972/ 1994	Austin, Larry	4	Peermusic Classical
Stargazing (3:00)	1966	Erb, Donald	4	Theodore Presser Company
Tight Squeeze (3:00)	2012	Shapiro, Alex	4	Activist Music
Lights Out (5:00)	2015	Shapiro, Alex	4	Activist Music
Ecstatic Waters (22:00)	2008	Bryant, Steven	5	Gorilla Salad Productions
Solace (14:00)	2012	Bryant, Steven	5	Gorilla Salad Productions
Purple Roofed Ethical Suicide Parlor, The (10:00)	1972	Erb, Donald	5	Theodore Presser Company
Lost In The Funhouse (13:39)	1994	Hass, Jeffrey	5	Ludwig Masters Publications
Liquid Compass (9:00)	2014	Shapiro, Alex	5	Activist Music

APPENDIX E

Interview Questions

1. What attracted/influenced you to composing music for electronics and wind band?
2. Why did you choose the wind band for your acoustic ensemble?
3. What makes this a unique combination?
4. Briefly explain how you treat the electronic track in your compositional process. Which comes first electronic track or acoustic instruments? Do you compose each independently? Does your approach vary from piece to piece?
5. Do you sample your sounds, create them using a specific software/synth program to create the sounds from scratch? Or are there other methods?
6. How would you classify the various methods of integrating electronic sounds in to a composition?
7. Integrating the electronic track: Do you have varying approaches to how you integrate the electronic track? i.e. prerecorded cues that are triggered at certain points in the score, a click track that underlies the entire piece, a MIDI-controller that triggers events in real time, or any other methods.
8. What is the benefit for using an electronics track?
9. Do you have advice/tips for performing/rehearsing Electro-acoustic works for wind band?
10. Would it be simpler to have a computer with preloaded software and interface available for rent by conductors?
11. Should music be “graded” in terms of the level of difficulty with regards to technology integration?

12. From an educational perspective, what do you see as the value of this new genre pedagogically and as it relates to student's future? What skills sets are students developing?
13. From a professional musician perspective, how do you quantify the value of combining the digital and analog worlds?
14. Do you feel that by adding an electronic element to your music new listeners have their own set of expectations of what they should hear or are they open-minded?
15. Do you feel professional ensembles are slow to adopt modern compositions, and how can we, as musicians, and promote the modern electronic compositions?
16. Why should conductors and educators perform music in this genre?
17. Briefly describe how new advancements in multimedia/social media are influencing changing music?
18. How do you see the electro-acoustic music for Wind Band developing? What's next?

Interview: Alex Shapiro, Composer

1. What attracted/influenced you to composing music for electronics and wind band?

I had been composing electro-acoustic chamber music pieces that feature a soloist for a long time, and I also used to compose film and TV scores which commonly combine synths and live players. I thought it would be amazing to pair the huge sound of a wind band with the all-encompassing sound of a stereo audio track, in a concert setting.

2. Why did you choose the wind band for your acoustic ensemble?

It chooses me! I'm very fortunate to receive many commissions in the field. Because there are so many very fine wind band composers, I gravitate toward electro-acoustic pieces because that's a voice that I can offer that very few of my colleagues explore. Every band commission I have is electro-acoustic now, and I sense that band directors appreciate this different, additional approach to creating repertoire.

3. What makes this a unique combination?

The potential for sheer sonic power, and most of all, the ability to create an entirely additional, separate, unique "section" in the band comprised of sounds that no one in the band can muster from their instruments (at least, without hurting themselves!).

4. Briefly explain how you treat the electronic track in your compositional process. Which comes first electronic track or acoustic instruments? Do you compose each independently? Does your approach vary from piece to piece?

As stated above, the audio track is as unique a section in the band as are the woodwinds, brass, or percussion. Everyone has their own color, and the audio I create is meant to add additional colors. I never try to emulate real instruments— that's what the real one are there for! Instead, I can devise textures and frequencies that can't otherwise be heard, and thus broaden the sonic scope of a piece of music.

Almost always, I compose everything vertically and simultaneously. Yes, I go back and flesh out the orchestration of the instruments and the track once a section is in place, just as most composers would do with any traditional arrangement, but I hear the gesture as one color.

I begin by thinking about my musical intentions for the piece, and spend a couple of weeks actively putting my sound palette together for the audio portion. I sample things, program things, choose sounds from my extensive existing libraries and then tweak them. It's rather like a chef preparing her ingredients and placing them in bowls on the kitchen counter, ready for when they might be used.

5. **Do you sample your sounds, create them using a specific software/synth program to create the sounds from scratch? Or are there other methods?**

All of the above!

6. **How would you classify the various methods of integrating electronic sounds in to a composition?**

Some composers like me prefer to work with prerecorded audio that plays back off of a laptop the same way every time (and probably won't crash in the middle of the concert!). Other composers like to use sounds played back live from an active program that's triggering the sounds in real time. And still other like everything to be live and interactive, where the audio is triggered by the instruments, or by movement, or lighting.

7. **Integrating the electronic track: Do you have varying approaches to how you integrate the electronic track? i.e. prerecorded cues that are triggered are certain points in the score, a click track that underlies the entire piece, a MIDI-controller that triggers events in real time, or any other methods.**

I use a prerecorded track that goes out to the audience, and also to the musicians on stage via monitors, plus a mix of that track plus a click track that goes to the conductor's earbuds.

8. **What is the benefit for using an electronics track?**

See my answers to #3 and #4.

9. **Do you have advice/tips for performing/rehearsing electro-acoustic works for wind band?**

While there are ways to cheat the tempo map here and there, for the most part a prerecorded track means that the pacing of the piece is unforgiving. So it's usually best for the ensemble to become familiar with the music at a slower tempo, if necessary, and then once things are solid with the musicians, the track can be added.

This being said, even with a click, there are many ways to add more musicianship and interpretation from the podium. A conductor can take a little rubato in one place, and make it up in the next; s/he can bring out certain elements in the phrasing, dynamics, and articulation, that will have a very distinct effect on the feel of the music, regardless of the existence of a click. Learning how to comfortably operate musically with this new tool just takes a little practice.

10. **Would it be simpler to have a computer with preloaded software and interface available for rent by conductors?**

Not for a composer like me who is fortunate to have performances virtually every day of the same piece! That would be a lot of computers :-). Instead, I offer a technical setup PDF that I put

together, with a lot of information that I update as needed. All the audio tracks are readily available for download from a private web page I supply the client, and all in all, it's really simple, one-stop shopping!

11. Should music be “graded” in terms of the level of difficulty with regards to technology integration?

I don't think that's necessary, because there aren't that many variables in EA music setups. As described in question #6, once it's known what format the composer has chosen, the setup is obvious.

12. From an educational perspective, what do you see as the value of this new genre pedagogically and as it relates to student's future? What skills sets are students developing?

Here is a section (used with permission), “Benefits to students,” from an extensive article I wrote in 2014 for the international band organization WASBE's print magazine, WASBE World:

In addition to the thrill of offering audiences a big, cinematic sound experience, electro-acoustic wind band pieces present many advantages to the musicians who brings the music to life, each of which is further amplified for younger, less experienced musicians who have yet to develop their range, breath control, intonation, and rhythmic sophistication.

The track can include frequencies beyond the range of the players:

It's important to compose music for younger players that is as compelling as music written for a professional ensemble. Some composers cite the inherent range limitations as one of the challenges of writing music for students, but I am not among them; there are sophisticated pieces at all playing levels that use an economy of notes. The advantage of composing a track is that we can provide the highest and lowest frequencies that students either can't yet manage, or that a band is simply missing in its instrumentation. It's not uncommon for a junior high school ensemble to lack a piccolo or a contrabassoon, and a composer can take that into account when creating additional frequencies in the track.

Additionally, for college and professional bands with a full complement of instruments, a composer can take the prerecorded electronic element into the sonic stratosphere or basement, far beyond the playable range of any instrument. Just as with acoustic orchestration, a wide use of registration brings with it an enormously expansive sound. Thinking like a recording engineer and spreading the location of these sounds by using panning, delays and other techniques, suddenly imbues the music with a powerful, otherworldly quality.

The track can include complex rhythms-- and improve morale:

A great deal of existing older band repertoire is written in stiff, sometimes plodding, regular meters that rarely change, and even more rarely are notably syncopated. In an electro-acoustic piece, even if the musicians are not yet capable of elaborate patterns, the track can provide a

wildly sophisticated approach to rhythm, while the notes played by the musicians fall on more predictable beats. The result is a piece that sounds far more mature than the norm for younger players, with the added bonus that students will feel accomplished and inspired by sounding a little better than they are!

The track can include a subtle melodic or rhythmic guide, and assist with intonation:

To support both the players and the band director, a composer can add a “guide track” that helps anchor the band to the track. It’s possible to include some of the melodic or bass lines and mix them at a lower volume than the rest of the soundscape, so that the audience won’t hear them, but the practicing musicians will. Another technique I use is to double some or all of an instrumental line with a unique sound of my own creation, including this prominently in the mix and thus bolstering the sound of the entire band.

The track can be made available to students so that everyone can practice with the music at home:

Students are eager to hear and absorb the audio track. The more they do so on their own, the better the rehearsals in the band room will be. I always encourage the band directors to share a private link with the ensemble.

13. From a professional musician perspective, how do you quantify the value of combining the digital and analog worlds?

It’s enormous, because of the increased scope of what a composer can envision and create.

14. Do you feel that by adding an electronic element to your music new listeners have their own set of expectations of what they should hear or are they open-minded?

My experience is that everyone is quite open-minded. In fact, we rarely indicate in the program whether a piece is electro-acoustic or not. If the music is good, the experience of the combination of live and recorded should sound entirely organic. In my scores, I indicate that the track and the band should be at the same relative volume level.

15. Do you feel professional ensembles are slow to adopt modern compositions, and how can we, as musicians, and promote the modern electronic compositions?

It varies by ensemble. Many chamber groups— particularly if they aren’t a standard, say, piano trio or string quartet with a ton of existing repertoire, are very interested in new works. Orchestras, by and large, sadly are less enthusiastic, and I have much to say about that!

The band world wins the prize for being the most supportive and enjoyable place for a composer to devote his or her efforts. Wind bands are actively seeking new repertoire, because they don’t have nearly as many years of it. They adore living composers! And because most bands are connected with schools or local communities, they have lots of rehearsal time and are devoted to getting a piece right. Or, in the case of younger players, as right as they are able :-)

My experience has been that no one has shied away from my music because it includes an audio track. If anything, this intrigues conductors and teachers, and draws them to the music.

16. Why should conductors and educators perform music in this genre?

Why *shouldn't* they? :-)

17. Briefly describe how new advancements in multimedia/social media are influencing changing music?

We are in a visual society now, in which everyone is staring at screens all the time. YouTube is the number one format on which people consume music (for better or worse, tinny speakers and earbuds be damned), and everyone's brains are becoming hard-wired to expect something to look at along with what they hear. As a result, composers like me give a lot of thought to the kinds of artistic experiences that will resonate with audiences raised in this new reality. It's not an either/or choice— there will always be a need for music—old and brand new— that asks the listener to simply be still and absorb it. But along side of this tradition, is one that I'm working to further, in which we actively engage many of the audience's (and, musicians') senses simultaneously. I find multimedia to be very exciting and alluring, and I don't think there's ever been a better time to be a composer.

18. How do you see the electro-acoustic music for Wind Band developing? What's next?

EVERYTHING! And that's what's so wonderful about this. As technologies continue to evolve, the sky is the limit. Or should be.

Interview: Steven Bryant, Composer

1. What attracted/influenced you to composing music for electronics and wind band?

I've always been fascinated with the sonic potential of electronic synths, recorded sounds, etc. My father was a band director, and I've grown up around the wind band, and have always enjoyed composing for large instrumental forces. The combination seemed inevitable.

2. Why did you choose with wind band for your acoustic ensemble?

Familiarity and opportunity. The wind band community is much more amenable to experimentation and afforded me the time and ability to try this out.

3. What makes this a unique combination?

You get the power and visceral energy of the wind band, plus the delicacy and nuance of the strings from a symphony orchestra, plus an entire world of unexpected sonic potential, all in one.

4. Briefly explain how you treat the electronic track in your compositional process. Which comes first electronic track or acoustic instruments? Do you compose each independently? Does your approach vary from piece to piece?

I compose both simultaneously. I treat the electronics as another family in the ensemble. I compose my music in *Digital Performer*, which allows me to mock up the acoustic instruments side by side with the electronic timbres.

5. Do you sample your sounds; create them using a specific software/synth program to create the sounds from scratch? Or are there other methods?

I collect sounds, and have a large archive of sounds from the last 15 years or more. For example, in *Ecstatic Waters*, I drew on those for some moments (such as the high-pitched whistle that comes in at the end of Mvt. III). In Mvt. II, I recorded a friend of mine on Trombone, Drew Leslie, and layered somewhere around 20 tracks of him to underscore the live Trombones. I've just re-recorded some additional Trombone timbres from Joe Alessi, as well. For Mvt. IV, I generated that groove in *Reaktor*, then chopped it up and reassembled it so the accents and pitches happened where I wanted. The chords in Mvt. V are layers of sounds from a synth called Omnisphere. I used a variety of sources, and spent some time going through various sounds and cataloging them according to how I thought they'd mesh with acoustic instruments (I made notes such as "this would work well with Harmon Muted Trumpets"). I assembled everything in *Digital Performer*, which I use to compose most pieces. I had all the electronic tracks next to a MIDI version of the band, so I could compose the acoustic and electronics sides simultaneously.

6. How would you classify the various methods of integrating electronic sounds in to a composition?

N/A

- 7. Integrating the electronic track: Do you have varying approaches to how you integrate the electronic track? i.e. prerecorded cues that are triggered are certain points in the score, a click track that underlies the entire piece, a MIDI-controller that triggers events in real time, or any other methods.**

For pre-recorded cues (such as Ecstatic Waters and the end of Solace) I use *Ableton Live*. With Solace, and subsequently Coil, I've been experimenting with breaking the sounds down into smaller chunks that can be played live by a keyboard player. I still use *Ableton Live* for this as well, though working on an app for Coil.

- 8. What is the benefit for using an electronics track?**

N/A

- 9. Do you have advice/tips for performing/rehearsing electro-acoustic works for wind band?**

Work on the acoustic-only portion first, obviously, but don't wait until the last day to incorporate the electronic elements. The ensemble should be able to hear and feel the electronic elements, too, so they can better integrate the overall sound.

- 10. Would it be simpler to have a computer with preloaded software and interface available for rent by conductors?**

It is, and I do. Performing groups rent it quite often (MacBook Air, MOTU 4Pre).

- 11. Should music be "graded" in terms of the level of difficulty with regards to technology integration?**

I don't think so – it's only going to get easier, and my goal is to make it transparent and "grade 1" for everyone for every piece, eventually. So I think it would be misleading, because technology as well as conductors' knowledge and experience are constantly changing.

- 12. From an educational perspective, what do you see the value of this new genre pedagogically and as it relates to student's future? What skills sets are students developing?**

Not sure I'd say it's a new genre – it's simply augmented large ensemble music. Pedagogically? Not sure how to answer that, though I'd hope it would provide an additional insight into how to blend and integrate disparate elements to form a coherent, whole, artistic work. Seems like that would be a useful, transferable skill.

- 13. From a professional musician perspective, how do you quantify the value of combining the digital and analog worlds?**

N/A

14. Do you feel that by adding an electronic element to your music new listeners have their own set of expectations of what they should hear or are they open-minded?

In the wind band world audiences generally haven't known what to expect, but have been almost uniformly enthusiastic afterward, which is gratifying. In the symphony orchestra world, there may be more caution, but I'm hopeful *Ecstatic Waters* will be met with the same sort of enthusiasm when the Minnesota Orchestra premieres it in May.

15. Do you feel professional ensembles are slow to adopt modern compositions, and how can we as musicians support and promote the modern electronic compositions?

Yes, but pro organizations are by definition businesses, and businesses are conservative and risk-averse. Education and awareness in the larger culture of who exciting and rewarding it can be to hear this music live is the key.

16. Why should conductors and conductor/educators perform music in this genre?

More and more composers are incorporating electronics in their works. If you ignore it, it's like ignoring an entire family of the ensemble.

17. Briefly describe how new advancements in multimedia/social media are influencing changing music?

No idea. I'd guess the ability to share in listening to works live will increase in quality, thus increasing audiences far beyond who's local to an ensemble.

18. How do you see the electro-acoustic music for Wind Band developing? What's next?

I expect (and hope) that technology will continue to become simpler and more powerful, to the point that we no longer talk about "electro-acoustic" music, it's simply a standard possibility of music, and no one bats an eye when a piece calls for electronics.

Interview: Christopher Stark Composer

1. What attracted/influenced you to composing music for electronics and wind band?

I grew up playing in wind ensemble (trombone), so I have an affinity for the ensemble, but I have always felt that it needed to update its repertoire to be in line with more contemporary trends. This is why I decided to add electronics.

2. Why did you choose with wind band for your acoustic ensemble?

The conductor at Cornell University at the time, Cynthia Johnston Turner, asked me to write for this combination.

3. What makes this a unique combination?

There aren't many pieces for large ensemble and electronics, so in that regard, it is unique.

4. Briefly explain how you treat the electronic track in your compositional process. Which comes first electronic track or acoustic instruments? Do you compose each independently? Does your approach vary from piece to piece?

I often experiment with electronic techniques, and then slowly infuse those techniques into my acoustic writing.

5. Do you sample your sounds, create them using a specific software/synth program to create the sounds from scratch? Or are there other methods?

For *Augenblick*, I sampled some of my friends playing individual notes, and then pieced them together in Logic and Max/MSP.

6. How would you classify the various methods of integrating electronic sounds in to a composition?

I'm not sure I know the answer to this question. In my opinion, there are endless ways of using technology to augment acoustic instruments in live performance.

7. Integrating the electronic track: Do you have varying approaches to how you integrate the electronic track? i.e. prerecorded cues that are triggered are certain points in the score, a click track that underlies the entire piece, a midi-controller that triggers events in real time, or any other methods.

I use pre-recorded tracks in *Augenblick* that are triggered by someone with a laptop and the Max/MSP software. There is a brief section where a click track is sent to the conductor's earpiece because the cues have to line up exactly with the ensemble. I have also used live processing, like in my work *Velocity Meadows*, where delays and harmonizers are added to individual instruments.

8. What is the benefit for using an electronics track?

Less can go wrong with a pre-recorded track, and it's easier for somebody without in-depth knowledge of the electronic equipment and programming to perform.

9. Do you have advice/tips for performing/rehearsing electro-acoustic works for wind band?

All pieces require a different approach, but in general, I find that many ensembles don't study the electronics as seriously as they study the acoustic instrumental parts. A very keen musician should be running the electronics, and they should be added early in the process, which makes blend and balance more integral and manageable.

10. Would it be simpler to have a computer with preloaded software and interface available for rent by conductors?

No.

11. Should music be "graded" in terms of the level of difficulty with regards to technology integration?

I don't think any music should ever be graded.

12. From an educational perspective, what do you see the value of this new genre pedagogically and as it relates to student's future? What skills sets are students developing?

I think most students know more about technology than their teachers, so it's difficult to use it pedagogically. If anything, it helps to keep the teachers in touch with new technology.

13. From a professional musician perspective, how do you quantify the value of combining the digital and analog worlds?

I see it as just another instrument, so I don't associate more or less value with it.

14. Do you feel that by adding an electronic element to your music new listeners have their own set of expectations of what they should hear or are they open-minded?

I find people are more open-minded at concerts that include technology. Most people love new technology, and their expectations for what the concert "should be" are often thwarted by the use of technology. I find audience members who expect something to be a certain way (which you often find at acoustic concerts) are the most difficult to please.

15. Do you feel professional ensembles are slow to adopt modern compositions, and how can we as musicians support and promote the modern electronic compositions?

Perform it well. Too often contemporary music isn't performed with the same fervor as "the classics," so it comes across lukewarm.

16. Why should conductors and conductor/educators perform music in this genre?

Because they like it. If they don't like it, don't play it. Play what you like.

17. Briefly describe how new advancements in multimedia/social media are influencing changing music?

This is too big of a question for a short response, but I do see a shift towards many composers viewing musical building blocks as *samples* rather than starting with individual notes, rhythms, etc.

18. How do you see the electro-acoustic music for Wind Band developing? What's next?

Video