

Levels & Leitmotifs: Creating an Immersive Experience Through Video Game Music

by

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Dedication

This work is dedicated to all students pursuing the art of music, looking to learn more about the magic music creates each day—especially those who are seeking a career in video games! I hope these interviews and song analyses inform you and educate you, and I hope the refiner’s fire within you never burns out. Make something amazing.

Acknowledgements

To my family and friends: Thank you for supporting me and loving on me throughout the making of this project. Through your encouragement and advice, I met some truly amazing people and gained knowledge that will prove invaluable in the coming years.

To each person I had the honor of interviewing: Each one of you is exceedingly kind and I'm thankful you had time to spare with me, an aspiring young musician. Your wisdom has reshaped my view of my career, my dreams, and my priorities for the better. Thank you.

To Dr. O'Brien: Thank you for your support and encouragement. Your kindness has helped me through the struggles of class and thesis alike. I hope you continue to make students feel valued and inspired for years to come.

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To myself: Thank you for hanging on through the tough times and putting in the hard work necessary to build my future. Future me appreciates it.

Abstract

The goal of this creative project is to provide a foundation for all musicians interested in video game music. The people I interviewed all possess unique talents, and their range of expertise covers a wide array of skill sets. Their wisdom should be of great help to all beginners. They offered advice not only for the development of musical talent but also for managing oneself financially and as a business. The song analyses are intended to be used as examples of basic songwriting principles, including a few that specifically apply to video game music.

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List of Terms

Chiptune: A style of music designed to sound like music originally created on vintage video game hardware, such as the Super Nintendo Entertainment System, Atari, Sega Genesis, etc.

Composition: A work of music, literature, or art.

Composer: A person who writes music, especially as a professional occupation.

Emulation: An imitation, v. to strive to equal or excel.

Ludomusicology: A field of academic research and scholarly analysis focusing on video game music, understood as the music found in video games and in related contexts.

Leitmotif: A recurrent theme throughout a musical or literary composition, associated with a particular person, idea, or situation; AKA the musical equivalent of a literary motif.

Playtester: An employee hired by a game developer to search their game for bugs and exploits, as well as to provide feedback.

Timbre: The aural texture of a sound, quite literally “how it sounds.”

Waveform: A visual representation of a soundwave, often manipulated through digital signal processing.

Introduction

This thesis project is a deep dive into the world of ludomusicology, that is, the study of video game music. Unlike modern music, video game music is fluid. Video games are a fully interactive kind of media—the player (the person controlling the game) can do any action that the game’s programming allows. There are questions that even the game developers cannot answer, such as: “How long will it take for the player to move through this area?” or “What will the player choose to do in this situation?” Because of these fundamental issues inherent in video games, composers needed to get creative. They learned how to create music that matches the location the player is traveling through, how to shape their music’s sound to match the level of intensity the player is feeling at a given moment, how to make the player feel as if they are in the digital world the game is revealing to them, and so much more. As Michael Sweet, film scoring associate professor at Berklee University, describes it, “This interaction between player and story in video games creates a reactive feedback loop, with each one affecting the other... This active interaction between the game and the player also affects how the music must change and react to player decisions. The music must be written in such a way that it is adaptable based on the player interaction” (Sweet). The job of the video game composer is similar to that of an artist: to pull the audience in, to immerse them in the world that is being shown to them, and to manipulate/enhance their emotions to make that experience profound, memorable, and intriguing. From my viewpoint, video games are a medium that can impact individuals more strongly than any other; they are an emulation of reality itself.

Ludomusicology is a field that is only approximately 20 years old. However, a great amount of study has been put forth to analyze the relation between video game music and other contemporary forms of music. According to Iain Hart, graduate student of the Sydney Conservatorium of Music at the University of Sydney, Australia, "...familiar concepts from other disciplines need to be tested thoroughly as they are applied in this new field. At times, this may seem like the re-treading of old ground, but it is an essential step in providing and proving the foundations upon which to build a nascent discipline" (Hart 274). Essentially, we must investigate older, established concepts from similar disciplines and reevaluate them in a new light. Some concepts will remain while others will need to be discarded or modified to fit this new medium.

This field greatly interests me because of this active reimagining of everything we know about music. As ludomusicology is still in its early stages as a field of study, I could even have the opportunity to contribute to the development of its ideas, concepts, and principles. This thesis project is my immersion into something that is musically new. I am greatly excited to see what new composers can contribute to the world of video game music and sound, and I'm certain these interviews will help them see things from a professional's perspective. It is my hope that these resources kickstart their journey into the video game music field. Once they begin their career, I don't want them to just be able to write good music.

I want them to create memories.

Methodology

This thesis project consists of three sections: a series of interviews with professionals in the game music and audio industry; a collection of four original musical pieces using my own knowledge and the knowledge I gained over the scope of this project; and this written work. The interviews were conducted from July of 2019 to September of the same year, for a total of six. I obtained a consent form from each interviewee. The individuals interviewed are Chris Rickwood, Ben Burnes, Paradoxigent, Matthew Rauber, Jack Reynard, and Ariel Gross. The four songs were composed from September of 2018 to October of 2019. The four songs are titled “The Battle of Spring and Winter,” “Haunt Jaunt,” “The Ancient Sunken City,” and “Golden Retriever Rush.” Each song was written to serve a specific purpose in a fictional video game.

Summary of Interviews

I conducted a series of six interviews for this thesis project; I interviewed people who worked with music or audio for video games. Through these interviews, I gained wisdom and helpful advice relating to sound design and composition, as well as guidance on using a variety of audio technology, applying for a position in game audio, understanding the priorities and needs of an audio director, managing myself financially as an individual business and freelance composer, pricing my work well to potential clients, and maintaining relationships with peers through integrity and empathy. I spoke to professionals working on AAA video game titles and independent artists/engineers working on small-scale games with independent game developers.

Because I have a background in both music composition and audio production, I have the unique opportunity to pursue a career in either. Thanks to the people I spoke to for this project, I confidently believe that I will take the right first steps towards a successful career and be more prepared than most people entering the field. Here is a summary of the knowledge I learned and the insightful conversations I enjoyed with these wonderful, intelligent music and audio professionals.

Chris Rickwood

My interviewing process began in early July with Chris Rickwood, composer for AAA video game titles such as Smite and indie titles such as Brawlhalla, Paladins, and the Orcs Must Die series. He personally invited me to his home in Suwanee, Georgia, where he has created an in-house music studio where he does all of his work. As a freelance composer, Chris has to be able to cover a wide array of genres. Versatility is a critical skill to land gigs as a video game composer; to work on this skill, Chris offered a helpful suggestion:

The most efficient way to broaden your understanding of music, according to Chris, is to spend a few minutes transcribing and analyzing music every day. That means finding a section of music that intrigues you (no matter how small), annotating the music note by note, and deciphering its structure and role in the song. Over time, this practice helps your brain recognize patterns in music, which can be used as tools in your own composition.

When it comes to writing a new song, Chris believes the most important element is its overall sound, also known as timbre (pronounced “tam-ber”). Through experimentation of different musical ideas and communication with the other team members involved in the making of the game, a consensus should be reached on what musical timbre best fits the themes and mood of the game. Only after this point should the second-most important element be considered: tempo. Tempo should be fine-tuned to match the pace of the game. If a tranquil nature setting was accompanied by a fast-tempo orchestral suite, it would be difficult to truly absorb the scenery. A higher tempo would be best suited for a setting with an equally high amount of energy, such as a snowstorm.

On the topic of surviving financially as a composer, Chris advised seeking sources of income that persist beyond the completion of a soundtrack. The most common forms of this are royalties (receiving a percentage of profits from the game), content creation (such as publishing videos on YouTube or live-streaming the compositional process online), and licensing (working to maintain copyright and control of your musical works beyond the scope of the game, permitting you a chance to earn more money from the music on your own time).

On the topic of landing jobs, Chris recommended doing research prior to accepting any positions. This allows you to determine if you would work well with the team involved and how much they'll be expecting you to charge for your music. By being informed, you can decide whether to say "yes" or "no" to each opportunity with more certainty. Out of all the topics Chris and I discussed, two that were of great importance were learning to price your services well and learning when to turn down jobs, even when they seem appealing at first glance. Chris strongly believes the integrity of the team on the job is more important than the amount of money to be earned from it.

Ben Burnes

Ben Burnes was the first composer I spoke to who had only worked on smaller games created by independent game studios. Ben, like most small-time composers, only writes music part-time. His day job isn't music-related; however, he told me he'd love to make music his primary source of income. Ben's musical specialty is the ambient genre, which focuses on creating an atmosphere without using a prominent melody or sense of harmonic progression. The benefit to this type of music in video games is that it can evoke emotions out of the player without drawing attention to itself, which could detract from the story the game is trying to tell or the experience the game wants to provide through non-audible means. Music, after all, is not the only way to shape a game's themes or moods; when the player is not focused on what they hear, they will naturally focus on what they can see. Ben's ambient style allows players to pay more attention to the art style, animation, and—most importantly—writing.

Ben hones his musical talents through rigorous, consistent practice. Each Wednesday, Ben live streams himself composing a new song in only two hours. Ben told me this has been a great exercise for generating ideas. Because his creative process can be watched online live by viewers of his streams, he also has the opportunity to teach less experienced musicians his thoughts as he is writing. On the subject of reaching out to the video game music community, Ben had some unique advice: in order to be more well known by the game developers who could potentially offer jobs, trying picking up game development yourself. If you have the time to make your own small games and write music for them, you'll be able to practice your musical skills while also learning more about how developers think. This, in turn, will give you a stronger ability to communicate

clearly with game programmers and directors. This will ensure that your music contributes as much as possible to the ideas the game is trying to present. Soft skills are paramount in working in a team environment such as game development, Ben believes.

In closing, Ben stressed with me the importance of holding on for the long haul. In his words, “Be aware that this is a marathon, not a sprint.” He reminded me that it can take years to be recognized and that it’s important to make sure you love what you do. Otherwise, you likely won’t last in the video game music industry long. In order for a musician to guarantee continuous progress in their talents, he explained that the important area to focus on is not the music itself but the process by which the music is written. Maintaining good habits that promote writing music often and with great care is essential to long-lasting passion as a creative.

Paradoxigent

Paradoxigent is primarily an animator, currently completing college. From my interview with him, I gained a unique perspective of a creative artist who works in multiple forms of media simultaneously. Paradoxigent combined his talents for animation and music composition with a school project, where he directed an animated film and also wrote the music for it. He is also an independent game developer in his free time, giving him another medium to couple with his music. During our time together, we discussed the different ways he's combined music with his other interests and the knowledge he's gained from working in a variety of creative fields. Additionally, we spoke of the importance of soft skills and of pricing your services fairly, for your own needs.

Matthew Rauber

Matthew is a sound designer in France who works with virtual reality games. Sound designers are audio engineers who combine and manipulate sounds from large libraries of sound effects and various audio clips in order to create unique and compelling sounds that convey information to the player. Matthew's current project is a virtual reality game that takes advantage of a real-world space. The team constructs a maze-like arena with walls that contain electronic components, allowing them to synchronize the real-world location of the walls with the digital location of the walls in the virtual space. Players use a VR headset and controllers to move through and interact with the virtual space. The players will track each other down in the maze and, similar to a game of laser tag, aim their weapons and fire at one another with virtual lasers.

Matthew's role on the team is to ensure that the immersion the players experience is not detracted from due to unrealistic audio. Using sensors in the gear the players wear on their legs and arms, the team is able to track each player's movements with high accuracy. Matthew described to me how he experimented using this functionality to detect when a player would take a step, which would then be accompanied by a footstep sound effect. The timbre of the footstep sound would be dependent on the surface the player was walking on (wood, stone, glass, metal, etc.) and the space the player was present in (outside in the open, in a hallway, in a large room, etc.). While footstep sound effects are common practice in most video games and are widely regarded as one of the most basic ways to make a player feel present in a game's environment, Matthew ran into a couple issues:

First, there was a time delay between when a player would take a step and when the footstep sound effect would be heard. This was due to hardware latency (the length of time lost due to processes being run by hardware or software), which couldn't be avoided. Second, the sensors placed on the players' legs could not differentiate between tiptoeing, shuffling, or running. In other words, they could not detect how hard the player was stepping—they could only detect when a step of some unknown force was taken. Having the same loudness for each footstep sound effect was found to feel unrealistic, as the volume would not always match the ferocity of a jog or the quick, light movements of changing the position of one's stance.

As I stated previously, the purpose of sound effects is to make a game's setting more immersive and realistic and to provide the player with information regarding the status of their health, the location of their enemies, or the current state of the gameplay. Another struggle Matthew described to me had to do with a miscommunication of this information. According to a survey given to their playtesters, the sound effects accompanying death in-game were completely unnoticed. This is an issue, as this means the player is not noticing when their character has died.

When a player suffers a death during gameplay, they are shown that they died using the following: audibly, a low pass filter is switched on, which cuts out all high frequencies in the audio, leaving only lower frequencies. Additionally, certain sound effects the player might normally hear are muted. The goal of these two effects is to pause the player's immersion temporarily and grab their attention so they notice that their character has run out of health. Visually, the game produces some glitchy visual effects and the color scheme temporarily turns to grayscale. When the communication issue was

discovered, Matthew tried changing what audio effects were used and which sound effects were played upon death, but the changes did not seem to solve the problem. Eventually, it was discovered that making more noticeable visual effects (such as tinting the screen a shade of red and dimming the brightness upon death) made the players connect the death sounds to their death itself. It turned out that they had noticed the sound effects signifying death in-game but had not realized that they were supposed to indicate they had died until the idea was communicated better through visual adjustments. From this, the team learned the importance of each bit of information working together to communicate to the player exactly what is needed at each moment in time.

Matthew uses audio middleware software called Wwise to automate audio effects in the games he works on. Middleware is software designed to act as an accessible interface for a central system of a game. In this case, Wwise is a programmable audio tool that can act as an intermediary between a sound engineer and a game's sound engine. Using this software, Matthew can automate many things. For instance, he can program the sounds around a player to automatically decrease in volume as the distance between the player and the source of the sound increases and vice versa. This is also the system through which the low pass filter mentioned earlier is implemented. According to not only Matthew but also other people I have interviewed, knowledge of audio middleware like Wwise is expected at most game audio jobs.

Jack Reynard

Jack is a great example of an amateur composer in their 20s; he holds two jobs while also writing music on the side. Through his perspective, I was able to gain insight into how my own career as a composer may look after graduation (how exciting). During the interview, we discussed how to create music as an individual who isn't yet well known in the industry. I learned what to expect as an emerging artist through Jack's experiences.

The genre of music Jack specializes in is chiptune music. Composers creating chiptune music work with two primary limitations: First, they can only use simple waveforms (such as sine waves, square waves, triangle waves, and saw waves) and samples that have been captured at an exceptionally low sample rate. Second, they can only use a limited number of voices simultaneously. These limitations come from a dedication to match the limitations of the vintage hardware chiptune imitates. Depending on which retro game hardware's sound chip is being emulated, the type of waveforms available (and how many are available of each type) can vary.

Keeping track of all the rules by which these composers work can be tricky. Thankfully, there's music software designed to do just that: Famitracker. This is the tool Jack works with. Famitracker's name is derived from "Famicom" (also known as the "Family Computer"), which is the name of Nintendo's original video game system, and "tracker," which refers to a type of composition that is based on programming notes into a system that repeats indefinitely. Working with Famitracker requires combining knowledge of composition techniques and vintage hardware. Famitracker is designed to

limit composers in the same fashion as the retro game systems, thereby allowing them to create music that is an authentic representation of that era.

Ariel Gross

Ariel Gross is the president of Team Audio and the founder of the Audio Mentoring Project. Team Audio is a group of audio professionals that provides a variety of services to development teams, including handling all audio development for a game, filling niche holes in preexisting teams, assisting other audio service companies with their work, and facilitating a game developer's audio hiring process. Chris Rickwood, whom I also interviewed, is a member of Team Audio's leadership team. The Audio Mentoring Project is a group of veteran game audio developers volunteering their time and expertise to mentor less experienced, aspiring audio developers. The organization's goal is to invest in the next generation of game audio developers by connecting them to other developers and helping them form long-lasting, mutually beneficial relationships. This service is offered to anyone interested—for no cost.

While discussing compositional techniques, Ariel pointed out to me that, while some people just try to write songs for their game, it is always important to remember that music in games should be modular in nature. The state of the game constantly changes due to player action, and the music written for the game must react to those changes. It is important to keep in mind what sort of game states the music will need to be used for before the composition process even begins. Although music is a form of artistic expression, it is not what the artists wants to do but what is best to reinforce the desired identity of the game that is most important. At the beginning of a new project, it is helpful to consume all information about the game as possible to understand the vision of the rest of the team. From there, it is best to consider how many central themes need to be composed and in how many ways variations of those themes will also be needed. For

instance, one could compose a theme for the protagonist, a theme for the world of the game, and a theme for the antagonist. The protagonist's sidekicks can utilize a variation of the protagonist theme, the antagonist's minions can utilize a variation of their boss' theme, the world theme could have variations based on the level of intensity the player should feel or the current physical state of the world itself, and so on. In the end, the music should help tell the game's story.

Ariel also gave me a great amount of insight as to how game audio veterans can gauge the skill level of a composer and how well their work synergizes with the desired identity of the game being developed. When helping a company hire a composer for their game, Team Audio reaches out to people who may be a good fit for the team and/or game and provides a small collection of concept art, story, and other elements that contribute to the game's themes and identity. With this given information, the composers are then asked to write a small, 10-second musical phrase that they believe best encapsulates the feeling of the game. More than anything else, Ariel looks for themes that are simple and can be understood by most people. After this first round of interviewing is complete and a few have been selected from the crowd, the remaining composers are asked to create alternate versions of their musical phrase. One of the alternate versions is a trailer theme, which shows how the theme can be used in high intensity situations, and the other is an atmospheric theme, which shows how the theme can be used in low intensity situations.

As an audio director, Ariel spends most of his time managing creatives rather than being creative himself. His job is to review content, provide feedback, and ensure the concinnity of the overall work (how well the different aspects of the game reinforce and support one another) by keeping in close communication with the other directors. One of

the most important aspects of his position, in his opinion, is encouraging and motivating all of the creatives and informing them about story elements that relate to their work so that they understand where their work fits in the big picture.

Summary of Musical Analyses of Original Compositions

In this section, I will describe in detail each of my four musical compositions, commenting on compositional techniques utilized and thematic intentions realized through musical features. One of the pieces (“Haunt Jaunt”) is designed to loop indefinitely. This is an integral facet of the video game music genre, as the music must be designed to function in an environment where the composer has no control over how long their piece is heard. Most pieces are designed to give thematic context to an in-game environment or circumstance; the player determines when to move from one environment or circumstance to the next. Since a player can theoretically never progress the game’s current state to a new one, music must be able to similarly last forever. “The Battle of Spring and Winter,” “The Ancient Sunken City,” and “Golden Retriever Rush” follow more traditional composition techniques and has a designated beginning and ending. This type of music still has a place in video games, primarily where the player’s input does not affect the length of time a song is heard. This can include cutscenes (where the player is shown a short video clip providing pertinent story information, usually accompanied by a more cinematically arranged piece of music) or credits sequences. Often times the option to skip such sequences is included, so that the player is not burdened by a mandatory waiting period when they could be enjoying the gameplay instead. The game developer must account for players that view these sequences in full, however, so the music is still needed. “The Ancient Sunken City” and “Golden Retriever Rush” could both potentially be looped with a couple minor changes in order to fill other roles.

“The Battle of Spring and Winter”

This piece is designed to symbolize the transition from winter into spring. The place in a video game where this piece would likely fit best is in a cutscene, perhaps one that takes place at the start of the game and is intended to establish a tone or theme that will be reinforced throughout the length of the game. Utilizing an orchestral range of instruments is a great way to provide the player with emotional clarity; that is, suggesting to the player which emotions would be most appropriate for engaging with the experience the game offers. An orchestra is one of the most versatile tools for a composer, thanks to its broad range of instruments and the nearly infinite ways they can be used together. Different groups of instruments (woodwinds, brass, strings, percussion) provide different tools for a composer to use.

Brass instruments such as the trombone, trumpet, tuba, and French horn sound bold and, at times, abrasive (although the French horn can be an exception). In this piece, I used a tuba; tubas draw attention to themselves easily, so I made sure that the volume of the tuba was kept low. I did this to give the listener a greater ability to hear the melody and harmony. While the bass line is the basis for harmonic movement, it is not where I wanted to draw the focus of my listeners. I avoided the use of other brass instruments because their timbres were not conducive to the theme I was establishing.

Woodwinds instruments such as the clarinet, flute, oboe, and piccolo sound elegant and full of emotional content. In this piece, I used a piccolo because it is the lightest-sounding woodwind instrument. I used its chilly timbre to help create the illusion of snowfall. I also used a bassoon, which has a lovely timbre that's well suited for a wide range of emotional contexts.

Strings instruments such as the violin, viola, cello, and bass can be played with different techniques (primarily pizzicato and legato), which allows them to fill many roles. In this piece, I used a full strings section at the start to fill chords, a cello throughout the latter two-thirds to fill the bassline, and a violin in the latter half to serve as a melody. Although piano is technically a percussion instrument, I will include it in this category, as well, since it serves the same purpose as most stringed instruments. Like them, the piano can be played with multiple timbres and can serve as a bass, harmony, or melody line. In this piece, the role of the piano shifts between these three or fulfills multiple of them simultaneously.

Percussion instruments such as the snare drum, bass drum, and cymbals are used to establish rhythm. In this piece, the meter of the rhythm shifts from duple to triple, and this is reinforced by the percussion instruments. On the topic of rhythmic elements, the tempo of the piece also fluctuates over the course of the piece. This is used to control the intensity of the piece and to emphasize certain musical phrases.

The song's structure is composed of 4 sections. The introductory section is used to establish a sense of snowfall, using the piano to suggest the frigid atmosphere. This idea will be emphasized in the second section, using the piccolo. This song begins with a lighter perspective of winter, one filled with life. The second section develops upon this perspective, adding block chords on the piano and introducing the piccolo part to make the sound feel fuller. This pleasant sound is only present for a short amount of time, however, as the end of this section marks a transition into the relative minor key of Db major, Bb minor. This transition is emphasized using the momentary rest and rigid rhythm.

After a solo piano section, the song moves into its latter half. The third section begins with a rapid piano run accompanying an equally quick flute arpeggio. The flute is intended to mimic the sound of harsh, strong winds, characteristic to that of a blizzard. These two parts, along with the added percussive instruments, place this section in stark contrast with those before it. This section represents the bleaker side of winter. This idea is developed further with a violin melodic phrase that hands off the melody to the bassoon shortly afterwards. As the section's intensity is brought slowly down and then to a standstill through the descending inversions of the minor tonic chord, a change to the sound is made once more. The final section climatically reintroduces instruments used in earlier sections and raises the overall dynamic level of the piece to its highest point, transitioning from the relative minor key of Bb minor back to the original key of Db major. This transition is accomplished using a French augmented sixth chord. The tempo is slowed from the start of this section to the finish, slowing exceptionally at specific points to draw out the impact of the chords. The song ends with a triumphant major chord, signaling to the listener that the winter storm has passed and that spring has arrived.

“Haunt Jaunt”

This piece was inspired by the Halloween season, written to provide a sense of fun while also sounding a little haunting. The song is approximately one minute in length and is designed to loop indefinitely. This aspect of the piece is important, as video game music often must be able to last forever. The player determines when a song ends or transitions, so music for video games must be versatile and reactive to the player’s actions.

For this song, I created original synthesized sounds using software called Serum. With it, I created a white noise riser and two bass synthesizers. One of the bass synthesizers uses a low frequency oscillator (LFO) to open and close a low pass filter. This makes the dynamic level of the sound rise and fall in time with the music. I also created a theremin-like sound using another synthesizer. The sound of a theremin is very airy and never fully settles on a pitch. This volatile and breathy timbre makes it sound very ghost-like in the upper range. This synthesizer, along with the organ, reinforces the spooky tone of the song.

The introduction’s instrumentation consists of a piano and a Serum synthesizer I created prior to this project. The synthesizer has a spacey, open sound that is used for the same reasons as the theremin-like synthesizer. The piano establishes the key of D minor and sets up the tone for the rest of the song. The spacey synthesizer supports this tone, matching the minor tonic and shifting its sound between the left and right ears. This is a technique known as panning, where a sound is placed on a spatial spectrum from left to right. Shifting the panning constantly in this way makes the synthesizer sound like its drifting to and fro like a wayward spirit.

The meter of the song shifts from duple to triple halfway through and emphasizes this change with the introduction of the violin and the bass synthesizer with the LFO, along with the reintroduction of the piano. The violin and theremin synthesizer use similar musical phrases that play off one another. The two instruments are separated via panning as well, with the theremin synthesizer placed on the left and the violin on the right.

The flow of the song is suddenly interrupted with a rest followed by a series of syncopated chord hits using the German augmented sixth chord. This chord was one of the most dissonant chords I could have used here; my goal was to surprise and perhaps startle the listener. The rhythmic and harmonic dissonances reinforce each other and draw out the dissonance for an extended period before resolving to the tonic chord in second inversion, played by the organ. The tempo dramatically slows at this point, causing the listener to completely lose their sense of timing. The harmonic progression is lastly resolved to the major tonic, rather than the minor tonic; this is an example of a Picardy third. After the chord is held for an adequate length of time, the drums reestablish the tempo and transition back to the section following the introduction.

“The Ancient Sunken City”

This song is intended to create a specific feeling rather than accomplish a musical feat or tell a story. The piece is designed to create a feeling of weightlessness and wonder, as if the listener is exploring the ruins of an ancient underwater city. The two synthesizers used in this song were both crafted in Serum. The sound of the synthesizers is thanks to a reverb plugin that emulates a large space. Additionally, the sound is entirely “wet,” meaning it does not contain any of the original sound but only the reverberations of it. The resulting timbre is very spacious, as if the song is being performed in a large concert hall. The openness of the sound is intended to suggest an equally open space, such as the great span of the ocean or the deep reaches of space.

The tempo of the song is extremely loose, with each chord lazily drifting into the next. The rhythm pushes and pulls at regular intervals, emphasizing the large chords and the prominent dissonances found throughout the piece. The primary sources of dissonance in the piece are appoggiaturas and suspensions. The notes of the chords are often played repeatedly so their dynamic levels rise and fall, mimicking the movement of the sea. The synthesizers slowly fade in with each new note (using a long attack time), making this effect easy to achieve.

The opening phrase of the piece utilizes a pentatonic scale with ascending and descending runs. The pentatonic scale, used in traditional Eastern music, has an airy quality to it. This contributes well to the atmosphere established by the instrumentation and rhythm. The introductory phrase ends with descending variations of the tonic, completing with a prominent tonic chord that establishes the key even more greatly. The rest of the piece follows typical harmonic progressions with added color through the use

of dissonance with non-chord tones. The piece ends with a dramatic lead up to the final tonic chord, emphasized with a suspension.

This piece would best be used in a game that seeks to immerse the player in a beautiful world. The song has qualities that are beautiful as well as sorrowful, creating a large amount of emotional depth. While some video game music is designed to entertain, much of it is used to communicate a specific idea or setting. This piece is an example of composing for such a purpose.

“Golden Retriever Rush”

This song’s purpose is to create excitement and to provide the player with a rush of energy. The song begins with a riser leading into the opening riff, consisting of chords that fade in and out and are panned to the left, a syncopated melody and harmony that’s panned to the right, a bassline that steadily supports the upper range content, and a drumbeat that pushes the momentum of the song forward. This energy is pushed even higher using a rapid tempo of 150 beats per minute and the use of pitch bend and vibrato in the melody, which gives it a little extra character. Each instrument used in this introduction—as well as the rest of the piece—is a basic waveform that embodies the chiptune style. While I did not hold to the same restrictions as most chiptune artists (such as the number of voices I used), I only used instruments reminiscent of vintage video game hardware. The waveforms I used include square waves, triangle waves, and pulse waves. I also used white noise as a hi-hat and riser, as well as a sampled bass drum and snare drum.

After the introductory phrase, the bassline walks up and down the scale using octaves and stepwise motion, maintaining the energy of the song while the other instruments aren’t present. After a couple of note runs with various instruments, serving as small musical flourishes to keep the listener entertained, the primary melody finally enters. Partway into this section, a momentary rest is inserted, which surprises the player for a moment before continuing onward with the same breakneck pace. Throughout this section, the melody continues to be enhanced with vibrato and pitch bends of varying degrees.

The pacing of the piece slows down a bit during the third section, playing block chords for a full measure at a time. The melody isn't as prominent in this section, so the intensity is held onto through syncopated rhythms in the drums and the chords. Following this section (which only lasts eight measures), the song transitions into a section that strips away the melody and chords entirely, leaving only the bass and percussion. This breakdown section is kept interesting by using more musical flourishes that slowly build in intensity up to the beginning of the final section. The transition into the final section is emphasized by taking away the percussion while the final flourish, a downward glissando, plays. The final section consists of rising block chords and bass accompanying the melody in its climb to the final tonic chord. The lead instrument is given a ping pong delay effect (an echo that bounces between the left and right ears) on the final note to keep the song from ending too abruptly.

Conclusion

This thesis project was quite a journey. Each interview conducted, song composed, and book read taught me more about the world of video game music. I'm certain that my passion for this unique art shows in my writing! One of the most important things I gained from my interviews was an understanding of what it means to be a professional or an expert. Before I talk on that point, however, let me make something clear: Each musician is a human being that possesses the same social anxieties as all of us, so spending time worrying about appearing inept or inexperienced when speaking to one is pointless. Many of them are happy to help others who share their passion for music! I talked to amateurs and professionals alike. Despite the difference in background and experience, both groups treated me with genuine kindness. This is the lesson I learned: not to be afraid of reaching out to professionals. I encourage all musicians to seek mentors and join communities of musicians so that they can have a plentiful resource of wisdom and guidance and they grow in their knowledge.

It is my goal that my academic pursuit of video game music doesn't end here. As the field of ludomusicology evolves, I hope I can contribute to its growth. I'm planning to continue to seek opportunities to teach about video game music in my spare time. I will be doing what every composer must do: handling life as it comes, writing music as much as possible, and waiting patiently for opportunity to arrive.

Appendix A: Original Compositions

Four original pieces were composed for this thesis project. All four tracks can be heard through one of the following options:

- Physical CD
 - Located at the MTSU Honors College thesis library, provided with the physical copy of this thesis project.
- Online streaming/download
 - Available on my personal Bandcamp page for free. Can be streamed on the website or downloaded onto your computer.
 - <https://josiahediger.bandcamp.com/album/levels-leitmotifs-the-album>

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