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EXPLORATION IN JAZZ COMPOSITION

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Abstract

A vast majority of listeners define “jazz music” as the straight-ahead, hard bop sound characterized by the Miles Davis Quintets of the 1950s and 1960s. Since the release of pivotal records during this time period, the façade of jazz has generally remained unchanged despite the invention of many different styles. Similarly, the styles of hard bop guitarists Wes Montgomery and Kenny Burrell still significantly inform the voices of modern jazz guitarists. How does the evolution of rock and roll music (a guitar-driven genre) since the hard bop era inform modern jazz compositions? How does the thought process of a guitarist translate to arranging parts for brass, woodwinds, and the jazz rhythm section? This creative project aims to explore the aesthetics of jazz composition in the present day through the languages of hard bop, modal, fusion, and Latin jazz. Over the last year, I have researched and studied jazz styles, incorporating them into my own creative works. I have composed five jazz compositions with lead sheets, assembled a jazz combo, recorded these pieces on an EP, This is the Thing!, and performed these pieces live with the group. My narrative account of the project accompanies the EP, which is the principal “thesis” of this project.
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Historical Review

Prior coursework in the form of MUSIC 007— The Evolution of Jazz—provided essential background knowledge of the many musical movements that modern jazz has experienced. Although jazz has only been in existence since the early 1900s, numerous advancements have pushed the harmonic and stylistic limits of the genre, creating a large, diverse melding pot of recordings. Because the collection of influential jazz recordings is so large, this project focuses on post-bop modern jazz styles. Specifically, these genres are hard bop, modal, Latin jazz, jazz-rock fusion, and ballad style.

Before bop music became “popular” among jazz listeners, jazz was dominated by big bands (groups of ten or more musicians) that performed swing music. This music became the most popular jazz recordings of the twentieth century because its loose feel attracted millions of dancers (Gridley 99). As a result, improvisations became inconsequential in many groups, as many listeners and concert-goers only valued the performances as dance music (Gridley 124). Great composers and bandleaders such as Duke Ellington and Count Basie rose to prominence with big bands during this era and hired many musicians that would be crucial to jazz’s future growth.

Bebop marked a cataclysmic shift in jazz music by realigning many jazz musicians’ goals from providing entertainment to exploring harmonic innovation. Swing-era sidemen Charlie Parker, Dizzy Gillespie, and Thelonius Monk became inspired by the more harmonically rich improvisations of performers like Lester Young, Coleman Hawkins, and Johnny Hodges and began to meet at Minton’s Playhouse in New York City in the late 1940s to experiment with the possibilities that these performers were alluding to. As a result, these music “experiments” lacked the rhythmic predictability of swing music, favored a harsh, biting tone, and focused on lengthy, progressive improvisations (Gridley 197). Even the few popular tunes that these performances included rarely included a vocalist and became disguised with frequent substitutions, changing chords in a piece to alter the tonal characteristics of it, further alienating fans of the swing-era sound. As author Ted Gioia states in The History of Jazz, this was a revolution created by sidemen. While the increased complexity of bebop was displeasing to listeners, many young jazz musicians embraced the new harmonic and rhythmic inventions, cementing its influence in the jazz tradition.

The term “hard bop” is used to describe a broad spectrum of jazz recordings. Mark C. Gridley claims that hard bop is an “extremely hard-driving later development with roots in bop” that commonly relied upon original chord progressions and improvisations that deviated significantly from those of bebop musicians (Gridley 230). Despite this, there are four different definitions that are interchangeably used to describe this stream of music. As mentioned in the abstract, the hard bop recordings of Davis’ First and Second Great Quintets have come to represent the mainstream “sound” of jazz music in the present day. This could possibly be attributed to the popularity of tunes selected, as his collection of critically acclaimed Quintet records from 1956 rely almost completely on jazz standards. Gridley might draw a connection to the “unmistakable sound” (Gridley 263) of placing Davis’ cool and detached improvisations against the inventive and volatile playing of tenor saxophonist John Coltrane and later Wayne Shorter. Others may point to the fact that Davis consistently organized “bands of key innovators at early moments in the development of bop, cool jazz, modal jazz, and jazz-rock fusion” (Gridley 262). In any case, hard bop—or “straight-ahead” jazz, as it’s known today—is something of a de facto standard in contemporary jazz.
Modal jazz presents a unique challenge for composers and soloists alike because of its focus on static harmony. Whereas bebop relies on chromaticism and the rapid change of chords that do not resolve to the tonic (the ii-V progression implies the tonic without including it), modal jazz restricts musicians to the seven scale tones contained in the musical mode of choice. Saxophonist Jimmy Heath comments on this, citing the “absence of the final cadence of ii-V-I” (Kahn, Kind of Blue 70). John Coltrane—who played tenor saxophone on Miles Davis’ *Kind of Blue*—pushed the concept even further than Miles with his Classic Quartet recordings for the Impulse! label. Coltrane commented on the difficulty of modal improvisation in 1959, saying that he “could not find anything good to stop on” (Heath, 94) during his improvisations in live performances of songs like Davis’ “So What.” Whereas Charlie Parker’s open challenge to “use any note against any chord” (Gioia, History 188) defined bop, Bill Evans written challenge to “play in the sound of the scales” (Kahn, Kind of Blue 70) changed the mindsets of jazz musicians, requiring them to rethink the note-chord relationships of a jazz piece.

Latin jazz is a diverse subgenre that merits study because its influence in jazz has been felt since the 1940s. Cuban influences have been evident in jazz music since the early 1900s, first combining improvisations into performances in the 1920s (Gridley 410). Before fusing with American jazz, Latin music was primarily dance music, emphasizing predictable rhythms and using improvisations as decoration, much like swing music. The 1940s saw an increased popularity in Afro-Cuban music as bebop and Cuban music began to mix, causing bandleaders to begin bringing timbales, congas, and other auxiliary percussion on tour (Gridley 411). Some of the most critically acclaimed Latin jazz recordings of the period were those of trumpeter Dizzy Gillespie and conga player Chano Pozo on Gillespie’s *Afro* album. Latin jazz remained popular in the 1960s as the cool jazz musicians embraced the sounds of Brazilian bossa nova music (Gioia, History 261). Even today, groups like Buena Vista Social Club and crossover acts like Tito Puente and Mario Bauza keep a Latin influence relevant in the jazz world. These recordings all mark a unique stream of jazz music—built from “straight” eighth notes—that prefers brevity, establishing polyrhythm, and featuring multiple layers of accompaniment rhythm (Gridley 412). This is a stark contrast from the harmonically dense and un-danceable bebop of Charlie Parker’s “Anthropology.” As a result, it took a long time for Latin musicians and jazz musicians to “learn how to coexist without friction” (Hellmer 157). The high-intensity polyrhythms required of a Latin jazz head present new challenges to the jazz composer and arranger.

*Jazz-rock fusion,* or simply “fusion,” became the largest influence on contemporary jazz since the 1960s, making it an essential part of the modern jazz musician’s toolbox. Conceived by, yet again, Miles Davis and brought to life on 1968’s *In a Silent Way,* fusion marked the successful marriage of progressive rock music and Davis’ lengthy, modal explorations. As proof, Davis states in his autobiography that the early fusion recordings were inspired by, “James Brown, the great guitar player Jimi Hendrix, and […] Sly and the Family Stone” (Davis 292). While the harmonic and melodic characteristics of fusion may have been based in commercial accessibility instead of the highbrow tradition of bebop before it, fusion introduced “a new area of exploration and experimentation for jazz musicians” (Gioia, History 326) through the new capabilities of electronic instruments. These traditions are carried on today, as many jazz artists in the new millennium such as guitarist Charlie Hunter, trio The Bad Plus, and Grammy award-winning bassist Esperanza Spalding have been involved in fusion based recording projects.

The dominance of electric instruments in fusion music further advanced the guitar’s role in jazz music, making it one of the premier solo instruments. John McLaughlin’s playing on Miles Davis’ fusion records—particularly *In a Silent Way* and *Bitches Brew*—opened the floodgates for guitarists to enter the jazz realm, building upon the freedom Charlie Christian had proposed in the bebop era. Since these records, guitarists George Benson, John Scofield, Pat Metheny, Larry Carlton, Robben Ford, Mike Stern, Larry Coryell, and countless others have risen to prominence. Many of these guitarists even worked with Davis himself (as seen in Table 12.2 on page 262 of Gridley’s *Jazz Styles*). As a modern guitarist, studying these works reveals further applications of jazz harmony to the guitar’s mechanics.
In addition to these names, many other respected rock guitarists entered the jazz realm as a result of fusion’s popularity in the 1970s. One of the most notable, Jeff Beck, followed up his critically acclaimed blues-rock record *Truth* and a stint with famous British invasion band The Yardbirds with *Blow by Blow* and *Wired*. The latter album even went as far as including a fusion-tinged version of Charles Mingus’ “Goodbye Porkpie Hat.” Similarly, Carlos Santana left his Latin-infused psychedelic rock experiments temporarily in favor of collaboration with John McLaughlin on 1973’s *Love Devotion Surrender*. The album notably featured interpretations of Coltrane’s “A Love Supreme” and “Naima” that feature intense rock-inspired solos by both. In the present day, rock guitarists have made a jazz influence more common, as heard in the recordings of modern virtuoso Derek Trucks, who frequently performs Mongo Santamaria’s “Afro Blue,” as well as other Davis and Coltrane standards. Fusion’s prominent influence on guitarists since the 1970s presents the need to have a working knowledge of jazz harmony, as many respected rock guitarists continue to move away from the I-IV-V progression.

The ballad style of playing requires improvisers to be competent in fast and slow applications of bebop harmony. A ballad in jazz music can be defined simply as “a slow piece” that is not a blues form (Gridley 479). We need only listen to the original bop recordings of John Coltrane to hear the dichotomy between slow and fast tempo jazz pieces. His up-tempo numbers like “Giant Steps,” “Impressions,” and “My Favorite Things” all feature a ferocity and rawness (especially on live concert recordings). By contrast, we can listen to two of his finest ballads, “Naima,” from *Giant Steps*, and “In a Sentimental Mood,” from 1962 collaboration with Duke Ellington, *Duke Ellington and John Coltrane*. The same Coltrane tenor sound is there, but there is a more profound sense of introspection, sensitivity, and phrasing, as compared to the dense “sheets of sound” that Ira Gitler famously named in a review of Coltrane’s playing.
Challenges of Defining and Composing Jazz

Composing in these major post-bop movements requires a look at the common elements that hold them all together. Jazz music is improvised, and “being original is very important to jazz musicians” (Gridley 8). The need for originality has propelled the creation of so many different styles of jazz, mostly because relying upon stylistic clichés is frowned upon. Evidence can be found in the nickname “Bird brain,” which is bestowed upon those saxophonists that replicate too many of Charlie Parker’s licks in their own solos. While pushing towards new ideas, the jazz musician still strives to create emotionally moving, harmonically rich improvisations.

Jazz recordings also possess “swing feeling.” General swing feeling is characterized by a constant tempo, cohesive group sound, and a rhythmic lilt to the performance (Gridley 9). Admittedly, this is a very vague qualifier of music. Jazz swing feeling builds upon these concepts by also requiring “an abundance of syncopated rhythms” and a swing-eighth note rhythm (the first of an eighth-note pair receives more than half—up to two-thirds—the value of a quarter note) throughout the piece (Gridley 9). In addition, jazz swing feeling requires a constant alteration of tension and relaxation in the music (Gridley 10). Some of these jazz styles, such as fusion and Latin, favor a straight-eighth note feel. Not surprisingly, there is considerable disagreement about the definition of jazz.

Many critics and historians qualify these recordings as jazz, prompting the discussion of what defines a jazz recording. Marc C. Gridley, author of the textbook, Jazz Styles, offers four potential definitions. They are:

1. Jazz is any recording that is associated with jazz tradition.
2. Jazz music conveys swing feeling.
3. Jazz music must be improvised.
4. Jazz music must be improvised and convey swing feeling.

Looking at these definitions, it is apparent that none are all-encompassing. As Gridley points out, the first definition falls prey to circular logic; we must only call a recording jazz for it to be jazz. In addition to this, there are far too many accepting criteria for something to be associated with jazz tradition. Many recordings possess a bluesy feel, contain common jazz instrumentation like the saxophone, and/or feature syncopated rhythms, yet they bear almost no resemblance to the recordings discussed in MUSIC 007. Definition two fails to include fusion recordings and 1960s and 1970s avant garde music. Music such as that on Bitches’ Brew does not possess the swing-eighth note feel of earlier jazz, yet is always improvised. This reveals the weakness of the third definition. Such is the case of new age pianist George Winston, who despite being self-proclaimed “not jazz” and not using swing feeling, regularly improvises during performances. What of other styles of music too, such as rock and traditional music from India and Africa, which also regularly feature improvisations? Even within the recordings identified above, multiple studio takes reveal little deviation between improvised solos. This music is not improvised, yet contains elements consistent with jazz tradition. Finally, looking at the fourth definition, a tune like Duke Ellington’s “Transblucency” presents a challenge in that it neither swings nor features improvisation as anything more than accompaniment. Despite this, Duke Ellington may be one of the names most synonymous with jazz. As proof, Stevie Wonder professed his love of Ellington via millions of home stereos—“the king of all Sir Duke”—on his best-selling Songs in the Key of Life.
The examples above only represent popular examples of the discrepancies that exist amongst these definitions. As jazz continues to fragment into new styles, it causes us to question whether or not we need a label for this collection of recordings anymore. Is jazz an obsolete qualifier of this particular music?

Much to the above question, jazz currently exists in a state of transition. As students of MUSIC 007 will attest, there are a plethora of different jazz styles in existence today, all of which are not “popular music.” Despite this, one genre—smooth jazz—represents the best-selling style yet. Its de facto leader, saxophonist Kenny G, is a twelve times platinum certified artist according to the Recording Industry Association of America (RIAA). Fortunately or not, this commercial success comes with the compromise of post-bop jazz’s progressive ideals. This betrayal—and musicians like guitarist Pat Metheny treat it truly as such—of jazz’s forward-thinking ideals has inspired a neo-traditional/neo-classical movement in modern jazz. Propelled by Wynton Marsalis, head of Jazz at Lincoln Center, this group of musicians receives the most media attention, but never earns substantial record sales. As a result, they prevent jazz from shifting far away from the straight-ahead sound of hard bop. Unsurprisingly, the bestselling non-smooth jazz record is the 1997 remastered edition of Kind of Blue (certified three times platinum). The only other RIAA certified platinum jazz records are Time Out (Dave Brubeck), Bitches Brew (Miles Davis), Heavy Weather (Weather Report), Futureshock (Herbie Hancock), Headhunters (Herbie Hancock) and What a Wonderful World (Louis Armstrong). All of these artists were already prominent jazz musicians by the 1960s.

This stagnation creates a unique paradigm for preparing the next generation of jazz musicians. As a result of jazz music’s ever decreasing commercial viability, many performers have taken collegiate level teaching positions to continue their music careers. For example, music students would not be surprised to find former Coltrane bassist Reggie Workman lecturing them at the New School of Manhattan in New York or hard bop guitarist Kenny Burrell at UCLA. Simultaneously, the current number of high school and collegiate level jazz students is the highest it has ever been (Gridley 424). The torch is being passed as the next generation of musicians is in training. With this abundance of new talent studying jazz in a climate with no commercial pressures—jazz recordings contributed to less than two percent of total U.S. record sales in 2003 (Gridley 424)—it is particularly exciting to wait for the new direction in jazz. What stylistic elements will define this new stream of music? How will modern jazz interface with popular culture in the near future? This project aims to begin exploring these questions.
Literature Review

As a hopeful member of the new class of jazz musicians and composers, I undertook an intense study of Richard J. Lawn and Jeffrey L. Hellmer’s *Jazz Theory and Practice*. This primer built upon the basic theory knowledge I obtained from MUSIC 008 (Rudiments of Music) coursework, allowing me to apply it to jazz specific scenarios. The most basic idea, the concept of the ii-V-I progression, serves as the building block for jazz harmony. This differs from most of contemporary pop music, which is defined by the I-IV progression. Interestingly, each of these devices is derived from the 12-bar blues progression, but serves wildly different purposes. The ii-V-I progression (or sometimes simply ii-V) is a unique device that allows for smooth, rapid transitions in the perceived tonality center of a jazz composition (Hellmer 91). By not stating the actual tonic (I) chord, the soloist may choose to imply it or disguise the functionality of the ii-V through his or her note selections. Here presents the opportunity for the soloist to introduce harmonic interest. In essence, the increased harmonic sophistication “frees” the improviser from the very limited opportunities presented to him by the I-IV progression.

While the ii-V requires a jazz musician’s ear to be more active while improvising, it also allows the performer to suggest different moods and emotions through harmonic substitutions and synthetic/hybrid scales. In the continual search for originality, jazz musicians have adapted and created new progressions and scales to better express themselves and expand the tonal limits of the genre. For example, jazz pedagogue David Baker coined the name “Mixolydian bebop” to describe a mixolydian scale that includes both the minor and major seventh scale degrees. This scale is used to provide “additional chromaticism that is characteristic of the bop style” (Hellmer 55) in an easy to remember, organized manner. This can be heard in Charlie Parker’s improvisation on his recording of “Blues for Alice.” Another example could be seen in the Lydian-Mixolydian scale—a hybrid mode of the melodic minor scale. This scale features both augmented fourth and minor seventh scale degrees and proves a useful solution over dominant chords with the #11 extension tone, a commonly used chord in jazz music. Even another example yet, pentatonic scales, can be constructed from nearly any scale and provide a unique sound by omitting certain scale degrees—much like quartal harmony maintains a functional ambiguity by omitting the third scale degree. These scales were used to great effect by both John Coltrane and Wayne Shorter in their late 1960s compositions.

The emphasis on originality and harmonic interest causes the jazz composer to build his or her compositions by anticipating the harmonic substitutions that performers may imply while improvising and providing an adequate amount of flexibility in the functional harmony to do so. We can validate this by looking at two of the genres most popular song forms, “rhythm changes” and the 12-bar blues, both of which reflect these priorities to the highest degree.

“Rhythm changes” is a 32-bar AABA song form that is based upon George Gershwin’s 1930 composition “I Got Rhythm.” The chord changes have been used regularly since 1930, being featured on prominent recordings like Duke Ellington’s “Perdido,” Count Basie’s “Lester Leaps In,” Charlie Parker’s “Anthropology,” Sonny Rollins’ “Oleo,” Miles Davis’ “The Theme,” and Michael Brecker’s “Suspone.” All of these recordings are characteristic of different styles of jazz music. Even more interesting, “rhythm changes” are always performed in the key of B flat, proving the exceptional flexibility that the harmony grants composers and improvisers.

The 12-bar blues has also been used regularly by jazz, rock, and country musicians since the early 1900s. One need only look at Chapter 11 of Lawn and Hellmer’s text to reveal the numerous possibilities
for harmonic substitution granted by the form. Further examples can be heard in the music of Charlie Parker. Both “Blues for Alice” and “Now’s the Time” follow a blues structure in the key of F, but both sound very different. Whereas “Now’s the Time” follows a more common blues progression, “Blues for Alice” uses constant ii-V substitutions to change the flavor of the harmony. Another popular example would be Miles Davis’ “Freddie Freeloader,” which resolves to an Ab7 at the end of the B flat blues progression. This move to the bVII7 instead of the I7 or V7 chord adds an unusual flavor to the traditional blues turnaround.

This practice of exploring new scales and harmonic devices is not common in pop or rock music because artists in the genre seek commercial success. In the case of the former, empirical results show that record sales are higher when music is simple and therefore accessible to a large audience. High smooth jazz record sales would validate this claim. Additionally, one can see this in Miles Davis’ invitation to perform in front of 600,000 people at the Isle of Wight Festival in 1969 after switching to a jazz-rock fusion sound. This was the largest crowd for which any jazz musician had ever had the opportunity to perform (Miles Electric). While these pieces were very dissonant and abrasive, the trance-inducing rock grooves Davis created were very similar to the popular psychedelic rock music of Jimi Hendrix, The Grateful Dead, and The Doors. Essentially, Miles changed his sound to align with public tastes of the time.

Alternatively, many pop musicians prefer a different medium to express themselves than that of the jazz musician. Many of pop music’s greatest songwriters—Bob Dylan, Woody Guthrie, Hank Williams, and Cat Stevens are only a few—do not utilize the sophistication of jazz because they prefer the written word. These artists are poets with musical accompaniment. While many of them have had a profound influence on popular music, they are typically heralded for insightful lyrics and storytelling.

Many pop artists also forego a jazz education because they intend to sell a persona instead of the compositions themselves. Bob Dylan, specifically, used a very cryptic, hyper-cool persona to cast the image of a mysterious troubadour over his sometimes haphazard live performances. Rolling Stones vocalist and songwriter Mick Jagger performs similarly, focusing on his vocals as another instrument in the band’s sound and using them as a medium for expressing his on-stage personality. These very popular and best-selling artists have influenced songwriters away from an intensive, jazz-like approach to composition.

While jazz is the main focus of this paper, it is important for composers to rely upon a variety of stylistic elements across genres. The works of Johann Sebastian Bach particularly provide rich source material for study with broad applications. Looking at Bach’s “Prelude in C” from The Well Tempered Clavier, we see that the first four measures of the piece contain a ii-V-I progression in the key of C major. The arpeggiated melody relies on various inversions of each chord, allowing the bass note to remain constant on C until the third measure, when it falls a half step to B during the G7 chord. Is this a precursor to jazz music? We can see that the ii-V was already being applied hundreds of years before jazz music began. Bach’s masterful voice leading continues throughout the following four measures of the piece. Six different chords are used in measures 1-8, but the bass note still only shifts by a half step between B and C. Further, each chord flows seamlessly to the next, exploring the note/chord relationships of the progression to the highest degree. Here we can see that European classical music that possesses no swing feeling can influence jazz compositions.

Further historical reading was done to learn more about artists and styles that influenced my compositions. Ted Gioia’s History of Jazz served as an extremely detailed and inclusive account of jazz history, building upon knowledge gained in MUSIC 007. Specifically, Gioia’s detailed accounts of Charlie Parker, Thelonius Monk, and John Coltrane sparked my interest in these artists and motivated me to undertake a deeper study of their compositions. This historical text also was enlightening in better
understanding public reception of modern jazz recordings. One particular area of note was the discrepancy in popularity between recordings made by African American and Caucasian artists. This was useful in understanding some of the motives behind composers like Miles Davis, who regularly felt racial pressures before the Civil Rights movement.

In addition to secondary-source historical texts, many autobiographies and interview transcripts served as makeshift “research publications” of jazz’s most influential artists. One of the best examples, Chris DeVito’s *Coltrane on Coltrane*, presents a collection of interviews with the artist that explain the musical concepts Coltrane was using on many of his ground-breaking records. Reading the explanations of the “Giant Steps” progression, the arrangement dynamic of the Classic Quartet, and the purpose of Coltrane’s avant garde pieces all became clearer when expressed in the musician’s own words. Similarly, Miles Davis’ autobiography makes it easy to trace the influences that inspired Davis many genre-defining recordings. Without this, I may never have discovered the recordings of pianist Ahmad Jamal, whose sound is both a personal favorite and an influence on my modal composition. To see the other historical sources like this, readers are encouraged to refer to the bibliography.

This project also required listening to many influential recordings that are associated with the aforementioned jazz styles to forge a personal guitar sound. While many exceptional jazz guitarists provide models for improvisation, literature shows us that many jazz musicians created original styles by adapting other instruments’ techniques to their own. For example, pianist Bud Powell and guitarist Charlie Christian solidified their influence in jazz history by adopting the horn-like phrasing of bebop contemporaries Charlie Parker and Dizzy Gillespie. Miles Davis similarly made history by attaching a wah-wah pedal—a tool used commonly by guitar players to create a vocal-like sound—to his trumpet during his fusion period to emulate the electric guitar sounds of Jimi Hendrix.

This raises the question of whether or not a jazz guitarist’s models should be guitarists or other instrumentalists—or both. I have focused on guitarists, because the guitar provides distinct opportunities over horns, such as polyphony (the ability to play more than one note simultaneously), an incredibly large range, the ability to easily execute wide interval leaps, and apply vibrato to and bend strings for more expressiveness. These techniques can be heard on Wes Montgomery’s recording of “Four on Six” for *Smokin’ at the Half Note*. As a result, this tune is rarely performed by horn players because it is very difficult to replicate these techniques. Interested readers are encouraged to refer to the bibliography for a complete list of the recordings that influenced my creative process.

This research, historical and theoretical, provided essential materials for guiding my compositions, as I was searching for an original sound with which to express myself. Considering the priority that this music places on originality, a new contributing voice is always an exciting and positive proposition.
Hard Bop Jazz

The hard bop piece, “Cold Coffee,” seemed a logical place to begin composing because of its status as the “sound” of jazz music today. The head melody of the piece began in August, 2011 as a variation on the harmonic and rhythmic ideas found in Tadd Dameron’s “Lady Bird.” As shown in Figure 1 below, the first four measures of “Lady Bird” begins with two measures of Cmaj7 and is followed by a (borrowed) ii-V progression (Fm7-Bb7) in measures three and four. Measures five through eight recycle this form, starting with a verbatim repeat of measures one and two, and then varying measures seven and eight with an augmented melody and new ii-V (Bbm7-Eb7) that resolves to its tonic (Abmaj7) in measure nine.

Figure 1. The opening measures of the lead sheet for Tadd Dameron’s “Lady Bird.”

“Cold Coffee” follows a similar form for its A section (measures 1-7), as seen in Appendix A.1. Measure one features a full measure of Bmaj7 with a similar syncopated pattern similar to that in Dameron’s tune. Following this, the tune performs a quick ii-V-I progression in measure two. This idea is repeated in measures three and four, only displacing the opening by one beat (the sixteenth notes effectively pick-up to beat two) and then continues into a new ii-V progression in measure four. Clearly, a parallel exists between the opening structures of both pieces.

The displacement of the original melody was done for two reasons. The first, because the melody sounded too forced to put the sixteenth note pick-up on and of beat four in measure two; the one beat delay creates a more lyrical feel. Secondly, the displacement adds interest to the piece by disguising the downbeat with a hemiola. This phenomenon, “when one meter is implied in the context of another” (Hellmar 70), creates the feeling of a 5/4 measure two while the band continues comping in 4/4. This occurs again in measure six, where the melody is voiced across two triplets, creating a brief feeling of 3/4 time signature again over a 4/4 time signature. This technique was used to great effect on Thelonius Monk’s “Straight No Chaser,” another inspiration for this piece.

From this point, the style of Wes Montgomery, whose recording catalogue arguably defines the hard bop “jazz guitar” sound, drove the A section to its completion. The harmonizing of notes in measures 1, 3, and 4 (as well as measures 10, 13, 14, and 15 in the B section) all recall Montgomery’s unique “chord solos” that served as the climax and third “movement” of many of his classic improvisations (Ingram 47). This can also be heard on the opening head of the live version of Montgomery’s “Four on Six” from the Smokin’ at the Half Note album. The melody is also very “busy,” mimicking the styles of both Montgomery’s reading of Sonny Rollins’ “Airegin” on The Incredible Jazz
Guitar of Wes Montgomery and Miles Davis’ reading on *Cookin’ with the Miles Davis Quintet*. Finally, measure 7 (and also 8) use a classic Montgomery lick to end resolve the melody over an unlikely ii–v progression in the key of B. The F#m7 leaves listeners with an uneasy feeling and does not draw the ear back to Bmaj7 as obviously as the dominant would. It also provides a nice contrast for the pickup notes to the B section.

The B section was completed after the A section and aims to draw similarities to the A section in terms of structure. The opening motif recalls measure 1 of the A section, this time transposing the chord up a fourth to Emaj7. Also like the A section, these “hits” experience a displacement in the measure as they are repeated. A notable difference is that these now follow the measure of eighth-sixteen-sixteenth-note runs instead of preceding it.

The final inspiration that this piece draws on is the Dizzy Gillespie standard “A Night in Tunisia.” The opening sixteenth-note pickup of the B section (beat 4 of measure 8 and beat 2 of measure 12) is meant to recall the famous triplet-lick that is featured throughout the piece via diminution and reharmonization. The original can be seen in Figure 2 below.

**Figure 2.** The opening measures of the lead sheet for Dizzy Gillespie’s “A Night in Tunisia.”

This tune follows a common AABA form with an irregular number of measures. The AABA song form is commonly 32-bars in length and is commonly used in jazz compositions. Many popular bebop standards, such as Charlie Parker’s “Anthropology,” Dizzy Gillespie’s “Shaw 'Nuff,” and Sonny Rollins’ “Oleo,” all utilize the 32-bar form, and, more specifically, George Gershwin’s “rhythm changes.” As a new composer, this seemed like a proven model to base the structure of the hard bop tune upon.

A large point of interest in the structure of the piece is the unusual number of measures in the A and B sections. The A section is six measures in length (excluding the initial pickup) and the B section, nine measures. Taken together in an AABA form, the result is a 27-bar song form. The odd number of measures creates a very jarring and surprising effect on listeners, because phrases are usually arranged in groups of 4, 8, 12, and 16 (Hellmer 68). Because the sections of the piece are not equal-length groups of eight measures, the listener feels surprised whenever the piece changes either before (the case for the A section) or after (the case for the B section) he or she expects. On a small scale, this proves the continued viability of the AABA song form, once one discards the 32-bar guideline that usually accompanies it.

In addition to listeners, jazz musicians performing this piece will also find interest in the structure of this piece because it will require them to improvise more actively. Given that all jazz artists and composers regularly utilize their own personal licks and phrases in their improvisations (Hellmer 244), it is likely that these ideas have been perfected within the context of common song forms (32-bar or a 12-bar blues). This piece denies the soloist the ability to recycle these licks over common progressions. Thus, improvisers must respond more dynamically to the quick and sometimes unexpected chord changes found within the piece.
I find this piece aesthetically very appealing as a composition that borrows heavily from the hard bop tradition. The piece contains the hard-swinging feel present in every bebop and hard bop jazz recording. The swing eighth notes are absolutely essential to the genre. “Cold Coffee” also contains the rapid succession of chord changes (some only lasting for durations of one quarter note each) and breakneck tempo common of all bop recordings, excluding ballads. While the underpinning may be more characteristic of early bop, the melody contains the “funky” bounce that defined seminal hard bop recordings like Miles Davis’ “Walkin’” and Horace Silver’s “Senor Blues.” The mind-blowing speed of Dizzy Gillespie’s “Salt Peanuts” is replaced by a cooler vibe.

Harmonically, the piece focuses on the upper extensions of chord tones and chromaticism to color the melody line and enrich the note-chord interactions. Maybe the best qualifier of this song as hard bop though is its focus on the technical dexterity of the musicians performing it. The frequent tritone leaps in the chord changes do not suggest the usual note choices that improvisers rely upon in a common jazz piece. In addition, the odd measure numbers require soloists to be wholly aware of their position and to extend and diminish rhythmic ideas to match the changing progression lengths. This was made apparent during the recording phase of the project, when the piano player commented after numerous bad takes of this song, “I just don’t get it. I don’t get what this piece is trying to do.” The composition aims to test the virtuosity of jazz musicians with its original structure and functional harmony. As a result, I feel that it is composed in the same spirit of straight-ahead jazz.
Modal Jazz

Looking at the modal jazz composition, “Too Flat for Five,” (found in Appendix A.2) it is easy to see the similarities between it and two of modal jazz’s finest tunes, Miles Davis’ “So What” and John Coltrane’s “Impressions.” Both of these pieces utilize the 32-bar song form and follow the same chord progression: 16 bars of D Dorian, eight bars of E♭ Dorian, and, finally, eight bars of D Dorian.

The piece began with the Gm7 intro figure that opens and closes the piece. This section was meant to recall the modal planning technique used by Bill Evans on the Kind of Blue record, as well as his own trio record, Waltz for Debby, with Paul Motian and Scott LaFaro. The voices in each chord are all separated by an interval of a fourth. This technique was made popular by McCoy Tyner during his time with Coltrane’s Classic Quartet. This voicing for the chord serves two purposes. The first, it includes only notes found within the representative mode (G Dorian in this instance). The second function is to provide a sense of harmonic ambiguity by excluding the third note of the scale, eliminating the major or minor quality of the chord. This allows players to select a variety of modes that share the notes with that which is originally voiced to alter the sound of the piece during an improvisation. This is partly what helped Coltrane to play the peculiar cycles of chord changes that he preferred over modal comping (Gridley 296). Because this figure resolves well to a Dm7 chord, this became the tonic for the rest of the piece.

The A section (measures 9-17) was inspired by a composition outside of the jazz realm entirely. “In Memory of Elizabeth Reed” is an instrumental composition by Dickey Betts, well known for his role as one of the original guitarists in the Allman Brothers Band. A favorite composition for years, this piece contains lengthy improvisations (especially in the famous Live at Fillmore East recording) over very static harmony. Unsurprisingly, when Duane Allman, the group’s guitarist, was asked by critic Robert Palmer how he was able to improvise riveting melodies over one-chord vamps for extended periods of time, he commented that it was a product of studying Coltrane and Davis’ playing on Kind of Blue (Kahn, Kind of Blue 187). The melody in “Too Flat for Five” is meant to recall the opening legato passages of “In Memory of Elizabeth Reed.” The B section (measures 18-24) also follows the structure, opting for a more syncopated feel over the long tones of the A section. D Dorian was selected for its bluesy character, recalling both the Allmans and Davis. Even the final movement from D Dorian to F Dorian in measure 32 suggests the movement of a minor third in the same syncopated passage of Betts’ tune.

While the melody meant to reference the Allman Brothers, a few demo recordings pointed directly towards another major influence: psychedelic-rock guitarist Carlos Santana. The chiming melody on an electric guitar clearly recalled Santana’s opening leads on his band’s cover of Peter Green’s “Black Magic Woman” on their Abraxas album. This Latin flavor helped establish the bass line that drives the tune along. This took the feel from the heavy swing of Davis’ “So What” or “All Blues” and gave the piece an identity unto itself.

Finally, the B section was constructed as an effort to challenge the original modal structure. As mentioned above, the chord progression to Davis’ “So What” has been used numerous times, either to reinterpret the classic song, or to recreate it, as Coltrane did with “Impressions.” Seeing as the A section had already been cast in D Dorian, the B section would need to be where change occurs. The first change came in the mode that that would be selected. Already channeling Santana, the Phrygian mode, which has a decidedly Latin flavor about it, would be a good departure from the original E♭ Dorian. This creates an interesting contrast because while the tonic note moves up one half step, the actual tonic which the mode is based upon (D Dorian is the second mode of C major) moves down one half step. Personally, this is a
very pleasing transition. The second of the two modifications was to put the piece in a 5/4 meter. This would not only surprise listeners, but would provide a challenge to musicians improvising on the piece. This change of feel and tonality in and out of the B section contradicts the expectations of many, seeing as “So What” and “Impressions” are two of the most popular jazz pieces.

The seven bar length is more a product of necessity than anything else, the final bar serving as a transition measure to plane back to D Dorian. Still, as mentioned above, the lack of an eight bar section is uncommon and makes the piece stand out further. It causes soloists to be more creative and provide innovative ways to end their phrases a bar early than most compositions require.

This piece was composed to root firmly in the tradition of modal composition. One of the most obvious signs that this is a modal piece is the use of modes to describe the key changes in the piece. Many transcriptions may not follow this format, but the best practice is to denote the mode and the letter name that corresponds to the root (Hellmer 194). This is critical to inform the rhythm section to comp in the modal style instead of implying tonal harmony, potentially clashing with the soloist’s decidedly modal improvisations. Similar instructions were given to the Miles Davis Sextet by pianist Bill Evans to record “Flamenco Sketches,” the final track on Kind of Blue (Kahn, Kind of Blue 132). One may notice that the Gm7 sections do not follow this notation. This is done intentionally to both allow the soloist flexibility in the turnaround of the chorus. The head melodies in each of these sections contain notes exclusively from each mode (barring the transitions between the A and B sections), accenting the sound of the scales and discarding tonal harmony. This is the signature of a modal composition, requiring the soloists to play within the modal idiom instead of using licks suited for ii-V-I progressions.
Latin Jazz

“Bossa Nueva” stems from an exercise on improvising over ii-V progressions. Afro-Cuban music is based in bebop harmony, making the constant series of ii-V progressions a good starting point. The feel came from listening to both guitarists Emily Remler and Pat Metheny’s Latin recordings. From these, the Brazilian bossa nova rhythm particularly stuck out for its cool, relaxed feel. These records display a comping rhythm similar to the clave rhythm (shown below in Figure 3) and a straight, half note bass rhythm. The first of many attempts at establishing the head melody came from these early improvisations in the bebop style.

Figure 3. Brazilian bossa nova clave rhythm (Hellmer 159).

Unfortunately, what would become the A section melody became a long, trying process over a six week period. While in no way a master of the Latin idiom, the music of Antonio Carlos Jobim, Tito Puente, Carlos Santana, and the collaborations of Dizzy Gillespie and percussionist Chano Pozo all contributed to the trial and error process. Jobim—a respected composer in the bossa nova style—is most well known for Stan Getz and João Gilberto’s recording of “The Girl from Ipanema” on Getz/Gilberto. The heads of this piece and other landmark bossa recordings all contain a very “distinctive melodies” and “impressionist harmonies” (Gioia, History 261). These terms describe the very introspective and thoughtful melodies for which Jobim was known. The B section of “The Girl from Ipanema” is the most popular example of this. A large part of the bossa nova sound is consequence of the assimilation of Brazilian music with west coast cool jazz. The soft, relaxed sound absent of roughness or brassiness was a trademark of the cool movement (Gridley 203). Special attention was paid to the voicing and upper chord extensions of each chord to produce harmony that follows very smooth and appealing voice-leading to fit this style. Combined with the montuno—a repeating eight-beat rhythmic pattern—this new direction would hopefully lead to a more cohesive Latin jazz effort.

Once the A section was overhauled to the lyrical, upbeat final incarnation, construction of the B section began; the A section simply wasn’t complete enough to stand on its own. The B section pulled more from Jobim’s “Ipanema” than the previous version. In Figure 4 below, it is easy to see that “Bossa Nueva” (Appendix A.3) recalls the long tone and triplet format of “Ipanema.” The triplet rhythm plays well against the eight-note clave rhythm and provides a new syncopation that is not introduced in the A section. Further, the recycling of the rhythmic syncopations via key changes is also common to both pieces. The harmony borrows the idea of a major seventh sound in the B section. Transitioning to the submedian (A maj 7) from C maj 7 created a more interesting change than following Jobim’s example of a half step movement above the tonic.
The Latin sound of this piece is most present in the rhythmic complexities of the piece. The use of the bossa nova rhythm best qualifies this as a Latin piece, but this is more a product of the performance than the harmonic interactions. Without this aspect, the piece becomes a bop composition. As is mentioned above, the complex rhythmic layers of a Latin jazz composition are, in fact, the feature of the piece. This view is supported by both Hellmer and Lawn and Gridley, all of which forego any harmonic discussion in favor of solely rhythmic characteristics in their analyses of the genre. Band leaders such as Dizzy Gillespie and Stan Kenton would most likely agree, as they relied upon auxiliary percussion instruments to ground their Cubop (Cuban bebop) and Latin jazz excursions (Gridley 410) to emphasize these rhythmic elements. The same could easily be said of the rock band Santana, who used a variety of Latin percussion instruments to add flavor to their debut record *Santana*. Further, even the bass and piano are required to play percussive roles in Latin music, proving that the syncopations are more critical than the walking bass and comping of bebop (Gridley 411). Listening to the recorded performance, these Latin rhythms exist in the drums and the guitar chording. The straight, half note bass feel also follows the Latin jazz tradition. The bebop harmony exists throughout, as discussed in the hard bop analysis, but the distinct rhythms that the piece is intended to be performed with validate this as a Latin composition.
The fusion composition, “Minor Incident,” was the easiest of the tunes to write. Having a rock background, I found incorporating jazz elements into my rock guitar style was the greatest challenge in the creative process. Guitarist John Scofield served as the primary model for this song. His recordings with the famous fusion rhythm section Medeski, Martin, and Wood, particularly the *A Go Go* record, possess the proper blend of jazz, rock, and funk ingredients to fit the desired direction for the piece. The piece began by adapting a chord progression from the song “The Next Movement” by modern hip-hop band The Roots. The VI\(^{13}\)-V-i progression served as the opening theme of the piece, providing a funky bounce to the track that matched the desired drum feel. Returning to Scofield, the song “Boozer” (from *A Go Go*) inspired the tempo and accentuation of beats one and three of each measure. From here, the melody stemmed from a combination of minor pentatonic and Dorian licks, slowly assembled from multiple melodic improvisational attempts over this initial progression. This can be seen in Appendix A.4.

Once completed, this four bar phrase (eight when repeated) did not seem complete enough. This led to the idea of basing the structure on the “riff” tradition of rock music. The early fusion recordings of Miles Davis—especially his *In a Silent Way* and *Bitches’ Brew* LPs—helped define the direction. One of the most interesting qualities of these long-form songs (many twenty minutes in length or more) is their constant confirmation of the tonic. As evidence, Joe Zawinul’s “Pharaoh’s Dance” on *Bitches Brew* is a twenty minute recording with a constant B pedal point. The first “movement” of eight bars very decidedly has a D minor sound to it. The second movement began again asserting the D minor tonic and comping with a more rock-oriented feel. The melody owes much more to minor pentatonic riffs than the bop-influenced harmony of the earlier tunes, but still colors in scale tones that the pentatonic omits for added flavor. The final E\(^7\) that ends the second “movement” in measure 10 is a purely functional move to setup the A\(^7(#9)\) in measures 11 and 12. Despite this, it’s a personal highlight of the composition. While the final two measures, or “third movement,” do not include a Dm\(^7\), the A\(^7(#9)\) functionally points directly back to it as an unresolved authentic cadence.

Much like Davis himself, Jimi Hendrix serves as a constant influence for guitar playing and rock composition. Most obviously, the use of the A\(^7(#9)\) recalls Hendrix’s sound. Among novice guitarists, a chord with the dominant seven and sharp ninth voice is colloquially referred to as the “Hendrix chord” because of his regular application of it in his music. More importantly, the overall sound and feel of the piece, once composed, was influenced by the song “Rainy Day, Dream Away” from Hendrix’s *Electric Ladyland*. A lengthy instrumental piece, it is Hendrix’s most obvious “fusion” composition. While the concepts of riffs and minor pentatonic phrases were already borrowed, other common rock guitar techniques like unison bends (holding one note and bending another string to match that pitch simultaneously) and ghost notes (muted notes with an indiscernible pitch) became key elements of the performance. This is why the final recording features the electric guitar performing the tune’s head arrangement. In addition, organist Mike Finnigan’s interplay with Hendrix inspired the keyboard-guitar arrangement that made the final recording.

What makes this a fusion piece? Upon first listen, the rock influence is glaring. The distorted guitar liberally mixes in minor pentatonic licks that recall a rock solo. This is not a solely rock composition though, because the melody line incorporates more sophisticated note selections than the minor pentatonic would suggest on its own. This can be best heard in measures six and eight. The harmonic underpinning also serves a few common functional purposes as those in more bop-influenced jazz. Yet, the simplification characteristic of fusion is present, constantly asserting the tonic of the song.
The funky rhythms also recall the fusion of Herbie Hancock’s Headhunters records, as well as Miles Davis later fusion ventures like *A Tribute to Jack Johnson* and *On the Corner*. Most importantly, the recording of this tune relies heavily on the use of electric instruments (guitar, keyboard, and bass guitar). This has become one of the most basic qualifies of fusion music and serves as the main platform of debate between traditionalists and contemporary jazz fans. While “Minor Incident” leans significantly more towards the modern incarnation of fusion as propelled by artists like Scofield, it still carries elements that the 1970s creators valued as important characteristics of the genre.
Jazz Ballad

The final composition of the project, “Plus Two Leslie,” became apparent as the difference between ballad and up-tempo improvisation styles became more distinct. My ballad was inspired by Wes Montgomery’s “Unidentified Guitar Solo,” the final track on Guitar On the Go. The recording features a particularly moving solo guitar performance. The tune began life as a similar arrangement containing only measures 1-11 as seen in Appendix A.5. The particularly striking element of the piece was the bluesy phrase contained in measures one and two. This melody possessed a familiarity and introspection that was personally appealing. From here, the tune took on a few melodic and harmonic twists before settling upon final version of the A section (measures 1-15).

An important observation allowed the piece to reach the final stage and gain a new sense of direction. The structure of the composition relies on the gradual extension of a two measure phrase. The phrase begun in measures one and two is referenced five times in total during the A section. Coincidentally, measures 1-11 were composed in a way that the phrase expanded by two beats each time it is referenced. For example, the second time the phrase lasts from the beginning of measure three until the second beat of measure five—ten beats in total length. The third variation begins on beat three of measure five and ends on beat two of measure eight—twelve beats in total length. This process repeats until the phrase doubles in length completely to four bars in measures 12-15.

This final segment was harmonized in a similar fashion to the turnaround of Victor Young and Ned Washington’s “Stella By Starlight,” shown below in Figure 5. Only minor adjustments had to be made to the progression to compliment the melodic selections on top of it such as the Gm7 in measure 14 instead of the expected Gm7(b5). This complicated structure speaks to the sophistication and progressive nature of jazz music. Instead of phrasing within the bar lines, the piece phrases across them to disguise the location of the downbeat. Much like “Cold Coffee” and “Too Flat for Five,” this structure also presents a challenge to instrumentalists improvising over the tune. This will hopefully inspire new and creative licks during improvisations.

Figure 5. The turnaround to Victor Young and Ned Washington’s “Stella By Starlight.”

Because the initial chord changes presented an exciting form to improvise over with very appealing melodic interactions already in place, an A-A’ structure was selected for the piece. Measures 16-30 were created with the goal of disguising the harmony so that it would sound completely fresh. The initial transposition and modification of the opening theme in measures 16-19 helped to add a new tonality to the changes. Further, the concept of highly syncopated phrasing helped to form measures 21-25. The most interesting point in this portion of the A’ section is the location of the fourth reference to the theme—beat four of measure twenty three. This is a stretch for the ears after 22 measures of the phrase beginning on either beats one or three. Finally, the turnaround from the A section was repeated, but this
time the melody resolves to the tonic an active above the harmony. This resolution to the root is a common element of many ballads, some of the most moving examples being those ballads performed by legendary vocalist Billie Holiday.

I composed this piece with a very slow tempo to leave large spaces in the chord changes. This slower tempo and harmonic motion allowed sustained melody notes to interact with each other during the head. Further, the improviser must respond differently as a result of the slow, swinging feel, presenting a different challenge to the performers on this record than previously introduced. Specifically, the performer must adapt the bebop licks used in “Cold Coffee” to a more introspective performance. The use of bop harmony in an A-A’ structure adds harmonic interest and sophistication, but most importantly clarifies that this is not a blues form. As a result, those interested might best classify this piece as a jazz ballad.
Challenges of Assembling a Jazz Combo

These recordings are filled with very adept and artful performances, but they did not come to fruition without significant interpersonal struggles. Unfortunately, the music business is exactly what the name implies—a business. Trying to create professional jazz recordings on a tight budget is very difficult. As a result of not being able to pay the musicians, both selection and availability were very restrictive constraints to negotiate. Many anecdotes can be found in the books cited by this thesis telling of the great frustration all jazz musicians face when gigs do not pay what they expect them to, so this is hardly a surprising result. This presented unforeseen interpersonal challenges that made the project simultaneously more difficult and enriching. Knowing how to work with other musicians and professionals is critical in the creative process, and it was important to continue exercising the skills required to do so. This is especially important as a bandleader. While in the studio, I needed to simultaneously focus on performing good takes and inspiring the other members to do the same through my leadership techniques.

Arranging the pieces proved particularly difficult as a result of the atypical key signatures in some of the pieces. Instruments like the guitar and piano lend themselves to quickly transposing keys because of their fairly uniform construction (guitar frets and piano keys follow linear, repeating patterns). The physicality of how different wind instruments like the saxophone and trumpet play various notes makes some key signatures excessively difficult for them. This was the case on “Cold Coffee;” the B major key signature was too much of a challenge for the tenor saxophone player on the session. As mentioned earlier, the wide range of the guitar allows for wide intervallic jumps to be performed easily. The more limited range of the saxophone presented some challenges, requiring a compression of the multiple octaves that pieces like “Cold Coffee” and “Plus Two Leslie” were composed across. While Wes Montgomery is a personal inspiration, this phenomenon attributes to why many of his standards are rarely covered by band leaders that do not play the guitar.

Despite the setbacks encountered, the sense of personal pride that these recordings and compositions instill in me is overwhelming. However, it would be interesting to hear the hypothetical recordings if a longer preparation and a larger budget were possible before the recording sessions occurred.
Appendix A: Lead Sheets
Appendix A.2

**TOO FLAT FOR FIVE**

Tim Vitullo

6 O ODEVIN

12

18 E' PRYDSIAN

22 O ODEVIN

26

22 F ODEVIN

Repeat Measure 5 until End for Solos
Appendix A.4

MINOR INCIDENT

(Music notation image)

Tim Vitullo

D.C. al Coda

(For solos repeat without D.C. al Coda)
Appendix B: Audio Recordings

Please see the attached audio to listen.
Bibliography


OBJECTIVE
To obtain a full-time position as a transportation engineer with future project management opportunities.

EDUCATION
The Pennsylvania State University
University Park, PA
- Bachelor of Science, Civil & Environmental Engineering Projected May 2012
- Honors in Music

Relevant Coursework:
- Honors Transportation Design (Capstone)
- Transportation Planning
- Traffic Operations
- Honors Intro. Highway & Traffic Analysis
- Road Safety Analysis
- Construction Engineering Materials Science
- Professionalism & Engineering Economics

- Honors Intro. Structural Analysis
- Open Channel Hydraulics
- Intro. Environmental Engineering
- Surveying (with AUTOCAD 2010)
- Programming for Engineers (MATLAB)
- Effective Speech for Engineers
- Technical Writing

HONORS
Owen Robert Jones Scholarship Recipient — 2010 & 2011
Frank Holzer Memorial Scholarship in Civil & Environmental Engineering Recipient — 2010 & 2011
President’s Freshman Award Recipient — 2009
Dean’s List — Fall 2008, Fall & Spring 2009, 2010, & 2011
William & Wyllis Leonhard Engineering Honors Program — 2008 – Present
Schreyer Honor’s College Dean’s Scholarship Recipient — 2008 – Present
Schreyer’s Honors College — 2008 – Present

EMPLOYMENT
Bombardier Transportation
Pittsburgh, PA
RCS Engineering Intern
Summer 2011
- Interned in the Rail Control Solutions (RCS) department.
- Worked on projects designing automated subways in Tianjin and Shenzhen, China, airport terminal trams in Sky Harbor Intl. Airport (Phoenix, AZ) and Heathrow Airport (London, ENG), and a new train network in downtown London, England.

Pennsylvania Department of Transportation
Pittsburgh, PA
Engineering, Science, and Technology Intern (ESTI)
Summer 2010
- Interned in District 11-0 construction dept. working on PA Rt.30 in Beaver and Allegheny counties.
- Inspected contractor performed activities, including HMA road repave, PCC bridge deck pour, drainage and base repairs, and other various state required highway maintenance.

COMPUTER SKILLS
AutoCAD
Civil 3D
ArcGIS
HCS2000
Synchro
RSAP
HEC-RAS
MATLAB
Microsoft Office

ACTIVITIES
Institute of Transportation Engineers (Penn State Chapter)
University Park, PA
Member
- Professional organization that focuses on occupations within the field of transportation engineering.

Freelance Performing Musician
Guitarist
Pittsburgh, PA
Spring 2005-Present

REFERENCES
Available upon request.