ANALYSIS OF LIFELINES

A COMPOSITION FOR STRING QUARTET

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By
David Yamasaki
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David Yamasaki

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I. INTRODUCTION

A. INFLUENCES ON THE COMPOSITION

*Lifelines*, the title of this string quartet, represents a connection between the past and the present. Lines, both physical and symbolic, connect one stage of life to the next. These lines serve the dual purpose of connecting past experiences and limiting movement to the future. My influences for the compositional structure of *Lifelines* are based in personal as well as musical ties.

The most powerful influence on the organization and structure of the composition came from my experience of watching family members die of cancer. The tubes, which were connected to them for oxygen, morphine, and glucose, became their lifelines connecting them to survival. My father, father-in-law, and uncle slowly died from cancer; the indelible image of their lifelines became the title of this composition.

The additional influences on *Lifelines* are far removed from images of death. I am very much interested in Afro-Cuban music. Its spiritual power and musical complexity promised a rich context for a string quartet. Yoruba/Lucumí
melodies and rhythms comprise much of the music in Lifelines. I used a string quartet to set these rhythms because the Afro-Cuban batá drumming could easily be translated into strings.

African slaves had to absorb European plantation owners' music and attempt to interpret it into the instruments that they were permitted to play or manufacture. In the Caribbean and other Catholic-dominated regions, the slaves were allowed to practice their dances and drumming. While they were not allowed to bring their instruments from Africa they were able to manufacture similar instruments from tools and other materials on hand. For example, the shipping crates used for storing dried codfish became drums and eventually the conga drum. "The botija (or botijuela) is a large ceramic jug which was used originally to import olive oil from Spain, and was used as a bass instrument in the son until the middle of the 19th Century"\(^1\). "Although a primitive instrument, the quijada is a very popular and recognizable sound, and inspired the contemporary creation of the "vibra - slap". The jawbone (of the skeletal remains of a horse, donkey or mule) produces a distinct, rattle or crashing sound when struck,

causing the loosened teeth to vibrate." These and other instruments were used and manufactured by the slaves to recreate the rhythms and music from West and Central Africa.

A string quartet most frequently plays Western European music with rhythmic and harmonic organization which differs from that of Afro-Cuban music. I wanted to set music for a string quartet in a different way by organizing it around batá and Afro-Cuban melodies and rhythms. In Lifelines, the cello represents the iya, or lead drum. As the largest drum, the iya initiates the "call" to which the other drums respond. Call and response is the practice of having a lead drummer or singer produce a motif to which the chorus or ensemble responds. Call and response is basic to many West African drumming patterns and chants so the connection between Lifelines and call and response is basic to Lifelines.

In Lifelines, the viola replaces the itotele, or middle drum. The two violins then serve a dual purpose. One violin takes the part of the smallest drum, the okonkolo or omele, which usually plays an ostinato. Like the omele, this violin responds to the call from the itotele and iya.

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2 Ibid., p. 33.
The other violin keeps the time and plays the foundation for the other instruments to interact with each other. In Afro-Cuban music, there are specific toques, or patterns, that each batá drum plays. The iya plays specific cadences, which the itotele answers. I employed this concept of call and response in Lifelines, basing the pattern in batá drumming, but fusing it with Western European music rather than employing an exact toque.

Western European music for string quartets also influenced Lifelines. In particular, the compositions of Bartók and Stravinsky that presented folk rhythms and melodies offered a rich area for adaptation to Afro-Cuban patterns. Many of Bartók’s pieces employing Hungarian folk melodies and rhythms used folk music not merely as imitation but rather as a pattern of influence for Bartók. These patterns are most clearly present in 8 Improvisations on Hungarian Peasant Sons, Opus 20, Romanian Dances, 3 Hungarian Folk Tunes, 15 Hungarian Peasant Songs, and Romanian Dance, Op.11.³

Harmonically, Bartók, along with Kodály, used the modes that indigenous Hungarian melodies were based on for his ‘serious’ works. In the first movement of Bartók’s

first string quartet Op. 7, he used a cello melody based on the melodic lines of Hungarian folk songs. In the third movement Bartók employed a popular Hungarian folk rhythmic pattern. This pattern and its variants are used throughout this movement. In the second movement of Bartók's second string quartet, measures 8 - 46, and 48 - 67, the second violin plays staccato octaves in a manner similar to a drum beat accompaniment in Arabic folk music which Bartók cataloged. These examples reflect the influence of folk music traditions on Bartók's early string quartets.

Example 1.1

Béla Bartók, Second String Quartet, measures 8 - 46
Similarly, Stravinsky drew from folk music traditions in his works Firebird and Petrouchka. Maurice Béjart described the two elements always present in Firebird as "a profound feeling of Russia and a certain rupture with traditional music," qualities which represented Stravinsky as both a Russian and a revolutionary. After completing Firebird, Stravinsky next composed Petrouchka. The music was composed as a contest between the piano, which Stravinsky conceived of a being represented by a puppet, and the orchestra. The piano would seem to be attacked by the orchestra, would rally, but would be overcome. Stravinsky selected the title Petrouchka, the term for "the immortal and unhappy hero of every fair" to illustrate this contest of forces. While originally composed as a nonballetic piece, Diaghilev decided to produce a ballet after hearing Stravinsky's music. Stravinsky was impressed by the ballet, noting that the setting of Old St. Petersburg in 1830 "greatly enhanced" the work.

During his "Russian" period, Stravinsky employed tunes from Rimsky-Korsakov's collection of 100 Russian National

5 Ibid., p. 314.
6 Ibid., p. 305.
Songs. In works like Renard (1918), Les Noces (1917), and Historie du Soldat (1918) the texts that Stravinsky used were derived from Russian popular verse. Stravinsky was not interested in recreating folk melodies, chants or verses in his music. "If any of these pieces 'sounds' like aboriginal folk music," Stravinsky was later to remark, "it may be because my powers of fabrication were able to tap some unconscious 'folk' memory" - not, in other works, because of any direct borrowing or pursuit of authenticity".7

In Stravinsky's Three Pieces for String Quartet Russian Folk tunes are used in the first of the three pieces. In 1928 the quartets were given titles 1. 'Dance', 2. "Eccentric", 3. 'Canticle'. Eric Walter White noted that "The 'Dance', with its melody confined to four notes within the compass of a fourth, is now seen to be a precursor of the long series of popular Russian tunes that Stravinsky poured out in profusion during the four years 1914-1917."8

In his other string quartet, the Concertino, Stravinsky once again employed a Russian popular dance tune. In

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measure 115-121 White described a "three, or maybe four-bar theme like a Russian popular dance tune."\textsuperscript{9}

Harmonically, Stravinsky was not paraphrasing the folk melodies. The rhythms, the accents, and the ostinatos captured the feel of the dances without directly quoting from them. Stravinsky's *Three Pieces for String Quartet* and the *Concertino*, while not specifically written for dance, were later used in the 1955 ballet production, *The Antagonists*. Both the choreography and the music weave folk and popular themes in an inventive format.

Similarly, *Lifelines* is not an effort to set Afro-Cuban music directly to a string quartet or to achieve authenticity. The effort is to reflect the inspiration from Afro-Cuban chants, not to merely mimic them in a different structure. The Afro-Cuban musical tradition shares with the folk-influenced compositions by Bartók and Stravinsky a connection to life experiences of the people. Bartók and Stravinsky incorporated folk themes in their compositions to link music to daily experience and to their own heritage. *Lifelines* also represent a connection between past and present times and folk and formal traditions. It

\textsuperscript{9} Ibid., p. 57.
presents African traditions in a European form as a connection between worlds.

B. TECHNIQUES USED

Use of several techniques strengthens the connection between Afro-Cuban melodies and rhythms and Western European instruments and compositional organization. In particular, pizzicato, bowing, bowed tremolo, harmonics, double stops, and staccato bowing were manipulated to represent the nature of Afro-Cuban music within the context of a string quartet.

Pizzicato

Pizzicato is used because it best imitates the short percussive nature of Afro-Cuban ritual music. The use of a cowbell, wood block, hoe blade, or any of the various Afro-Cuban percussion instruments is fundamental to Afro-Cuban music. Therefore having a pizzicato section in a string quartet that is based upon Afro-Cuban music is essential.

From measures 34 to 109 of movement two, all four instruments at one time or another use pizzicato. In measure 34, the cello begins by playing a five-note motif, which represents the concept of clave. Clave, a basic
concept to Afro-Cuban musical structure, is a group of three notes followed by a group of two notes, or the reverse, two - three.

Example 1.2, Clave.

This pattern is echoed in the next measure by the viola.

The first violin is also a reaction to the clave invocation by the cello in measure 34. The first violin response represents one of the motifs that I define as a group of five notes in a duple meter. This cell of five notes in which the first of the five notes receives an accent takes five measures to complete its cycle.

Example 1.3, Lifelines, measures 34 - 41
The arco sections in the first movement also represent percussive rhythms that are a part of Afro-Cuban music. The first 12 measures have all four instruments bowing, emulating a church choir singing, the choir that African slaves may have heard from their plantation owners on Sunday church services. This must have been initially a jarring sound to the Africans and certainly an alien sound that in measures 13 - 16 I accelerate into a whirl that leads to the cello ostinato in measure 17.

The batá drums produce a pitch that can be imitated by arco strings. The flexibility of arco bowing produces the nuances of dynamics and articulations present in the batá drumming. In measure 97, the larghetto section, strings are again scored to emulate a choir. However this choir's theme is made up of the chant to the Yoruban God Yemaya. The
texture of the bowed string is again best suited for this section.

Example 1.4
Bowed Tremolo

I used bowed tremolo as a texture in the accompanying instruments so that the soloist would not be obscured. This coexistence of parts is one of the interesting phenomena in batá drumming. While one instrument is soloing, other instruments play parts that accompany the soloist and create a rhythm to support the soloist rather than detract from or overpower the solo. The bowed tremolo section in measures 143 - 155 of movement one are used to accompany the viola solo in measures 143 - 146 and then the cello solo in measures 153 - 155.

Example 1.5
Harmonics

Harmonics are only used in the second movement and only in the first violin part. The use of harmonics produces notes on stringed instruments, which are flute-like in their purity. This quality of another instrument influenced my use of harmonics in the second movement, measures 169 - 184. I assigned harmonics to only the first violin so that one of the two instruments with the highest range would play the harmonics. These high notes played on violin, yet sounding like the clarity of the flute would then represent the ringing qualities of the cowbell played in Afro-Cuban music too. I was first exposed to this high-pitched ringing when I listened to a percussion descarga or jam session. The bell rang out clearly over the rhythms of the drums. After leaving the descarga my ears still rang with this sound so I structured harmonics on the violin to achieve this same lasting sound in a string quartet.

Example 1.6
Double Stops

Double stops are used in both movements of Lifelines. In movement one I have the cello and viola playing open string double stops through out the movement. The overtones produced by the open strings are again similar to the many overtones produced by the batá drum when it is struck. The overtones from the batá drums were influential in my selection of open string double stops. Use of open strings allowed the upper partials to be heard easily. Also, in sections like the cello part of movement one, measures 15 - 31, the open strings are easier to play. Since the rhythms are syncopated and very important to be played accurately, open strings are functional for Lifelines. The accuracy of the rhythms is also the reason for my use of the single note material, especially in the violins.

Example 1.7 Lifelines, movement one, measures 16 - 23
Staccato bowing

Staccato bowing was used in both movements to mimic the short percussive sounds of the Afro-Cuban percussion instruments. This percussive bowing was used in movement one measures 91 - 94 and in movement two, measures 99 - 102. Most of the sections with any repeated sixteenth notes are to be played in a staccato like manner. The connection to Afro-Cuban percussion is in the percussive nature of staccato bowing.

Example 1.8

*Lifelines*, Movement One, measures 91 -94
Lifelines, Movement two, measures 99 - 102

The various techniques used in both movements are an effort to emulate the percussive nature of Afro-Cuban music without having the string quartet players hit their instrument with their hands and bows. The purpose was not to replicate or imitate the Afro-Cuban percussion but to coalesce the two idioms without making the instruments play the parts of Batá and reproduce that sound on a cello or violin. *Lifelines* is a homage to Batá not a transcription of a performance.
II. FORM

A. SEQUENCE OF FORM

The overall structure of *Lifelines* follows the clave's rhythmic structure with a "two side" and a "three side." The three side of the clave is traditionally the more syncopated side since its rhythm has a beat that is on an off beat.

In Afro-Cuban music, clave is both a rhythm and the name of the instrument that plays the rhythm. This rhythm is one of the main organizational concepts of *Lifelines*. The basic concept of the clave rhythm is a syncopated rhythm or "three side" and a relatively stable rhythm the "two side" together. *Lifelines* is organized along these rhythmic lines. There are two movements in the composition. The first movement is divided into two subsections and the second movement is divided into three subsections.

The clave has many variants from the implied feel that it has in African drumming to the different styles it became in the Americas. From the United States through the Caribbean, Central and South America, the rhythm of clave, though varied and in numerous forms, is basically the same, a syncopated side and a more or less stable side. The
similarity in the basic rhythm, despite the varied geography where clave is extant, prevailed because the seized West and Central African slaves were able to retain this rhythm from Africa.

In West and Central Africa the rhythms of the religious drumming and chant are usually in a 6/8 or triple meter. The European military bands from the countries of the slave owners played march rhythms or duple meters. I believe the intermingling of these rhythms may have some significance in the development of clave in the Americas; however the basic clave rhythm was a prevalent part of religious drumming in West and Central Africa before slavery overwhelmed Africa.10

The clave rhythm in North America can be traced to New Orleans where the plantation owners were less restrictive in their treatment of the African slaves and their traditions. In the New Orleans area of Congo Square the slaves were permitted to play their music periodically. From these collective performances as well as from work songs, field hollers, and the assimilation of some European music, came the beginnings of what later developed into

Blues, Ragtime, Dixieland, Jazz, Rhythm and Blues, and eventually American Popular music.\textsuperscript{11}

The rhythm of the clave can begin with the three side or the two side of the clave. If the three side starts, then the clave is said to be a three two clave. If the two side starts then it is said to be a two three clave. There are variations in the clave rhythm including son clave, rumba clave, and six eight or bemebe, all of which have a relatively stable side and a syncopated side with different beats accented.

Example 1.9

\begin{verbatim}
\textbf{Clave in 3-2 Direction} \hspace{2cm} \textbf{Son Clave in 2/4} \hspace{2cm} \textbf{6/8 Clave Variation}

\textbf{Claves 1}
\begin{verbatim}
\[ \text{Clave in 3-2 Direction} \]
\end{verbatim}

\textbf{Claves 2}
\begin{verbatim}
\[ \text{Clave in 2-3 Direction} \]
\end{verbatim}

\textbf{Claves 3}
\begin{verbatim}
\[ \text{Rumba Clave in 2-3 Direction} \]
\end{verbatim}

\textbf{Claves 4}
\begin{verbatim}
\[ \text{Brazilian Clave in 3-2 Direction} \]
\end{verbatim}

\textsuperscript{11} Ibid., p. 7
The overall form of *Lifelines* is like a two-three clave. The composition is divided into two movements. The first movement is like a two side of a clave rhythm. The second movement is like the three side of a clave rhythm. Each side could stand alone as individual pieces but they are meant to be played together. They are really a call and response or antecedent and consequent.

I chose the son clave starting on the two side for *Lifelines* because the two side represented the duple meter of the military bands the Africans may have first heard in the Americas. The three side of clave stands for the more syncopated triple meters heard in most of the West African drumming tradition. This distinctive blend of rhythms, becomes the structure of the entire string quartet.

The first movement of *Lifelines* was structured on the two side of a clave rhythm because I felt it could stand alone as a composition even without the second movement. Originally, I organized the first movement into two subsections however, when I completed drafting the slow "B" section, I felt that the first movement needed to have a stronger finish. I then repeated the "A" section in order to achieve a complete feeling for the first movement. The first "A" section, measures 17 - 53, and the second "A"
section, measures 156 - 191, are identical. The slow "B" section, measures 97 - 155, is almost twice as long in music measures to balance the two "A" sections in movement one of Lifelines. This complete or settled feeling conforms to the two side of clave since that is the more stable of the two sides.

The first movement, after a slow fugue-like introduction, is essentially an "A" section in 2/4 meter followed by a slower B 4/4 section. The B 4/4 section is then followed by another A section. Basically the first movement is two sections, each in an ABA form. The ABA form organizes the music into a form that brings familiarity as well as stability. The listener is allowed to hear the A section after the B section and become comfortable with the return to the "home" quality of the return of the A section. Overall, in the context of the two movements of Lifelines, the first movement represents the two side of a clave rhythm.

The instruments play different roles in the first movement than in the second movement. For example, the cello plays an ostinato part in the 2/4 section. This part emulates a string bass part in Cuban salsa music. The bass part is called tumbao and it is the repeated pattern played
by the bass, often accenting the and of two and the down beat of four. This syncopated ostinato becomes a relatively stable part of the composition because it is repeated. Over the tumbao, the viola and violins play fragments of melodies and counter lines over the cello’s part.

Call and response, which is an essential part of African music, was used in various places of movement one of Lifelines. I used call and response as homage to the African music that influenced the batá music, which is the basis for Lifelines. During the slow middle section of the first movement there are several examples of call and response. In measure 109 the first violin plays the motif from the Lucumé chant to Yemayá and the other instruments respond to the call.

Example 2.0
In measures 123 - 125 the cello starts the call and the other instruments echo or respond. These fragments of the chant keep calling and responding until the fermata in measure 141.

Example 2.1
I employed repeated notes and motifs to resemble the batá drums. In batá drumming the chant is sung repeatedly so I used the same concept of repeated chant motifs for various sections of *Lifelines*. The repeated notes were used to emulate the percussive nature of the drums.

The slower B 4/4 section is a melody from an Afro-Cuban chant that has been harmonized. I sang in a chorus directed by Rebeca Mauleón for her Masters Thesis performance at Mills College (1990). This melody is from my recollection of that experience. In her thesis, Mauleón analyzed the intermingling of Cuban and European music. In the performance of the choir she wrote a chant melody in the form of a madrigal to combine traditional African with traditional European musical forms.\(^\text{12}\) In *Lifelines*, I have structured the composition and employed specific techniques and forms to explore the connection of Afro-Cuban and European music.

Consistent with the structure of clave, the second movement of *Lifelines* is much more syncopated than the first movement. Within each movement are many uses of this clave rhythm. Some are exactly the same as the clave rhythm.

\(^{12}\text{Ibid., p. 49}\)
Example 2.2, *Lifelines*, Movement two, measures 17 - 20

The second movement of *Lifelines* can be divided into three sections. It begins with a fugue-like introduction that is similar to the first movement's introduction. It differs from the first movement's fugue section in that it uses quarter notes instead of whole notes and that it is in a faster tempo. This change in the tempo forms a connection to the first movement but keeps the more syncopated nature of the "three side" intact. The syncopation only lasts for the first five or six measures. The second section is really a gradual acceleration of the clave rhythm and its variants until m.m. 174 where it starts to lessen the frenzied pace which ends at measure 205.
Other manifestations of the clave rhythms are really extrapolations of the basic clave. For example 2 - 3 clave can become two quarter notes and three half notes or five quarter notes. The five note groups are then repeated five times over five 4/4 measures. The five note group does not reach its original starting point until the five note group is repeated five times.

Example 2.3, Lifelines, movement two, measures 136 - 143
Throughout this section the cello and viola start many of the motifs and the violins, as a rule, repeat the rhythm. This is patterned after the call and response pattern also prevalent in West African drumming. Most motifs are in groups of five notes, which are the two side and the three side of clave "added" together. The cello also plays the chant melodies in various places of section two. These melodies were sung at various performances and recordings and I was able to recall and transcribe some of them.

Chants are usually sung as invocations to the various Orisha or Gods. The words are sung in Lucumé and since all drumming is accompanied by singing, it became crucial for me to include chant melodies in both movements.

The third section, measures 205 - 236, is an ending that recalls the slow fugal introduction of the first movement. This reintroduction is a way of really showing the connection from the three side back to the two side of clave.
Example 2.4
The "three" side of clave is represented in the second movement of *Lifelines*. Since the "three" side is the more syncopated side of clave, this movement needed to have more rhythmic activity than the two side. The connection between the two side and the three side is accomplished by starting the second movement in a similar manner as in the first movement, with a fugue. The second movement fugue is shorter and starts in quarter notes making it feel more active and hopefully syncopated.
B. ORGANIZATION OF SECTIONS

The first of the three sections in the second movement features pizzicato. The pizzicato strings gradually change to arco in the second section. The third and concluding section combines elements of both the pizzicato and arco sections.

I developed sub-structures as compositional devices within each movement. In both the first and second movements, there are melodic and rhythmic ideas and procedures taken from Lucumé chants and the batá drumming concepts. In Cuba, Lucumé is the term used to refer to Afro-Cubans of Yoruba descent, and the language and religion of Yoruba tradition. The Yoruba people used the batá drum.13

The chants I used in the first and second movements are played in the slow section of the first movement, measures 97 - 141.

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Example 2.5, *Lifelines*, movement one, measures 97 - 129
The violins play Yemaya, a Lucumé chant. In the second movement the cello initiates the chant which is later echoed in the viola and then the second and first violins. This practice of receiving the call from the lowest drum, in this case the cello, and then getting responses from the other strings in turn, bottom to top, is common practice in the batá drumming tradition. Rhythmic ideas were also echoed from the cello on up through the viola and second and first violins mimicking the call of the batá drums.
Since clave is made up of a three side and a two side, I "combined" the accents on both sides to form five note motifs. Five pulses or notes are one of the rhythmic motifs that I used in Lifelines. This five note pattern over a 4/4 or 2/4 meter will repeat after five repetitions.

Example 2.6, Lifelines, movement two, measures 144 - 148
With other sections, I employed five beat notes. Whole notes tied to a quarter note also will repeat after five repetitions.

Example 2.9, *Lifelines*, movement two, measures 168 - 175

The combination of the five pulse motifs and the batá call and response technique is reflected in many sections of the second movement. The five note repeated motifs and the call
and response techniques are use to incorporate the
polyrhythmic feel and antiphonal singing that is a part of
the African musical traditions that are flourishing to this
day in the Caribbean.¹⁴

III. HARMONY

The harmony in Lifelines plays an ancillary role to the rhythm because principally the batá drums influenced this piece. However, the harmony does have some framework that reflects some of the influence of Afro-Cuban traditions. The numerous applications of the repeated five note motifs are allusions to the pentatonic scale, which is a part of Afro-Cuban music. The military band music of the Spanish colonizers as well as "the harmonic developments and innovations introduced by the Europe Impressionists, mixed with African-derived harmonies (such as pentatonic and "blue" tonalities)"¹⁵ served as influences to Cuban music. These devices serve as influences on Lifelines as well. Michael Spiro, a noted authority on Cuban music, stated in an interview, "there is no drumming without singing or chant."¹⁶ In other words, the music tradition does not separate drumming from vocals they are not discrete. Since sung chant parts are a part of the batá tradition, the harmonies and tonalities of these chants are a part of Lifelines.

¹⁶ Interview with Michael Spiro, San Bruno, California, 2 April 2000.
In the first movement I begin with an A minor 11th chord (measure 1) with the 11th in the cello. I wanted the harmony to begin with a Western European chord over a differentiating note in the cello that would establish a movement under foot. It is also a metaphor for what the Africans experienced when they may have heard Western European harmony in the 18th and 19th centuries. The Africans heard the music of Europe and may have absorbed its tonalities, but their music had at its core a different foundation. This movement away from Western European traditions is realized in Lifelines movement one, when in the next 11 measures the outer voices collapse into an augmented chord (measure 11), and then expand out to a stack of fifth intervals in measure 16. This stack of fifths is a representation of the amalgamation of the two traditions. It is a chord without major or minor implications and since it is really an outgrowth of the second partial of the overtone series, it is a kind of primordial chord.

The interval of a fifth and the number five continue to play important roles in Lifelines. As described previously, the pentatonic scale was an outgrowth of the African mix with the European harmonies and many of the
motifs are in-groups of five. The cello starts in measure 17 with two double stops at the interval of a fifth on the cello's open strings. This measure is followed in measure 18 by a group of three notes that almost sound like two notes because of the D repeated with a G added as a double stop. In measure 19, we have another double stop at the interval of a fifth on the cello's open strings that makes a total of three. This motif is like a rhythmic group or cell of five notes. These five notes enclosed in a duple time signature of 2/4 over the course of three measures of music. The series of five note cells repeats five times ending in measure 31. The viola responds to the cello motif and picks up the open string fifth intervals with its own rhythmic group. The viola's motif, which starts in measure 30, is four double stops in a row followed by an eighth note rest, which forms a group of five. This group of five is repeated five times and ends in measures 53.

In measure 55, the meter changes to 4/4. This section marks the beginning of the dispute between A minor and A major. A harmonic question that actually starts "five" measures later in m.m. 58. From m.m. 60 to 96, the instruments utilize various motifs based on the number five either in a group of five notes or in accent markings.
There is also the salsa bass pattern used at the interval of a fifth in various parts of this section, which is part of the "three" side of clave. In measures 94 - 95 the 2/3 clave cadence in an ambiguous key of either C major or A minor signals the end of the section and in measure 96 the cello's absence leaves further doubt of the tonal center.

The larghetto section that begins with the cello playing the open string double stop of C and G. This really establishes either C major or minor as a tonal area however in measure 99 the first violin enters with the Yoruban chant melody primarily in G major. This move to the dominant of C (G) is further reinforced by the appearances of the leading tone (F#) in various places over the next 17 measures. The addition of C# in measure 125 implies the dominant of G. This is realized in measure 130 with the cello and viola holding open D and G and holding on the fermata D major chord in measure 141. This is followed by a 14-measure transition to a C triad over a D bass note in the cello in measure 155. The chord is really a signal that the C tonality is returning.

In the next measure the "key" of C returns with the same melody, motifs, rhythms, and 2/4 time signature as in the beginning of this movement. The only difference is that
in the final cadence, it is in A minor. This is the midpoint of the two movements of the string quartets and serves as a mark of the way back to the tonic key in movement two of *Lifelines*.

Movement two is more an exploration of the rhythmic elements of the two - three clave motifs and the related groupings of five note patterns than a harmonic progression. The opening six measures comprises a kind of fugue with the interval of a fifth emphasized and the bowing slurred to underscore the two and three side of clave.

This also previews the five note patterns that will appear later in the movement. Movement two starts in "F major / D minor" however, the numerous B flats, E flats, and A flats used in the first 33 measures demonstrate the link to the parallel minor of C major from the beginning of the first movement. By measure 40, the cello’s entrance on the low F makes the key of F major more evident. The measures that follow start the real use of the five note motifs and the use of call and response. The cello or viola will start a "call" and the instruments above respond. The responses are not always exact imitations but the rhythmic contour or shapes are employed. The key of B flat starts
being hinted at in measure 64 by the cello. The cello plays chant melodies centered on B flat major until measure 97. From measure 97 until measure 228 in the viola, the flats evaporate for the most part and C major or A minor has returned. In the final cadence, measure 238, the notes from bottom to top G, F, C, and G, spell the combinations of the general harmonic areas that were used in both movements.

The final cadence of the second movement also shares the notes of a harmonic series starting with the fundamental, octave, fifth and fourth. In using this partial overtone series as the final chord, the conclusion is to return to the fundamentals of sound and the basic properties of sound from which the Africa music started. Since key is a convention of the tonal system of tonic and dominant relationships, I had difficulty placing this piece into key relationships. I did make an effort to bond the two movements by tonal relationships and that is what makes the two movements cohere.
IV. CONCLUSIONS

A. SIGNIFICANCE OF THE COMPOSITION

The string quartet genre has been the province of primarily European music. In an attempt to expand the types of material used for the string quartet, I decided to incorporate Afro-Cuban music. Lifelines is not the only composition that uses African or Cuban music as an influence. However, the inclusion of the batá rhythms, chant, as well as the exploration of the clave motif as a basis for five note groups is distinctive to the string quartet genre. Making Afro-Cuban batá rhythms the focal point of a string quartet is an introduction to the exploration of the mixture and cross pollination of the African and European traditions. The violins in movement two act as timekeepers and responders to the calls given by the cello. This almost submissive role of the violins to the cello is a distinctive feature of Lifelines. The focus on the cello as the main solo and melody provider is unusual to the traditional string quartet format.
B. FUTURE PROJECTS

The synthesis of Afro-Cuban and European music provides a rich area for composition and performance. I am very interested in exploring the fusing or melting of Afro-Cuban music with symphonic band, wind ensemble, orchestra, guitar quartet, and choir.

The symphonic band literature could be expanded with the use of Afro-Cuban rhythms. For example the low brass sections could represent the low drum of the batá. The trumpets, horns, and other sections could perform the function of the middle drum. The flutes and clarinets would function as the high drum. Finally, the percussion section could provide more melodic features with the low batá / low brass sections. This exchange between the various sections of the symphonic band could explore batá drum group interactions as well as the rhythmic motifs and derivations from clave. The wind ensemble or the brass quartet would be a rational extension of the string quartet/batá fusion. As with the symphonic band the low brass would supplant the low batá drum in a brass quartet or wind ensemble. The other instruments would emulate the respective parts of the batá ensemble. The guitar quartet is another instrument group that could easily use the concepts applied in
Lifelines. The lower strings of a guitar could be tuned to lowered notes and the guitar playing the high okonkolo or omele batá drum could use a capo on one of the higher frets. In theory, the solo guitar could play all the parts of a batá group. This could work if the guitarist playing the proposed piece were able to play an ostinato on the top string while playing chant melodies on the bottom strings. This is a technique that I am interested in exploring for jazz guitar as well as classical guitar. A choral group could sing the parts of the batá ensemble if they were able to imitate the sounds of the various drums. This could be a very different and difficult piece for a traditional choral group and would perhaps need a unique form of notation. The result of the experimentation of mixing the music from Africa and Cuba with European forms can be challenging. The resulting music could really be exciting and refreshing.
APPENDIX

Lifelines Score
Lifelines

Movement One

for String Quartet

Chorale Like $\approx 104$

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Lifelines

Movement Two
for String Quartet

David Yamasaki

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198
Vln. 1
Vln. 2
Vla.
Vc.

205
Larghetto a poco a poco
Vln. 1
Vln. 2
Vla.
Vc.

213
Vln. 1
Vln. 2
Vla.
Vc.
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