Two Etudes by Unsuk Chin: No. 1, in C, and No. 6, Grains, for Piano

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TWO ETUDES BY UNSUK CHIN:
NO. 1, *IN C*, AND NO. 6, *GRAINS*, FOR PIANO

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A Treatise submitted to
College of Music
in partial fulfillment of the
requirements for the degree of
Doctor of Music

Degree Awarded:
Spring Semester, 2013
Doori Yoo defended this treatise on February 5, 2013.
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ACKNOWLEDGEMENTS

My first and deepest thanks go to God, who is my constant source of strength. My entire life, including this very treatise, reveals His faithfulness.

I would like to express my very special gratitude to my major professor, Dr. Read Gainsford. I could not have completed this treatise without his many hours of help and guidance. I am ever grateful for the support that I had from this incredible artist. Because of his excellent teaching, my doctoral studies were both fruitful and tremendously enjoyable. The ingredients for his teaching always included knowledge, curiosity, creativity, openness, as well as genuine care for his students. It is this art of teaching that inspired me to be a teacher of piano.

I owe much to my committee members: Dr. Michael Buchler, Dr. Joel Hastings, and Dr. Timothy Hoekman. Dr. Buchler’s insightful and creative ways of looking at music in class motivated me to study the scores better. I am thankful for Dr. Hoekman’s thorough guidance with my treatise, as well as Dr. Hastings’ agreeing to be on my committee after Prof. Leonard Mastrogiacomo retired.

I have special appreciation for my former piano teacher, Daisy de Luca Jaffè. Without her I could not have begun my doctoral studies. She is the one who taught me to overcome difficulties through determination with a positive attitude, both in music and in life.

I wish to express my heartfelt gratitude to my mother, Lim Bog-Heui, who constantly surrounded me with prayers and words of wisdom; and to Wendy and David Seaba, who lavished love on me from the moment I stepped into the United States and became my family away from home.

To my many friends and family that encouraged me and stood beside me throughout my life, your existence in my life means more than words can express.
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ABSTRACT

Unsuk Chin’s *12 Klavieretüden* (1995-2003) give a microscopic view of her compositional style. Chin (b. 1961) is a Korean-born composer who has developed a worldwide reputation since winning the Grawemeyer Award in 2004. Etude Nos. 1 and 6 from *12 Klavieretüden* display her meticulous organization of musical elements including rhythm, dynamics, and pitches. These two etudes also show an aspect of the diversity in her writing style in that they apply techniques of and simulate the sound of electroacoustic music as a means of creating unique sonorities from the piano.

This treatise provides background information on Chin’s Etudes through a biographical sketch of the composer and general overview of her compositional style in Chapter 1 and an introduction to electroacoustic music in Chapter 2. Chapter 3 examines the two etudes in depth and explains how Chin achieves both unity and variety through specific organizing principles.
INTRODUCTION

Unsuk Chin’s 12 Piano Etudes (1995-2003) are an important addition to the body of contemporary piano etudes that follow the lineage of Chopin, Liszt, Debussy, and others, allowing the composer to showcase his or her compositional style while providing the performer with opportunities for virtuosic display. Examples of these contemporary piano etudes include Piano Etudes Book 1 (1985), Book 2 (1988-1994), Book 3 (1995-2001) by György Ligeti and 12 New Etudes for Piano (1988) by William Bolcom. Chin’s etudes are fine examples of her unique compositional style which blends techniques of electroacoustic music\(^1\) with cultural influences from both East and West.

Korean composer Unsuk Chin established her international career soon after she won the prestigious Grawemeyer Award in 2004. Born in 1961 in South Korea, Unsuk Chin finished undergraduate study at Seoul National University and moved to Germany to study with György Ligeti in 1985 at the University for Music and Theatre in Hamburg (“Biography,” 2012). Since then Chin has remained an active composer residing in Berlin.

Chin achieves her appeal to audiences using both vivid instrumental colors and an eclectic choice of compositional materials. Her compositions, especially the orchestral works, evoke shimmering colors that come from her frequent use of the overtone series and natural harmonics. These vivid colors also come from Chin’s use of extended techniques for standard instruments, and rare instruments such as the Chinese sheng. Her compositions make reference to music from diverse time periods (e.g., the polyphony of Guillaume de Machaut from the medieval era and the chance operations used by John Cage from the mid-twentieth century) and she uses electronic resources including microphones and loudspeakers. According to conductor Kent Nagano (2007), “Her music can never be pinpointed as having a single, specific style. It remains eternally fresh, original and full of surprises. She mixes and matches well-known parameters, uses rhythm as colour, colour as tempo, interweaves catchy tunes with unexpected harmonies” (para. 3). She combines elements from various composers and countries such as the aksak rhythm\(^2\) used by Bartók and Balinese gamelan music without adhering to a specific national flavor (her music does not reflect Korean music immediately),

\(^1\) Music that uses electronic sound. The word electroacoustic is generally accepted today to include both purely electronic music and music that involves both electronic sound and

\(^2\) The aksak rhythm refers to the irregular subdivision of meter such as 3+3+2 within an eight-beat bar found in Turkish folk music. Aksak is a Turkish term that means ‘limping,’ which describes the asymmetricity, or ‘limping,’ of the rhythm (Reinhard, 2012).
which forms another aspect of the eclecticism of her music.

While most of her compositions are large-scale orchestral works, Chin has written three solo instrumental works to date. Among these solo instrumental works are the piano etudes, her only composition for solo piano. Chin has published the first six piano etudes under the title *12 Klavieretüden*. This is a continuing project—she has set aside the etude-writing at the present time because of bigger commissions such as orchestral pieces and an opera (Chang, 2006). These etudes provide challenges to performers both technically and musically, with their extreme velocity, polyrhythms, and intense drama. Recent studies (Chang, 2006; Yoo, 2005) show that these etudes continue the line of the Romantic Piano Etude—intended as both a practice piece and an artistic piece for performances—and that they reveal some similarities to Ligeti’s etudes in terms of the focus on polyrhythms and the frequent use of ostinato. These studies also describe various influences on the etudes including gamelan music, Korean traditional percussion ensembles, Romanian and African rhythms, Conlon Nancarrow’s compositions for player piano, *aksak* rhythms used by Bartók, and additive rhythms described and used by Messiaen (Yoo, 2005).

Studies by Chang and Yoo cover many aspects of and influences on Chin’s etudes, but they do not provide in-depth discussions about the influence of electronic music. In many interviews, Chin emphasizes how her experiences in the electronic music studio in Cologne altered her style of writing acoustic music. The style of Chin’s electronic music permeates her acoustic compositions, either by directly using techniques found in electronic music or by simulating the sounds of electronic music. According to Paul Griffiths (2003), many of her orchestral compositions possess certain qualities of spectral music, which is also rooted in electronic music. Spectral music, according to the *Oxford Companion to Music* (2012), originated in France in the late 20th century, created by a group of composers whose common objective was “to explore the acoustic properties of sound itself and the psychology of musical perception (of tempo, sound, and pulse),” (para. 1) using the analysis of sound given by the computer. Composers of spectral music also use the overtone series as a generating principle of their compositions. Chin also favors the overtone series in her compositions, as seen in Etude No. 1, in C. The influence of electronic music on these etudes sets them apart from other piano etudes of the past and the present.

While detailed analyses of four of her etudes (Nos. 2, 3, 4, and 5) exist, there has been little discussion of Etudes Nos. 1 and 6. This may be because Nos. 1 and 6 are more difficult to read (there is an overabundance of notes) and understand. However, these two etudes highlight important and original elements of her compositional style and merit similar
attention.

The purpose of this paper is to provide background information on the etudes. To capture the essence of her etudes, one must understand all the elements that have influenced her composition, including electronic music. Since electronic music may be unfamiliar to many pianists, providing a survey of the history of electronic music and description of some of the main techniques will be useful. These piano etudes are less familiar to pianists today because they were composed within the past twelve years. Without any prior knowledge of Chin’s music, pianists may find her style of writing in these etudes difficult to understand. By providing some important background information associated with the etudes by Chin, I will help pianists better understand her works.

The second purpose of this paper is to provide a contextual analysis of Etudes Nos. 1 and 6, which may assist pianists interested in learning these seemingly abstract and formidable works. Understanding how the music is organized will aid the performer and others who wish to know this music.
CHAPTER 1
UNSUK CHIN’S LIFE AND COMPOSITIONAL STYLE

Biography

Composer Unsuk Chin was born in 1961 into the family of a Presbyterian minister in Seoul, South Korea. Several family members became culturally important figures in Korea: Unsuk’s sister Hwe-sook is a music critic; the youngest of the family, Jung-gul, is a computer programmer; and her brother, Jung-kwon, is a writer, philosopher, leading educator, cultural critic, and politician. Their interest in music, technology, and culture helps them challenge and inspire each other in their respective fields. For example, Unsuk’s sister, Hwe-sook, publishes criticism and reviews of Unsuk’s compositions (Chin, 2007).

In many interviews, Unsuk Chin has mentioned her experience with music in her childhood. Although she received hardly any formal musical training growing up, Chin showed determination to learn music from an early age: almost everything was self-taught. She learned to read music from her father; she learned to play the piano by playing for her father’s church services and by accompanying her sister’s singing; and she learned to compose by hand-copying famous composers’ scores.

After three initial rejections, she finally was admitted to Seoul National University to study composition in 1981. Reflecting on her past college years, Chin (2006) says that her education at Seoul National University widened her view of contemporary music, especially through her studies with Professor Sukhi Kang. Until she met Kang, Chin’s knowledge of contemporary music did not go beyond Stravinsky. Journalist Kim (2010) reports that Kang introduced her to the writing style of the Western post-war *avant-garde* including Stockhausen, Boulez, Ligeti, and Penderecki. Kang also had written some electroacoustic pieces and worked at the Electronic Music Studio of Technical University in Berlin, where Chin would later study.

While in college, Chin proved her exceptional skill in composition. Chin won several international competitions for new music, one of them the first prize from the Gaudeamus Foundation in 1985. In that same year, Chin won a DAAD scholarship from the German government, which provided funds for her to study composition with György Ligeti (1923–2006).

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3 DAAD: Deutscher Akademischer Austausch Dienst (German Academic Exchange Service)
2006) at the University for Music and Theatre in Hamburg from 1985 to 1988. This opportunity changed her life in many ways. South Korea in the mid-1980s was under the military dictatorship of Du-hwan Chun. During this time, many college students protested against the dictatorship. Because of this politically unstable society, Chin wanted to live in “an open society” where she could freely express her thoughts (Chin, 2006). The scholarship to Germany gave her that opportunity.

Her study with György Ligeti, one of the best-known living composers of that time, proved a catalyst in Chin’s life as a composer. When Chin took her prize-winning pieces to him, Ligeti would disapprove and say, “Throw all this away. There is nothing original in these pieces” (Chin, 2006). His disapproval made Chin desperate to come up with a new compositional style. The process of Chin’s finding her own style in some ways reflects Ligeti’s own development in that they both rejected the European trend of the 1950s.

According to Paul Griffiths (2012), Ligeti left his home country of Hungary after the Hungarian Communist Revolution of 1956 and found himself in Western Europe. At his first hearing of the music of Western avant-garde composers such as Anton Webern and Pierre Boulez, Ligeti familiarized himself with the serial technique used in their music, but he was always suspicious of using it in his music. Instead of embracing this new technique, he carefully developed his own language. In the late 1950s, Ligeti spent time in an electronic music studio and composed music that focused on texture and sound density. This is reflected in his Apparitions (1958-59) and Atmosphères (1961), which create sustained sound-masses traveling through different regions of colors, harmony, and texture. As he continued to broaden the horizons of his compositional world (during which process he also stopped composing for a long period of time), he became interested in and stimulated by non-Western musical elements. In the year Chin began to study with him he had finished his first book of Piano Etudes (1985). To Ligeti, who had journeyed long in search of a new musical language, Chin’s music, which was still rooted in the Western avant-garde style, appeared outdated and lacking in individuality. Chin took Ligeti’s criticism to heart and examined her works and her identity as a composer more seriously (Yoo, 2005). Chin tried to find a different compositional technique other than the serial technique, but she could not come up with anything. This time of searching was extremely difficult for her, making her feel unable to compose anything for the next three years.

In 1988 Chin began to experiment at the Electronic Music Studio of Technology University in Berlin. This experience was the turning point in her life. In an interview with Yoo (2005) Chin described,
Since the process of composing electronic music is very abstract and complicated, it requires a total revamping of how one thinks about music. After [working with electronic music] my point of view towards music changed and I could apply that into my acoustic music when I returned to writing acoustic composition again. It was indeed very helpful for me to find a way to write music with my own voice (p. 151).

She redefined her view of music during this time, as many other composers of her generation have after experimenting with electronic music. She began to write again—this time, with sounds she believed came from her inner self. The composition that marked Chin’s new journey as a composer was *Gradus ad Infinitum* (1989) for tape. In an interview with Ehrler (2001), Chin remarks that the huge advantage of writing electroacoustic music is the ability to hear the result of her own composition in the studio exactly as it will be heard in the actual performance. She explains that often composers are surprised by the sound when their pieces are played by acoustic instruments, but that is not the case with electronic music. To Chin, writing electronic music still involves organization of musical ideas, like writing for acoustic instruments; the difference is how one manipulates the sound material, since there are entirely different kinds of sound material available for electronic music.

After *Gradus ad Infinitum* (1989), Chin wrote two more electroacoustic compositions: *ParaMetaString* (1996) and *Xi* (1998). *ParaMetaString* was commissioned and performed by the Kronos quartet, a group that actively promotes new music with their diverse, daring and inventive programming in concerts. Besides these electroacoustic compositions, Chin composed *Acrostic-Wordplay* (1991, rev. 1993) for soprano and an ensemble of eleven instruments. This was her first acoustic work since she began to work in the studio. With this piece, Chin’s status as a composer skyrocketed, and her style began to emerge clearly, presenting a distinct sense of fantasy and shimmering colors.

In 1999 Chin began to work with American conductor Kent Nagano (n.d.), who is known for his “inventive, confrontational programming” (para. 1) in Germany with Deutsches Symphonie-Orchester Berlin. In 2001-2002, Chin was appointed composer-in-residence for the Deutsches Symphonie-Orchester, where Nagano was the artistic director and chief conductor. The Deutsches Symphonie-Orchester commissioned a violin concerto from Chin, for which she received the prestigious Grawemeyer Award in 2004. Warren Lee (2004), journalist of the *Korean Herald*, writes, “Unsuk Chin has been a member of an intellectually demanding, though not always listener-friendly, precinct of Europe’s contemporary music scene. But her *Violin Concerto* represents a departure that may very well endear her to a new legion of listeners” (para. 1). Chin’s *Violin Concerto* (2001) was received well by critics, composers, and even by audiences with little prior interest in contemporary music.
More recently, she composed the opera *Alice in Wonderland* (2004-07). Interestingly, Ligeti also had started writing an opera with the same title, though he never finished it. Chin’s opera serves as an example of her interest in surrealistic art, and Lewis Carroll’s literary works appear frequently in her works as texts. *Alice in Wonderland* was premiered as the opening work for the 2007 Munich Opera Festival at the Bayerische Staatsoper. Chin was the first female composer to have an opera performed at Bayerische Staatsoper in its two hundred year history (Chin, 2007). With David Hwang’s libretto and Kent Nagano conducting, the opera was a huge success. *Opernwelt* selected *Alice in Wonderland* as its prestigious World Premiere of the Year, and the opera continues to be performed around the world.

Chin is highly sought after as a composer, with frequent commissions by major orchestras and ensembles. While she resides in Berlin, Germany, she is regularly invited to Korea both to present her own compositions and to introduce other contemporary music to Korean audiences.

**Compositional style**

When Chin received the 2004 Grawemeyer Award for Music Composition$^4$ for her *Violin Concerto* (2001), the award committee (2003) introduced Chin as a composer “known for the diversity of her music” (para. 4). The diversity is apparent in her choice of genre and sound media, adding electroacoustic music to the now standard orchestral, solo, and vocal genres, and in her blending of old and new, of Eastern and Western traditions. Chin (2005) has spoken of her goals as a composer thus: “I want to write music that speaks to all kinds of people. . . . I write pieces for many different types of listeners” (p. 146). As opposed to Morton Feldman (1972) who said, “I don't write my music in relation to the attitudes of the public” (para. 5), Chin aims purposely to reach diverse audiences through her music. This chapter examines the means that Chin uses to appeal to an intentionally wide range of listeners, including developing of complex music from a simple organizing principle, choosing compositional materials deriving from various places and time periods, and providing aurally stimulating experiences through bold expressions.

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$^4$ A prize awarded annually by the University of Louisville
Simple organizing principle

Chin develops complex music from a simple organizing principle such as a single note, harmony, or a specific instrumental technique. This style of writing continues the compositional style her teacher Ligeti once sought in the 1950s as a reaction to serialism. Toop (1999), in his book György Ligeti, documents Ligeti’s comment on his departure from serialism to simpler musical elements:

I started to experiment with simple structure of rhythm and sounds, in order to evolve a new music from nothing, so to speak. I regarded all the music I had known and loved up to then as something I couldn’t use. I asked myself: what can I do with a single note: what can I do with the octave, or with an interval, or two intervals, or a specific rhythmic situation (p. 38).

Ligeti’s experiments with the simplest musical elements were almost obsessive in his Musica ricercata (1951-53). In the first movement of Musica ricercata, for example, he uses the pitch class A as the subject. No other pitches but A appear until the last note, yet the music is interesting because of its rhythmic organization and the registral changes in the use of the pitch A. Chin took a similar path away from serialism. Like Ligeti, she chooses simple musical elements such as a pitch, a rhythm, or an instrumental technique as the compositional material and develops it into complex music.

An example of Chin’s focus on a simple organizing principle appears in her ParaMetaString (1996), for tape and amplified string quartet. This piece demonstrates her use of a single pitch as the organizing principle. The first and the third movement of ParaMetaString (1996) explore the pitch D on stringed instruments. D becomes the point of departure in both movements. In the first movement, all instruments play D only for the first 21 measures and then gradually move to other pitches by way of tremolo. In the third movement, according to the composer’s program notes, the cellist’s D (recorded on tape) gradually moves downward, while the other strings (live) move the D upward in fluctuating fifths using glissando (Chin, n.d.) (Example 1.1).

In the same composition, Chin also chooses specific instrumental techniques as the subject. Since it is composed for string quartet (commissioned by the Kronos quartet), it features string techniques such as tremolo, pizzicato, and col legno. For example, in the first movement, all four string instruments play a tremolo on D along with the prerecorded sound of string tremolos as shown in Example 1.2.
Example 1.1: ParaMetaString, third movement, mm. 73-79

Example 1.2: ParaMetaString, first movement, mm. 8-12
Chin also displays the use of a simple organizing principle in the opening movement of her *Violin Concerto* (2003). This movement focuses on the interval of a fifth. Using mostly open strings and their natural harmonics, Chin explores the interval of a fifth in various registers and pitches. Because of her obsessive use of open strings, at times the music sounds as if Chin purposefully imitates the tuning of the instrument. While the music is made colorful and exciting through the extreme virtuosity and careful orchestration, Chin’s focus on the interval of a fifth creates a certain simplicity, making this piece both thrilling to listen to and easy to understand.

Another example that uses a simple organizing principle is the fifth movement of *Acrostic-Wordplay: Seven Scenes from Fairy-Tales for Soprano and Ensemble* (1991, rev. 1993). It uses a simple musical element—a D-Major triad—as the subject. In the opening of the fifth movement, the orchestra in the background plays an ostinato rocking back and forth between F# and D, the third and the root of the D-Major triad. A few seconds later, the soprano enters on A, completing the triad. The soprano sings using solfège as the lyrics in this movement. “La” is the first word, being the pitch A. After sustaining the A for about nine seconds, the soprano completes the triad by singing "La fa re," the descending broken chord. Next, she and all the music digress to a different harmony with A as the common tone: “La sol mi.” She then returns to D Major, but this time adding the 7th: “La fa re do.” While the soprano continues to vary and extend this D Major triad, the orchestra elaborates on the initial F#-D ostinato in multiple layers. This polyphony creates interesting rhythms and textures (See Example 1.3).

*ParaMetaString* (1996), *Violin Concerto* (2003), and *Acrostic-Wordplay* (1991, rev. 1993) all illustrate how Chin develops complex music from a simple organizing principle. These examples do not mean, however, that her compositions are simple. Rather, her music is virtuosic, its scores tightly packed with small black notes. Her music explores the possibilities of the simplest elements by arranging them in the most complex ways. Paul Griffiths (2003) comments, “The ostinatos and oscillations of small melodic cells, drawn from Balinese gamelan music, became ways to define chords on musical courses that dart along through harmonies of complex lustre” (para. 2). Even the simplest melodic cells such as ostinatos can become the source of the colorful harmony in Chin’s sound world.
Eclectic use of compositional materials

Along with using simple organizing principles, Chin’s purposeful appeal to a diverse audience is seen in her eclectic use of compositional materials. Her music crosses geographical boundaries. Hanno Ehrler (2001) remarks, “The music of Unsuk Chin evades
any attempt of stylistic or geographic classification” (p. 2). Griffiths (2003) agrees, saying, “Her music makes no parade of national flavor.” He considers this “one of her strengths” (para. 3). Since she is Korean, one might expect her music to show some Eastern qualities. In her music, however, it is difficult to find her native country’s sounds. Rather, the Eastern and Western qualities are incorporated without drawing attention to themselves and are transformed into something new and idiosyncratic to Chin’s voice as a composer.

This seamless use of both Eastern and Western qualities can be seen in features such as the use of Eastern instruments within Western contemporary idioms, the drawing of subjects for her compositions from all over the world, and the use of many different languages for titles of her compositions. Šu (2009) is a concerto for the Chinese wind instrument sheng and orchestra. According to the article “Unsuk Chin: New Šu for Chinese sheng and orchestra” (2009), Chin wrote Šu for Wu Wei, a Chinese sheng player who contributed much to “transform the ancient mouth organ into a modern performance instrument” (para. 1). In an interview with David Allenby, Chin (2009) clearly states that her intention was not to mix the sound of East and West:

You can’t decide on one day to take a few Eastern and Western instruments by random and write interesting music. . . . For me, the idea to write a sheng concerto was not to pursue a mixture of East and West. I always simply try to compose my own music, because I believe every new piece has to have an individual voice in the midst of all these bewilderingly different possibilities (para. 6-7).

Rather than trying to bring out the unique Eastern sound of an instrument, Chin looks for the instrument’s potential to be a part of the sounds in her imagination. She does not set the music for the instrument but the instrument for the music. As a result, the music does not sound Chinese per se.

In Allen’s interview, Chin (2009) explains the versatile capability of the sheng in this way: “Because of the key mechanisms, it has the potential for chromaticism, microtones, chords, polyphony, clusters. . . . And at times, it can sound like electroacoustic music and the instrument is capable of the eerieist sounds and of explosive power” (para. 5). Much like her treating a synthesized tone as an instrument in an electroacoustic music composition, Chin treats the sheng simply as an instrument, not an Eastern instrument. By extending and exploring the capabilities of the instrument, she is able to create music that is eclectic, free of specific geographic boundaries.

Chin uses elements of the Balinese gamelan music in a similar way. In gamelan music, small motives repeat, constantly varied in each presentation. Chin uses this musical element from the East in Western contemporary idioms, for instance in Piano Etude No. 1, in C. In
this etude Chin uses a broken CMm7 chord as an ostinato in the middle register of the piano, constantly varied in each presentation as in Balinese music (See Example 1.4). The scintillating effect created by the use of fast-playing, high-pitched percussion instruments in gamelan music is also adopted in this etude in the upper register, where multiple dissonant intervals are played rapidly.

Example 1.4: Etude No. 1, mm. 1-7

Yoo (2005) points out that Chin’s use of multiple strata resembles the music of the gamelan ensemble in which each percussion group plays a specific role: “[In a gamelan ensemble,] one [instrument] plays the main melodic materials, the second embellishes it, and the third
provides purely rhythmic figures. The distinctiveness of each voice in Etude No. 1, *in C*, resembles this division” (p. 91). That Chin applies the procedures of gamelan music in a contemporary piano etude is another example of the eclecticism in her music.

Chin also has an eclectic use of languages in the titles of her compositions. The titles appear in multiple languages, ranging from ancient Sanskrit to German. Below is the list of some of the titles used in her compositions, with their origins and meanings, as provided by the website of Boosey & Hawkes (2012):

- **Santika Ekalata**: (Ancient Sanskrit phrase) “Harmony to avert evil”
- **Šu**: (Shu, an Egyptian deity) Egyptian mythology in which it is a symbol for air
- **Gougalon**: (Old High German) “to hoodwink; to make ridiculous movements; to fool someone by means of feigned magic; to practice fortune-telling”
- **Xi**: (Korean) Nucleus, core
- **Miroirs des temps**: (French) Mirrors of time
- **snagS&Snarls**: (English)

Appropriately for the titles, she draws the subjects of these compositions from all over the world. For example, *Gougalon* (2011), a composition for instrumental ensemble, was inspired by her trip to China (Hong Kong, Guangzhou, and other cities) in 2008-2009. Not very far from the modernized cities were old, poor residential areas which brought up her memories of Seoul in the 1960s. The subtitle of the music “Scenes from a Street Theater” summarizes the content. Chin (n.d.) comments,

> I was particularly reminded of a troupe of entertainers I saw a number of times as a child in a suburb of Seoul. These amateur musicians and actors traveled from village to village in order to foist self-made medicines – which were ineffective at best – on the people. To lure the villagers, they put on a play with singing, dancing, and various stunts. (I still recall that the plots almost always had to do with unrequited love, and that the performance inevitably ended with the heroine’s suicide (para. 1).

She turns the scenes from a street theater into a folk music that exists only in her mind. In other words, she does not refer directly to the primitive music of the amateur musicians from the street theater; instead, she creates her own folk music which pretends to be primitive within her own contemporary idiom.

Chin’s eclectic use of compositional materials is also evident in her drawing musical
textured by the aestheticism of the past and the mirror images seen in its structure, which is a musical palindrome. Harders-Wuthenow (1999) states that Chin adapts music from the early 15th century—a Cypriot virelai and a ballata by Johannes Ciconia—in two of the seven movements in Miroirs des temps (1991). In the third movement of the same work, Chin makes reference to Machaut’s rondeau, Ma fin est mon commencement, Mon commencement est ma fin (14th century), by directly quoting the text of this rondeau. According to Harders-Wuthenow (1999), this specific rondeau by Machaut was one of the earliest examples of a musical palindrome. Using this compositional device from the rondeau, Chin creates an eighteen-part polyphony, a remarkable change from the original three-part polyphony by Machaut (Harders-Wuthenow, 1999). The eleven-voice crab canon in the fourth movement also demonstrates Chin’s employing the musical style of the medieval period. Not only does Chin draw musical examples from the past, but she also adapts modern compositional devices. Chin employs chance elements from the twentieth century in her piece Allegro ma non troppo (1994/98) for solo percussion. According to the concert reviews by Jeffrey Edelstein (2011) and Jiwon Kim (2007), the solo percussionist is to rip open the cardboard box immediately after he comes out to the stage. The noise which comes from ripping the paper becomes part of music. During the performance, the percussionist makes many other noises including ruffling tissue papers, breaking wine glasses, and rattling a trash can. Because each performance is slightly different, depending on the performer’s acting on the stage, it can be said to include chance elements as an important component.

The last element which contributes to Chin’s eclectic use of compositional materials is that of the sound medium. Using electronic sound (the myriad of sounds that can be synthesized) in addition to acoustic instruments has become a gateway to a whole new world of sound for Chin. Her experience in the electronic music studio did not just change her writing style of acoustic music; it changed her view of sound itself. As a result of this change, she frequently uses both media (electronic and acoustic) together in her compositions. Often, she makes the orchestra sound as a completely new instrument, similar to how she creates a synthesized sound out of many different sounds in electronic music. In one of her interviews, Chin (2009) said, “In the concertos for violin and piano, in the Double Concerto, and in my new sheng concerto I was seeking to merge the solo instrument and the orchestra into a single
virtuoso super-instrument” (para. 1). At other times, she treats electronic sound just like another instrument within an ensemble or orchestra, as in *ParaMetaString* (1996). In this live electroacoustic music\(^5\) for amplified string quartet and tape, the cello sound is prerecorded and processed electronically, and participates in the ensemble along with other string instruments playing live (See Example 1.5).

Example 1.5: *ParaMetaString* (1996), second movement, mm. 1-5

Another electroacoustic piece, \(\text{Xi}\) (1998), shows how Chin creates electronic sound from an acoustic instrument. This twenty-three minute long piece begins with a gradually developing electronic sound that sounds like constricted (almost asthmatic) breathing at irregular time intervals. This breathing-like electronic sound of indiscernible pitch which appears from beginning to end is created by recording a sound (sound which came from a piano whose strings were struck by a wooden stick while the pedal was depressed) and processing it electronically using granular synthesis technique (Ehrler, 2003). The electronic sound, then, originated from the acoustic instrument.

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\(^5\) Live electroacoustic music refers to music which uses electronic processing of the sound produced by the performer real time. Often, the performance requires another performer at the mixing console for manipulation of the electronics (Emmerson & Smalley, 2012).
The sound media she uses also include sounds from everyday objects and nature. For example clock noises, paper ruffling, a lion’s roar, and falling drops of water become part of the percussion family in an orchestra, as seen in *Allegro ma non troppo* (1994 for tape, 1998 for percussion) and *Alice in Wonderland* (2007). Using diverse sound media regardless of their origin is an important aspect of the eclectic style of Chin’s music.

**Bold expressions**

Third, the most characteristic feature that leads to the broad appeal of her music is that it provides aurally stimulating experiences through bold expressions. If I can compare her music to visual art, it would not be a painting, but rather, an action thriller film. These bold expressions include brilliant color, virtuosity, and humor.

**Brilliant color.** Chin creates brilliant color in her music through the use of extreme registers, adventurous instrumentation, blurring of the sound, and extended instrumental techniques. Her choice of extreme registers is an important color-defining element of her music because it intensifies the timbres—it makes the bright brightest, and the dark darkest. Chin’s *Rocaná* (2008), which means "room of light" in Sanskrit, illustrates how effectively Chin uses extreme registers to enhance the color. From the explosive, thundering sound of the percussion and low brass instruments to the eeriness of the piccolo and strings, the repeated contrast of extreme registers plays an important role in making this music stimulating, exciting, and electrifying.

Using extreme registers is common in electronic music as well, which may be where Chin became at ease with it. Composers of electroacoustic music create their own timbres by controlling the frequencies and amplitudes of a number of sine wave oscillators. This allows them to create sounds ranging from barely audible ticking sounds to a rumbling sound of indiscernible pitch with minimal effort.

Chin’s adventurous instrumentation also contributes to the color of her music. Her recent opera *Alice in Wonderland* (2007) demonstrates how she creates color through instrumentation. Some of the musical forces included in this piece are the following:

Chorus of 40-60 singers, additional children’s chorus with a minimum of 20

Timpani, marimbaphone, xylophone, vibraphone, triangles, tamtams, sand paper blocks, crotales, finger cymbals,

alarm clock, pop-bottles, crystal wine glass, trashcans, wine glasses, forks, spoons, metal casseroles, metal rattles, metal grille, thin metal sticks, auto-horn, pea-whistle, bird-whistle, lion’s roar, siren
orchestral bells, plate bells, tubular bells, glass wind chimes, bell tree, woodwind chime, cencerros 
chromonica, sistrum, rachet, whip, flexatone, wind machine, anvil, timbales, 
Javanese gongs, Brazilian bamboo shaker, thunder sheets, bongos, guiro 
swanee flute, harmonica, harp, pianoforte, accordion, and mandolin.

Chin gives special attention to the percussion group, which has the widest variety of instruments. Her interest in groups of percussion instruments is apparent in *Double Concerto* (2002) for piano and percussion ensemble, in which Chin gives the percussion prominence as solo instruments.

Griffiths (2003) points out Chin’s skillful “instrumental matching” (para. 1) as an important source of the scintillating color in her music. Instrumental matching here refers to matching the specific quality of an instrument to the quality of a combination of different instruments. Griffiths (2003) uses a passage from the *Double Concerto* (2002) to illustrate the instrumental matching: here, Chin projects sound from “a solo horn into a complex mixture of piano, percussion, and string ensemble” (para. 1). Such metamorphosis of sound frequently appears in her compositions. Griffiths (2003) credits her experience in the electronic music studios as the source of her development of this technique:

As with the spectral composers of Paris, her work in electronic music deepened her awareness of how sounds could be constituted and transformed by purely instrumental means, and so of how the orchestra could be again the magic box it was for Rimsky-Korsakov or Ravel (para. 2).

Her skillful instrumentation makes Chin a prominent colorist among contemporary composers.

**Blurring sounds.** Another source of color found in Chin’s composition is what may be termed “blurring of sound.” Chin blurs sound by using microtonal intervals between pitches. In her *Acrostic-Wordplay* (1991, rev. 1993), Chin (1993) asks certain instruments—piccolo, alto flute, clarinet, harp, violin, and double bass—to be “tuned anywhere between a quarter and sixth of a tone higher than concert pitch,” and notes that “each instrument may take a different tuning” (Scoring section). When played together with other instruments that are tuned normally, this tuning mixes in sounds that are slightly off-pitch to varying degrees, thereby creating fine shades of unusual colors.

Chin’s *Violin Concerto* (2003) is another example that demonstrates the blurring of sound—in this case, by frequent use of glissandi and tremoli between half steps in the strings. This effect can be compared to using a modulation slider in electronic keyboards or synthesizers. The modulation slider changes the pitch only very slightly by adding vibrato to
the sound, which makes the pitch unstable.

The blurring of sound through unstable, off-pitch sounds can be found in her writing for the voice also. In Acrostic-Wordplay, the soprano purposely sings slightly off-pitch without vibrato, and slides between large leaps frequently, almost like yodeling. The off-pitch technique and vocal sliding are reminiscent of the Korean traditional vocal techniques used in several vocal genres—namely, Pansori and Gayageum byungchang. As cited in Jocelyn Clark’s dissertation *Jijijiji jujijuji. Korean Gayageum Byeongchang: History, Performance, and Libretti* (2005), Song Bang-Song defines Pansori this way:

A [vocal] musico-dramatic tradition, . . . in which a single singer performs a long dramatic folk tale through song (sori), speech (aniri), and action (pallim) with a constant drum accompaniment. . . . From the musicological point of view, . . . Pansori can be best described as the uniquely Korean style of folk operatic song, which was developed by professional folk musicians called gwangdae during the late period of the Joseon Dynasty (1392-1910) (p. 17).

In *Pansori* the singer switches back and forth between telling a story (with characterization) and singing, hence the notes are purposely off-pitch. Also, the changing of pitch (sliding) becomes an important method of adding color to emphasize specific words. While the quality of sound (straight tone is used in *Acrostic-Wordplay* [1991, rev. 1993]) used in *Pansori* and Chin’s music is completely different, they are similar in that their blurring the pitch creates microtonality as an important coloristic element. The various types of off-pitch technique in Chin’s music—in both instruments and voice—create iridescence, evoking an atmosphere of fantasy.

**Extreme virtuosity.** Another characteristic of Chin’s music that contributes to bold expression is the extreme virtuosity. A love of speed is found in virtually all her compositions—solo music or passages and orchestral music. In addition to frequent large leaps and rhythmic challenges, her piano etudes, for instance, call for extremely fast tempi as a display of virtuosity. For example, Etude No. 3 has a tempo marking “eighth note = ca. 200-208,” and it includes 32nd notes. Another example of extreme virtuosity is found in *Cello Concerto*. In an interview with Daniel Allenby regarding her *Cello Concerto* (2009), Chin (2009, June) said,

I try to explore the boundaries of the cello's expressivity and to broaden the definition of 'expression.' Therefore I also use special playing techniques and call for unusual timbres, including noises and rasping sounds. For me, this actually serves the expressivity by suggesting new meanings. The unique artistry of Alban Gerhardt inspired me immensely. Not only his solo part but also the orchestral parts are often
characterized by extreme virtuosity, by the idea of the instrumentalists being pushed to the edge (para. 2).

While extreme virtuosity is demanding for the performers, it can also be exhilarating to the audience.

**Humor.** Chin’s music also provides aurally stimulating experience through its use of humor. The humor in her music largely comes from her precise instinct for timing. For example, rests frequently appear between short melodic cells, and the patterns of these rests are slightly unpredictable, which often leads to a moment of surprise. These surprising moments are emphasized by big sweeping gestures, clashes, or clusters. Chin also frequently uses wide leaps, embodying playfulness and strong personality.

Chin’s music is diverse in scope, broadening its appeal to a wide range of audiences, through its use of a simple organizing principle, eclectic compositional materials, and bold expressions. To contemporary audiences, a majority of whom may feel a distance from contemporary music, these qualities are a large part of what makes her music more understandable. To performers, such qualities stand for Chin’s communicative power. This communicative power is also exhibited in her piano etudes, with many minute details of similar compositional style contained in fewer than six pages per piece. These characteristics in two of the etudes are discussed in Chapter 3.
CHAPTER 2
AN INTRODUCTION TO ELECTRONIC MUSIC

The influence of electronic music is the distinguishing characteristic of Chin’s piano etudes. Regarding electronic music Chin (2009, October 20) said,

[It] is a genre that holds the most important meaning in contemporary music. As much as German composer Karlheinz Stockhausen once predicted that instrument-rendered music will eventually disappear in the future and only computer-generated electronic music will remain, my faith in electronic music is strong (para. 6).

Her faith in electronic music is shown not only in her electroacoustic compositions, but also in many of her instrumental compositions, including the six piano etudes. Although there is an increasing number of piano pieces associated with electronic music, the topic of electroacoustic music is rather foreign to most pianists. In Klavierstück IX (1954/61) by Karlheinz Stockhausen, there appear special notations for pedaling to create sounds that simulate electroacoustic music. According to Luciane Cardassi (2004), the una corda pedal in Klavierstück IX was used for a special diminuendo effect which is associated with the filtering technique\(^6\) in electroacoustic music; depressing the damper pedal in rapid succession is associated with “an effect of sound unnaturally cut-off” (p. 16) in electronic music. To a pianist who is unfamiliar with electroacoustic music, it would be difficult to communicate these passages effectively. To help understand Chin’s etudes better, I will first discuss electroacoustic music and show how it developed.

Definition of Electronic Music

The term electronic music, more generally known today as electroacoustic music, can include music that involves live acoustic sounds as well as purely electronic sound. Chambers 21\(^{st}\) Century Dictionary (2011) defines electroacoustics as: “The technology of converting sound into electrical energy, and electrical energy into sound” (para. 1). Arnold Whittall (2012), in the Oxford Companion to Music, adds that electroacoustic music uses such technology for artistic, creative use. The development of electroacoustic technology led composers to significantly expand the possibilities of sound in musical composition.

\(^6\) Filtering technique: by setting the boundaries of the frequency, only the frequency that is within the boundary comes through. The resultant frequency is less than the original.
History of Electronic Music

Discussion of electroacoustic music begins with its source, electricity. The first use of electricity in sound production came through the invention of the telephone, which allowed sound of the voice to travel by electric current. The modulated electric current would then be changed back into sound by an electromagnetic device. An increased interest in voice communication by the telephone led to the development of recording technology. According to Israel (2012), Thomas Edison was inspired to invent the phonograph in 1877 while working on a telephone transmitter. His experiments with the telephone led him to think about ways to record telephone messages as a permanent copy mechanically, similar to writing down the dots and dashes of Morse code through a device used with the telegraph. Instead of writing down the telephone messages, Edison had the idea to record the sound itself, and realized this idea in his phonograph. Edison’s phonograph was purely mechanical, but later, improved phonographs (after 1925) used electricity to record sound, specifically in their use of a microphone to gather the sound. Electrical amplification of the recorded sound also allowed improvements in fidelity. Electronically recorded media went through several changes until magnetic tape appeared in the 1940s. Magnetic tape recording involved the analog recording of electronic signals through the selective magnetization of portions of a magnetic material, the tape. Because this process involved fewer mechanical movements than previous recording techniques, magnetic tape recording could reproduce sounds with much improved quality. The development of sound recording meant that an unlimited variety of sound could be captured, providing countless new sound materials to composers.

In 1948 a Parisian radio broadcasting engineer named Pierre Schaffer created music prepared from recorded sounds on magnetic tape, calling it musique concrète. Schaffer’s musique concrète piece Étude aux chemins de fer (1948) was made from the sounds of railway trains. In this piece, Schaffer first recorded sounds inside or outside a studio, edited the recording by cutting and splicing the tape, and assembled the bits together into a bigger structure as a piece. Like other composers of his time, he favored magnetic tape over disc records because it made the editing process easier: it could play back immediately, erase content easily, and was reusable many times without losing the quality of the recording. Musique concrète was distinguished from other music by working directly with the raw sound material instead of relying on musical notation, the symbolic representation of sound, to be brought to life by human performers. This manipulation of recorded sound to create music is seen as the beginning of electroacoustic music.
Instead of using sounds captured from everyday life, some composers of magnetic tape music in Cologne during the 1950s used purely synthetic sound. Synthetic sound refers to sound generated electronically by means of an oscillator (an electric circuit which generates repetitive back-and-forth acoustic waveforms by alternating voltages). An oscillator can create various waveforms such as a sine wave, sawtooth wave, or square wave. The shape of the waveform determines the characteristic of the sound. Sine waves produce pure tones (without overtones); sawtooth waves give out fundamental tones and all related overtones; square waves consist only of the odd-numbered partials, or component tones, of the natural harmonic series. Calling their music Elecktronische Musik, this group of composers set out to create music that was entirely electronic—from the construction of the timbre by electronic resources to the organizing process of the sound materials into a bigger structure electronically. The latter, however, was made possible only after computers became available.

By the end of the 1950s, we see the term electroacoustic to refer to the cohabitation of both kinds—musique concrète and purely electronic music. The term tape music was also used to specify how the final form of music was stored. Musique concrète and the synthesis of electronic sound provided the foundation for making electroacoustic music—composing music from raw sound material in a recorded format and working with the sound waves to create purely electronic sound.

Several early electronic instruments contributed much to the development of electroacoustic music. As early as 1895, American inventor Thaddeus Cahill began to build the telharmonium (he made several revisions to the instrument during the next several years), which was the first instrument to generate musical tone and used the telephone receiver as its amplifier. In the 1920s, other electronic instruments such as the theramin and ondes Martenot were invented. The theramin and ondes Martenot both used metal antennas that detect the position of the performer’s hands, allowing the performer to control both the frequency and amplitude without touching the antennae. Both the theramin and ondes Martenot used a loudspeaker for the sound to be heard. The sounds which these instruments produced provide the archetypical examples of electronic sound: their sounds were characterized by warbling, wailing, and eerie sounds, and they could also produce glissandi easily. (Messiaen used ondes Martenot in his Turangalîla-symphonie (1946-48), alongside acoustic instruments and voices).

Synthesizing electronic sound became much easier with the appearance of the first commercial synthesizer made by American inventor Bob Moog in 1964. This synthesizer, which looked like a console piano, consisted of three elements: a box packed with
independent electrical units (oscillators, filters, amplifiers, envelope generators\(^7\)), a touch-sensitive keyboard, and a portamento control.\(^8\) Derek Cooper (30 September 1969) from *Tomorrow’s World* on the BBC introduced the Moog synthesizer in this way: “[This synthesizer] would produce sounds in a matter of minutes which would normally take radiophonic experts with their complicated equipment days of hard work with multiple rerecording to achieve.” With its compact, all-in-one design, it allowed musicians to create a virtually limitless array of electronic sounds with ease.

Analog synthesis gradually began to give way to digital synthesis with the rapid development of computers. Digital-to-analog conversion (getting sounds out of the computer) and analog-to-digital conversion (putting sounds into the computer) opened new ways both to analyze and to synthesize sound. Today, most electroacoustic composing is done by computer. Also, most live electroacoustic music involves computers to manipulate the live sounds produced by the instruments in real time. Besides the manipulation and synthesis of sounds, computers have been used for the analysis of the sound, showing the exact constituents of the sound.

From *musique concrète* to computer music, electroacoustic music placed an emphasis on both composing with sounds and, in Stockhausen’s (1989) words, “the composition of sounds themselves” (p. 89). Composers from the 1950s on applied this expanded view of composing music in their instrumental compositions, both applying the techniques used in electroacoustic music and simulating the sounds of electroacoustic music.

**Influence of Electroacoustic Music on Instrumental Compositions**

**Application of the techniques of electroacoustic music**

*Spectral music*. Some composers apply specific techniques from electroacoustic music in their instrumental compositions. Spectral music, for example, uses computer analysis of sounds as part of the writing process. *Spectral music*, according to the *Oxford Companion to Music* (2012), originated in France in the late twentieth century, created by a group of French composers whose common objective was “to explore the acoustic properties of sound itself and the psychology of musical perception (of tempo, sound, and pulse)” (para. 1). Using

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\(^7\) Envelope generator: A device that allows the user to control the onset, intensity, and fade (called Attack, Decay, Sustain, Release, abbreviated as ADSR) of each sound.

\(^8\) Portamento control: A metal bar that allows voltage control by a finger running along it sideways, producing a sliding pitch.
computerized Fourier analysis,9 composers were able to get accurate physical representations of the components of sound—the resolution of partials and their relative amplitudes, which they used to discover specific overtones and designate those pitches with corresponding volume to each instrument in an orchestra.

Gerald Grisey, one of the most representative spectral music composers, used the analysis of sound as preparation for his piece Partiels (1975). He used a particular electroacoustic music technique called additive synthesis in this composition. Additive synthesis involves the summation of component frequencies (each tone with a sine wave) to build up complex composites (Rose, 1996) (Figure 2.1).

Grisey achieved “instrumental additive synthesis” in Partiels (1975) through the following process. He first analyzed the trombone’s low E, extracted different frequencies of the harmonic partials in that note, and then assigned different instruments in the orchestra to each partial. When the instruments with their assigned pitch (the harmonic partial) all play together, the sound mixture represents the single E tone—only the sound is much more complex than just an E tone because the sound includes both the added natural harmonics of each instrument and the interactions among the instruments.

Besides working with the aspect of frequency, Grisey used the timing and the dynamic level of each partial from the model sonogram and adapted it for orchestration. Thus, the entry of each instrument followed the timing of the entry of the partials, and some partials

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9 Fourier analysis is a mathematical method which can break down complex signals into series of their constituent waves (Forinash, n.d.). This made it possible for composers to see that sound is composed of different parts, just as the color white can be broken into spectra of different colors when sunlight goes through a prism.
were played softer than others (e.g., softer partials being given to a string instrument playing a natural harmonic with its weaker sound) (Rose, 1996). Because spectral composers were especially interested in showing the components of sounds and in creating new timbres, they used the overtone series as the organizing principle in their compositions.

The use of additive synthesis in instrumental compositions. Besides spectral music, some traditional instrumental compositions used additive synthesis to create new timbres. When dealing with electronically generated tone (e.g., a sine wave), as Allen Strange (1983) explains, one can use an audio mixer to combine “two or more frequencies or signals into a single signal in such a manner that minimal distortion of the original signals occurs” (p. 17). Strange further remarks that this principle of mixing different frequencies to create a single new timbre has been explored by composers such as Kagel in his *Music for Renaissance Instruments* (1965-66). In this piece, Kagel explores various nonharmonic sounds using instruments such as crumhorn, shawm, recorder, dolcian, cornet, baroque trumpet, renaissance trombone, lute, theorbo, viole da braccio, and regal. By doubling the instruments at a dissonant interval, Kagel creates an illusory new timbre, an effect often found in the harmonics of the pipe organ. Interestingly, like Chin, Kagel has also worked in electronic studios. As a similar example of additive synthesis to Kagel’s *Music for Renaissance Instruments*, Strange (1983) also discusses Ravel’s *Bolero* (1928).

Beginning in measure 149, Ravel combines a horn, celeste, and two piccolos to produce a sound unlike any of the individual instruments used. Examination of the score discloses that Ravel’s apparent tri-tonality is actually a reinforcement of the harmonic series of each pitch in the melody. The horn plays the fundamental while the celeste plays the first and third harmonics and the piccolos provide the second and fourth harmonics (p. 17).

As seen in this example, Ravel creates a new timbre through dissonance based on harmonics. Granular synthesis. One type of additive synthesis is called granular synthesis. Instead of combining sound waves, granular synthesis uses many thousands of very short (usually less than 100 milliseconds) overlapping sound bursts or grains to construct a new timbre. Each grain contains a waveform, which determines the characteristic of the sound. Burk, Polansky, Repetto, Roberts, & Rockmore (2011) describe granular synthesis in this way: “By manipulating the temporal placement of large numbers of grains and their frequencies, amplitude envelopes, and waveshapes, very complex and time-variant sounds can be created” (para. 1). An example of such complex sound is the aforementioned quasi-asthmatic sound from *Xi* by Chin, which was processed by granular synthesis.

Event-oriented organization of time. One way in which electronic music fundamentally
differs from traditional instrumental composition is in the concept of time. Most instrumental compositions before the twentieth century base their organization of time on regular meters. Gradually through the course of the twentieth century composers used more and more irregularly spaced accents in their music, to the extent that it can be difficult to hear any meter. On the other hand, composers of electronic music decide musical time (the duration of each musical event) in real time, rather than in reference to recurring beats or other metric systems.

Many of Chin’s compositions reveal the approach to the organization of rhythm and time that is event-oriented\(^\text{10}\), pulse-free and continuous. In four of the six etudes, Chin does not use any time signature. Other piano works written by composers who worked extensively with electronic music often use notations which suggest a pulse-free, more continuous streaming of sound events and their development. For example, Klavierstück No. IX (1954/61) by Stockhausen has extremely frequent shifts among unusual meters such as 13/8, 3/8, and 10/8 over just three measures (mm. 56-58). According to Luciane Cardassi (2004), Sequenza IV (1966) by Berio includes extended filigree passages, with emphasis on the effect rather than the exact timing.

One of Chin’s electroaoustic pieces that demonstrates the event-oriented organization of time is Xi (1998) for tape and ensemble. In this piece, each time the breathing-like sound enters, its length is slightly longer than the previous entrance. As the breathing-like sound develops, the identity of other sounds in the music also becomes clearer—what used to be mere metallic sound begins to have more definite pitches and eventually clear harmonies. Continuing this process of development, the entire composition is organic—growing from a tiny event, namely the entrance of the breathing-like sound then its fading.

**Simulation of electronic sound**

Electroacoustic music opened up more possibilities for composers to create a wide range of sound effects. With this expanded view of sounds, composers began to use traditional acoustic instruments to simulate the special sounds achieved by electronics. Chin’s acoustic music, including several passages in the etudes for piano, reveals this attempt to simulate the electronic sound in her acoustic music. Among the various aspects of electronic sound, for specific aspects used in electroacoustic music, the spatial aspect (sound in motion), microtonality, transformation of timbres, and complex polyrhythms, in connection to Chin’s

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\(^{10}\) According to Tomlyn & Leonard (1988), *event* is “a term used to describe something which happens in time. Usually an event is described in two parts, when it started and when it ended (e.g., pressing a key down on a keyboard, and then releasing the same key)” (p. 21)
etudes will be discussed here.

**Sound in motion.** The spatial aspect of electronic sound has to do with sound’s traveling through space. A common example of sound traveling through space is the well-known Doppler effect. The classic demonstration of this is the perception of a pedestrian after a fast-moving ambulance has passed him, that the pitch and volume of the siren have dropped. The concept of sound in motion was especially emphasized by composer Edgar Varèse, one of the important pioneers of electroacoustic music. His vision of sound in motion was realized for the first time in his electronic piece *Poème électronique* (1958). For the premiere of this piece he placed 425 loudspeakers at various locations within the pavilion at the Brussels World’s Fair in 1958. Varèse (1998) recalls the performance:

> The music [on tape] was distributed by 425 loudspeakers; there were twenty amplifier combinations. . . . The loudspeakers were mounted in groups and in what is called "sound routes" to achieve various effects such as that of the music running around the pavilion, as well as coming from different directions…etc. For the first time I heard my music literally projected into space (p. 207).

Sound moved from one group of speakers to another, creating sound in motion by literally moving the sound from place to place.

Another piece by Varèse, *Intégrales* (1924-1925), for 11 wind instruments and 4 percussionists, is an instrumental composition with a similar objective: to make the sound travel. To create the effect of sound traveling while the source of sound is stationary, Varèse uses dynamic markings to create the illusion of sound’s having distance. John Strawn (1978) writes,

> The extraordinary orchestration and the carefully notated, complicated dynamic markings in *Intégrales* would strongly suggest that Varèse thought of a loud, brilliant, present sound (sound source) as creating a sound mass (auditory image) located in the vicinity of the listener. A soft, dull sound, on the other hand, is to be heard and understood as being "far away". Diminuendi, crescendi, and other transformations would represent intermediate steps between these two extremes (p. 143).

Although cresendo and diminuendo are common expression markings, Varèse uses them in a particular way that gives a new attribute to the sound, that of distance.

Similarly, in Chin’s music, extreme crescendo or decrescendo markings (very soft to extremely loud within a very short time period) appear frequently, giving the illusion of sound traveling across the space right in front of the audience to create distance or nearness. Her *Double Concerto* (2002), for example, includes such extreme crescendo markings. In particular, the sustained B♭ tones from the brass instruments are perceived as the sound’s moving close toward the audience, thus creating a three-dimensional listening experience.
Another method to make the listeners perceive sound in motion is the pitch drop, which also appears in Etude No. 6. Toward the end of Double Concerto (2002), there is a section where pitches of various instruments drop gradually using slow glissando, an effect similar to the sound of a bomb dropping in wartime. The pitch drop creates an effect of sound traveling toward the audience from a higher altitude.

Microtonality. Early electronic instruments such as the theramin as well as the portamento control in the Moog synthesizer demonstrate the possibilities of glissando effects using electronic sound. The gradual change of voltage produces a gradual change of frequency, forming microtonality. On microtonality Curtis Roads (1987) writes,

Microtonality is the domain of unusual pitch intervals, tunings, and scales. The promise of exploring the microtonal universe has lured composers and researchers from the very beginnings of computer music development (Bell Telephone Laboratories 1960). Microtonality offers the possibility of highly evocative melodies and complex, sometimes mysterious sounding harmonies and counterpoint (p. 3).

Chin often incorporates microtonality in her compositions. To create microtonal sound, she frequently uses glissandi for strings and different tunings for instruments such as the flute, clarinet, and harp in an orchestra (e.g. Acrostic-Wordplay [1991, rev. 1993]). An example of actual microtonal writing by Chin is Gradus ad infinitum (1989) (translated as Steps to Infinity) for tape. This piece employs a microtonal scale of twenty partials within an octave (Ehrler, 2001). In one of her interviews, Chin mentioned that this piece was an homage to a Conlon Nancarrow’s Studies for Player Piano (Chin, 2006). While Nancarrow does not use microtonal scale in Studies for Player Piano, the dense texture and fast contrapuntal activity produce an illusion of sounds overlapped. Moreover, when the texture gets extremely thick, the overtones of each tone affecting each other works together to produce an iridescent sound mass as a whole, bridging the gap from semitone to semitone. This rich bed of sounds gives a similar effect to the use of microtonal scales.

Transformation of timbres. Since electronic music puts emphasis on working with the raw sound material, timbre becomes of great importance in the compositional process. In his lecture on electronic music, Stockhausen (1962) included “the composition and decomposition of timbres” as “one of the four important characteristics for electronic composition” as distinguished from the composition of instrumental music” (p. 39). Through

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11 Stockhausen (1962) lists these four characteristics as “1) the correlation of the coloristic, harmonic-melodic, and metric-rhythmic aspects of composition 2) the composition and decomposition of timbres 3) the characteristic differentiation among degrees of intensity 4) the ordered relationships between sound and noise” (p. 39).
analysis of timbres, a composer of electroacoustic music can find the similarities between two different timbres and discover ways to transform one into another. The transformation of timbres frequently becomes the main subject of an electroacoustic composition and is now also an important method of developing music.

Stockhausen, in his *Kontakte* (1959-60) used this transformation of timbres both as his main subject and also as a way of developing the music. Written for piano, percussion, and electronic sounds on 4-track tape, this piece is Stockhausen’s first live electronic piece, according to Jonathan Harvey (1975). The title *Kontakte* or “Contacts,” suggests timbres making contact with each other—contact is made between instrumental and electronic sounds. First, the piano sound makes contact with instruments of almost-definite pitch such as crotales, tamtam, and marimbaphone. These in turn make contact with indefinite-pitch percussion instruments, which make contact with tape. Harvey explains that the tape consists of sounds that Stockhausen created electronically after analyzing the sounds of percussion instruments (Harvey, 1975). The piano sound therefore transforms into electronic sound by way of the sounds of the percussion instruments.

In a similar way, Chin explores the transformation of timbres between piano and percussion in her instrumental piece *Fantasie mécanique* (1994, rev. 1997) for five instrumentalists (piano, trumpet, trombone, and two percussionists). In this piece, different registers of the piano are carefully matched with specific percussion instruments. For example, the low register of the piano is paired with timpani, the middle register with xylophone and vibraphone (mm. 261-269), the higher register with bells (Example 2.1). When the piano and percussion instruments of similar register and timbre play together with similar jagged melodic gestures, they blend so well that at times it is difficult to distinguish one from the other. Even in the piano etudes Chin uses similar jagged melodic gestures. Example 2.2 shows Chin’s distinctive percussive treatment of the piano. Chin’s piano writing in the etudes is more percussive than it is melodic or singing, as evidenced by the many staccato and accent markings in the score. What is unique is that Chin explores different registral timbres of the piano in a way that is similar to that of her other instrumental ensemble pieces that include percussion. Chin’s use of extremes of register has to do with exploring the different timbres available to the piano. In Etude No. 2, *Sequenzen*, the low bass notes have the effect of the timpani. Also, the occasional quick sixteenth notes in the left hand provide a rumbling effect similar to that of drums.
Example 2.1: *Fantasie mécanique*, mm. 261-269
Example 2.2: Etude No. 2, mm. 30-49

**Polyrhythms.** Edgar Varèse (1998) prophesized that science would give birth to a machine that would enable cross rhythms unrelated to each other, treated simultaneously, or to use the old word, ‘contrapuntally,’ since the machine would be able to beat any number of desired notes, any subdivision of them, omission or fraction of them—all these in a given unit of measure of time which is humanly impossible to attain” (p. 201).

What Varèse envisioned was soon made possible by technological advancements. The advantages that electronic music has over instrumental music include a complete rhythmic freedom and greater ease in creating counterpoint. Already when working with magnetic tape, composers were drawn to counterpoint. Boulez (1958) comments, “Nothing is simpler than the composition of canons at the unison; just take one track with several heads. Different
speeds suffice to make a fugue and there is nothing easier than making a tape-loop and so obtaining an ostinato” (p. 20).

The dense counterpoint found in *Apparitions* (1958-59) or *Atmosphères* (1961) by Ligeti also finds its roots in his experiences in the electronic studio in 1957-58. Ligeti, as cited in Griffiths (1983), said,

The idea of micropolyphonic webs was a sort of inspiration that I got from working in the studio, putting pieces together layer by layer. I was very much influenced too by older music, by the very complex polyphony of Ockeghem, for example: after all, I had been a teacher of counterpoint. But it was the studio work that gave me the technique (p. 25).

Such use of counterpoint is clearly demonstrated in Chin’s electroacoustic piece *Xi* (1998). One sound meets another without limitations of meter or pulse. Each layer has its own temporal organization. When combined, the sounds create complex polyphony and exciting polyrhythms. One of the biggest challenges of playing Chin’s piano etudes is the rhythmic aspect, specifically because of the many polyrhythms and cross-accents between layers. These layers in her etudes often consist of extremely low, sustained bass notes; jagged melodic lines which create two levels of melodic line; cross-accents; and lines separated by polyrhythms (Example 2.3). The 12:10 ratio between the right hand and the left hand in Etude No. 5 (mm. 35-54) is made more difficult to play because of the accents along the way as well as the quick, seemingly random leaps of the right hand. In m. 96 of Etude No. 5, Chin writes groups of seven eighth-notes against groups of six sixteenth-note triplets. Such complex polyrhythms show how Chin treats each line completely independently, an organization of rhythms which is natural to electroacoustic music.
Example 2.3: Etude No. 5, mm. 33-44
CHAPTER 3
ANALYSIS OF THE TWO ETUDES

Etude No. 1, in C

Introduction

Etude No. 1, in C, which opens the set of Chin’s six published etudes for piano, provides a clear example of the stylistic features found in her piano writing. Like Chin’s other etudes, it possesses a clear formal structure marked by changes in tempo, develops the musical material using variation technique, and treats the piano as a percussive instrument. In binary form, Etude No.1 expands the principal motive by manipulating it in various ways, and it uses many staccato, accent, and sforzando markings which enhance the percussive quality of the sound. On the other hand, Etude No. 1 is unique in its use of stratification from beginning to end. This stratification displays multiple layers of melodic lines spanning from the highest to the lowest range of the keyboard. This etude also has the greatest number of accidentals of all six etudes, indicative of its rich chromaticism and opulent harmonies, as well as a greater number of dissonances. Chin’s use of multiple melodic lines and frequent harmonic changes creates rich, complex polyphony in this etude.

Although Etude No. 1 opens the set of etudes by Chin, it was not the first etude to be composed. It was composed in 1999 and revised in 2003, and was the fourth etude of the set to be composed. Chin wrote other compositions around the same time as Etude No. 1 that share similar features. For example, in the same year, Chin also wrote Miroirs des temps, which exhibits a complex polyphony. Written for ATTB soloists and orchestra, Miroirs des temps recalls polyphony of the medieval period by making reference to the music of Guillaume de Machaut.

Etude No. 1 also shares similarities with Chin’s electroacoustic pieces written around the same time. In 1998 Chin wrote Xi for ensemble and tape. In this work, indistinct, breath-like electronic noise at the opening eventually turns into distinct pitches and harmonies. These various distinct pitches belong to the overtone spectrum of the individual grain of the electronic sound (Harders-Wuthenow, n.d.). Like French spectral music, Xi explores the acoustic properties of sound through the analysis of sound. Etude No. 1, in C, shares this same principle: it explores the acoustic properties of the note C. As the title suggests, in C is about the acoustic overtones that are literally “in” the pitch C. Like Grisey, Chin gives special
attention to the dynamics in this etude: while the fundamental in m. 1 is marked sforzando, the upper stratum, the distant partials, stays in \( p \), and the middle stratum plays in \( mp \) (Example 3.1).

Example 3.1: Etude No. 1, mm. 1-7

The interaction of the natural harmonics of the basses with the notated C partials in the middle and upper strata creates a special aura of sound: this process is derived from sound spectra, a collection of many individual frequencies which combine to make a single aural event, as part of creating a unique timbre.

One of the interesting features found in Etude No. 1 is the constant juxtaposition of
opposing musical elements such as high and low registers, staccato and legato articulations, and static and active lines. Even the subject of this composition, in C, is an example of juxtaposition—simplicity versus complexity. C is the first pitch in the C Major scale, and is thus associated with simplicity. However, Chin reveals that the pitch C can be quite complex through its constituent partials. This complexity is apparent in the appearance of the score itself, which has a density of notes and accidentals on the page that makes this etude formidable to learn.

As already described by Yoo (2005), the harmonic content of Etude No. 1 is a skillful mixture of consonance and dissonance. Yoo describes that the sound of this etude as “a homogeneous and rich noise” and states that the listener hears “an intense vertical rhythmic flow, with multiple accents” (p. 104). These accents outline the consonant C overtones against the rich, dissonant sound mass in the background. This strong sense of consonances here, as in the other five etudes, leads Yoo to conclude that Chin’s etudes reflect “a quasi-tonal post modernism” (p. 104) because of the harmonies she favors, such as C dominant seventh chord in Etude No. 5, Toccata (2003). This argument may seem counterintuitive in the case of Etude No. 1, with its many dissonances, but Yoo explains that Chin “focuses on a vertical harmonic relationship, so we hear many consonances even though she uses mostly dissonant intervals horizontally” (p. 104). Yoo observes that the vertical harmonic relationship found in Etude No. 1 shows how Chin prominently uses the seventh chords. These seventh chords, derived from the overtone series, appear in both major-minor seventh and diminished seventh (mostly appearing in arpeggiated form). Chin also makes use of tritones from these chords, although she stays relatively consonant with other components of the chords (Yoo, 2005).

In this next section, I will provide a contextual analysis of Etude No. 1, in C, showing how Chin brings out complexity from a simple subject.

**Preparation**

Chin requires a special preparation for the performance of this etude. The pianist is to depress eleven bass pitches silently and to hold them with the sostenuto (middle) pedal for the entire performance. These eleven pitches consist of all of the bass notes from the lowest stratum which will be heard throughout the piece. They are also the fundamentals of the overtone series in the upper two strata. When other higher sounds react with these eleven pitches, it creates a special aura of sound, especially with the use of the

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**Notes:**

12 Chin provides an extra staff underneath the first measure for these eleven pitches.
damper pedal.

**Structure**

Etude No. 1 follows a binary form. Section A (mm. 1-25) establishes the basic layout of the piece—the pitch content, texture, and the registral placement of each layer. Marked by a new tempo \( \text{t}=\text{ca. 108} \), section B (mm. 26-48) has a clear change of mood and rhythmic organization, leading to the climax of this piece in mm. 41-43.

**Section A (mm. 1-25).** Section A begins with the announcement of the subject of this composition—the note C. It opens with three consecutive blows of the note C, all marked \( \text{sfz} \) (m.1) (Example 3.1). Chin creates a strong impact with the first pitch, C8, which breaks the silence like the shattering of a glass. This is followed by two more Cs, C6 and C2. These reflections of the first note respond with equal intensity and are full of vigor. The final C2 in the lowest stratum is the first fundamental, out of which emerge the harmonic series in the upper two strata. This C2 is also the first note from the group of notes held with the sostenuto pedal.

After the announcement of C in m. 1, Chin establishes the basic layout of this piece in mm. 2-9. Measure 2 shows the first presentation of the four registral and textural layers, using stratification. The four layers as discussed in Yoo’s (2005) treatise, are shown in Table 3.1, with my additional observations (marked with *).

<table>
<thead>
<tr>
<th>Layer</th>
<th>Register</th>
<th>Function</th>
<th>Pitch content</th>
<th>Duration of Notes</th>
<th>Articulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Highest</td>
<td>Chordal progression. Mostly dissonance*</td>
<td>Distant partials of the C overtone series</td>
<td>Shortest note values (Eighth and sixteenth notes)</td>
<td>mezzo staccato*, ( \text{sfz} )</td>
</tr>
<tr>
<td>2</td>
<td>Middle to High*</td>
<td>Emphasizes C overtones at slower rate*</td>
<td>C overtones</td>
<td>Longer than layer 1 or 3; shorter than a whole note*</td>
<td>( \text{sfz} )</td>
</tr>
<tr>
<td>3</td>
<td>Middle*</td>
<td>Mostly outlines harmonies linearly, through a melodic line.</td>
<td>C overtones</td>
<td>Same as layer 1 (eighth and sixteenth notes). Note values become shorter in the B section.</td>
<td>legato</td>
</tr>
<tr>
<td>4</td>
<td>Lowest</td>
<td>Lowest pedal tones—the structural notes. Each of these notes become the fundamental of a new harmonic series</td>
<td>C, F#, G, B, B♯, B♭, D (the fundamentals)</td>
<td>Longest—longer than a whole note</td>
<td>( \text{sfz} )</td>
</tr>
</tbody>
</table>
As shown in Table 3.1, layers 1 and 2 include sforzando notes which mark the C overtone series (Figure 3.1).

![Figure 3.1: C overtone series](image)

These sforzando notes provide the characteristic cross-accents (accents that exist in more than one layer) in this music, and mostly appear in layer 2. Section A alone has 89 sforzandi, and 40 out of these 89 sforzandi occur in layer 2. They are always placed on a weak beat, creating syncopations. Each series of sforzando notes begins with the bass. Each time the bass is rearticulated, the overtone series starts over. The chart below shows the groups of pitches that are the sforzando notes in layers 1 and 2 occurring when the bass changes. The first three series especially show how Chin uses the same pitches, with slight changes in the order.

Table 3.2: Groups of sforzando notes in Etude No. 1, mm. 1-16

<table>
<thead>
<tr>
<th>Measure where the bass changes</th>
<th>Bass</th>
<th>Sforzando notes that follow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>C</td>
<td>G, E, B♭, G</td>
</tr>
<tr>
<td>4</td>
<td>C</td>
<td>B♭, E, F#</td>
</tr>
<tr>
<td>6</td>
<td>C</td>
<td>E, B♭, G, (C)</td>
</tr>
<tr>
<td>7</td>
<td>B♭</td>
<td>E, D, G♯, B♭, G</td>
</tr>
<tr>
<td>9</td>
<td>C</td>
<td>E, D, D, G, B♭, E</td>
</tr>
<tr>
<td>11</td>
<td>C</td>
<td>F♯, G, C#</td>
</tr>
<tr>
<td>12</td>
<td>F♯</td>
<td>A♯, E, G♯, C, E, A, F#</td>
</tr>
<tr>
<td>14</td>
<td>D</td>
<td>C, G♯, E</td>
</tr>
<tr>
<td>15</td>
<td>D</td>
<td>F♯, A, C, G, E, D</td>
</tr>
</tbody>
</table>

13 The appearance of F# in the second row as new pitch interfering with the CMm7 pattern will be described later in the chapter.
Layers 1 and 3 are more closely associated with each other than the other layers. First, they share the same rhythm for most of section A. It is only at m. 21 that the rhythm of layer 3 begins to depart from that of layer 1. Second, Chin uses an interlocking of layers 1 and 3 in the extreme treble register to mark the end of the longer phrases. The melodic line of layer 3 which begins at middle C at m. 2 moves higher toward layer 1 until the two overlap in pitch and seem to interlock. These interlocking moments occur three times in section A: mm. 8, 16, and 25. Third, layers 1 and 3 are directly contrasted in their pitch content and articulation. The pitches in layer 1 are the distant partials of the C overtone series while that of layer 3 are the lower-numbered partials. Layer 1 provides constant dissonances in the background in mezzo staccato. On the other hand, layer 3 plays a smooth melodic line as it outlines tonal harmonies such as CMm7.

Layer 4 leads the change of harmonies. Because layer 4 contains the fundamental of each harmonic series, each change of bass note alters the color of the harmony. For example, in mm. 7-8, the bass C2 changes for the first time to B♭. Beginning from here, tritones appear more frequently in the upper layers, and the harmonies become darker and more ominous. As discussed earlier, the bass begins the overtone series outlined in sforzando notes. With the appearance of the bass B♭ in m. 7, the sforzando notes depart from the CMm7, replacing G with D and G♯ as the new members. Each time the bass changes, the other layers also move to a new harmony. The second long phrase, mm. 9-17, continues to move away from the C overtone series, using the new bass notes F♯ and D.

The last long phrase, mm. 18-24, is the culmination of section A. The bass notes in this phrase change more frequently. It includes some new bass notes, B♯, F, and G, as well as some of the lowest bass notes in section A, G1 and F♯1. Similarly, the harmonies in this section have the most variety, including BMm7 (mm. 20-21), GMm7 (m. 23), and F♯Mm7 (m. 25). This phrase presents the culmination of the section by reducing the number of pauses or rests between subphrases, thereby creating a continuous sound. In previous measures, smaller subphrases were separated by rests, which sometimes lasted more than two half rests. In mm. 18-24, however, the sound is continuous and pushes to the end of the phrase, with no room for breathing. The last note of the previous two phrases was B♭7 and B♯7, respectively; this line finally reaches the anticipated C8 in the third phrase, in m. 25.

Section B (mm. 25-48) The B section, which begins with the return of C2 in the last beat of m. 25, contrasts with the A section in several ways (Example 3.2).
Example 3.2: Etude No. 1, mm. 26-28

First, it is more playful. This playfulness, at times mischievous and sarcastic, derives from the abrupt and irregular rhythmic patterns and the faster tempo. To emphasize the irregularity of rhythmic accents in section B, Chin uses more diverse rhythmic patterns, with more rests and more sforzandi (almost double the number of section A) in addition to the rhythmic pattern (combination of two sixteenth notes and one eighth note) which was characteristic of section A. To vary the rhythmic pattern, Chin introduces new rhythms into this section: groups of four sixteenth notes and their variations, and plain eighth notes. Rests also appear more frequently, adding humor and suspense. What contributes the most to the irregularity of the rhythm in this section, however, is the use of sforzando notes in mm. 26-42 which never repeat the same pattern in any measure. The playfulness also comes from the short, brisk articulation with frequent accents in this section. Except the held bass notes, everything else in the upper layers is marked either staccato or sforzando with a wedge.

Section B is also contrasted from section A by the change of the middle stratum. Immediately in m. 26, the middle stratum no longer has the swaying, arpeggiated, legato melodic line from the previous section. Marked staccato, the middle stratum consists of mostly dyads, like layer 1. These dyads follow the intervallic formula of layer 1, emphasizing dissonance more than the previous section. The dissonance results from sounding the two pitches together as a harmonic interval rather than separately as a melodic interval. Sharing the same articulation, volume, and pitch content based on these dissonant intervals, the upper two layers in section B now act as a unit.

New in section B is the tenor line, which shares the same staff as layer 4. Like the arpeggiated legato line in layer 3 of section A, this tenor line also has a more melodic contour.
However, here the notes are sparser than in layer 3 of section A. The tenor line begins with B♭3 (m. 26) and moves upward until it reaches the B♭5, a pitch which will repeat 12 times at the very end of the piece. This tenor line uses many tritones which contribute to the overall dissonance.

The B section quickly builds up to a climax. Chin uses the same method of intensification as in the previous section with a greater density resulting from reducing the number of rests, and with both hands reaching higher and higher on the keyboard. Features of this climax include the crescendo up to ff and the rhythmic diminution. Chin begins to mix in sixteenth-note quintuplets in m. 39, and gradually increases the number of quintuplets until they completely take over from the quadruplets (Example 3.3).

Example 3.3: Etude No. 1, mm. 37-42
Also, Chin builds the climax through harmonic intensity. In mm. 37-42, Chin uses abundant chromaticism in thick textures. Also, the overtones of pitches all ringing alongside each other create sound, achieving an effect similar to microtonality.

The ending of the B section brings the piece to a close. Immediately after the music reaches the climax at mm. 41-43, the bass proclaims its dramatic return to C in *sffż*. This C, however, is C1, the lowest C on the piano, and is held until the final measure. The upper three layers drop down one octave in *subito pp* immediately after the thump of C1 and climb toward C8 over the course of several attempts. With the rich, resonating C1 underneath, the quiet tinkling of the upper C-partials ascend and disappear, leaving only the dissonant based B♭-B♮-F chords with their tritone and semitone clashes (Example 3.4).

![Example 3.4: Etude No. 1, mm. 45-48](image)

**Compositional devices**

Chin creates complexity from the seemingly simple subject “in C” through meticulous
use of harmonies, melodic lines, and rhythms.

**Harmonies.** Chin produces an effect similar to gamelan music by her use of fast-moving pairs of notes in the upper registers. In gamelan music, the shimmering sound comes from rapid shifts between pitches, played by various gongs which, by their nature, produce multiple overtones. Chin imitates the effect of these overtones by placing two notes of various intervals as a pair and moving them rapidly. As seen in Chapter 2, placing two notes at a dissonant interval to create a new timbre is associated with additive synthesis in electroacoustic music. These dyads, which appear mainly in layer 1 and occasionally in layer 2, can be divided into three categories by interval:

1. interval of a second (major or minor), with all of their inversionally related intervals, and their octave compounds and enharmonic spellings (e.g., m2, M7, and m9);
2. interval of a third (major or minor) and all of their inversionally related intervals;
3. tritones

For example, in m. 2, the pitches of the dyads in layer 1 are F#5-G#6 (M9), E♭5-D6 (M7), F5-E♭6 (m7), and G#5-E6 (m6). In this measure there is only one dyad (G#5-E6, m6) which falls in the category of thirds. In the following measures, Chin increases the number of sixths: two sixths in m.3, three sixths in m. 4, and four sixths in m. 5. Furthermore, in m. 4 there is the first appearance of a diminished 5th, and in m.7 the first augmented 4th. By gradually inserting new intervals, Chin gradually changes the harmonic color of each phrase.

Chin also follows certain intervallic guidelines for pairing up the pitches vertically between layers 1 and 3. The pitch-class from layer 3 is always one half step, two half steps, or a tritone away from one of the pitches in layer 1. For example, in m. 2, C from layer 3 is a tritone away from F# in layer 1; and E in layer 3 is one half step away from E♭ in layer 1.

**Melodic lines.** The melodic lines in Etude No. 1 also reflect Chin’s focus on the intervallic relationship between pitches. An example of this is found in the simple melodic line of layer 3 in mm. 5-6 (Example 3.1). This line begins with middle C, reaches a high point E6, and returns to middle C. On the way to E6, the line rises, beat by beat, by ascending fifth (C-G, E-B♭, etc.); when it descends back to C, it traces back the line with leaps in the opposite direction (E-E, G-C, E-B♭, G-C). When the line descends Chin places an F# (beat 2) and B♭ (beat 3) between the pairs to contrast the harmony.

The process which Chin uses to create the above melodic line in mm. 5-6 reveals her skill in crafting phrases. Chin first introduces the four pitches (C, E, G, B♭—all from the C overtone series, outlining CMm7) in layer 3 of m. 2 (Example 3.1). In m. 3, we see the first
variation of the previous measure: the four pitches from m. 2 appear in a slightly different order, with one additional new pitch (C, B♭, F♯, E, B♭, G). Measure 4 continues to add a new pitch, and each time the series goes a little longer, a little higher. Finally in mm. 5-6 we see the complete picture of the melodic line. Although each subphrase has basically the same pitch content, Chin creates interest by reordering the pitches, by gradually inserting new pitches, and by gradually lengthening the duration of the phrases as shown in Figure 3.2, where the numbers indicate the number of sixteenth notes per phrase.

![Figure 3.2: Gradual lengthening of the phrases, mm. 2-6](image)

Rests are placed between fragments of these mutating CMm7 motivic cells at irregular spacing, which makes it difficult for a listener to predict when the next sounds may enter. She also ends each phrase on a weak beat, which causes a lack of closure, heightening anticipation of what is to come. This creates a continuous flow of sounds appearing and then disappearing—an event. This gradual lengthening of the phrases reveals Chin’s event-oriented organization of musical time.

Chin is also careful to match the contour of melodic lines with the harmonic color. For example, in m. 7, the harmonies, to my ears, become dark with many tritones in both layers 1 and 2. To match this dark harmonic color, Chin gives the melodic contour in layer 3 a less clear direction, neither rising nor falling strongly, but meandering as if entangled (Example 3.5).

![Example 3.5: Etude No. 1, mm. 10-11](image)
Chin uses reordering of the pitches from the overtone series to shift both the harmonies and the mood effectively. There are many different options for grouping the pitches in the overtone series, including the whole-tone scale or tritones. For example, the rapid, vehement run in m. 15, which sweeps across the entire keyboard, consists of G#, F#, E, G#, C, and D (Example 3.6).

These pitches all belong to a whole-tone scale (C-D-E-F#-G#), but create a dissonant effect because of the order in which they are presented. The first four notes of m. 16 have the same pitch content as the rapid run in the previous measure, this time highlighting the two pairs of tritones: D-G# and F#-C, as well as the major third D-F# and G#(A♭)-C. This reordering of the pitches allow Chin to shift harmonies and the mood effectively.

Often used in French spectral music, the principle of “harmonicity-inharmonicity” refers to phasing in and out of harmonicity, a spectrum of sound whose frequency components are all whole-number multiples of its fundamental. Inharmonicity, on the other hand, indicates that at least one of the component frequencies is not a whole-number multiple of the fundamental (Rose, 1996). Gerald Grisey, one of the most prominent composers of French spectral music, employs “harmonicity-inharmonicity” as a way of developing music in his composition Partiels (1975) for a large ensemble (18 players). In the opening of Partiels, Grisey uses the 1st, 2nd, 6th, 10th, and 14th partials of E consistently in eleven reiterations of the E harmonic overtone sonority. François Rose (1996) comments, “During the course of eleven repetitions of this sonority, some inharmonic components are gradually introduced to unsettle the initial timbre.” Chin achieves an effect similar to harmonicity-inharmonicity by gradually inserting pitches that are distant partials. Chin organizes the sforzando notes in section B in a
similar manner. She gradually mixes in distant partials of C with the initial C, E, B♭ (1\textsuperscript{st}, 5\textsuperscript{th}, and 7\textsuperscript{th} of C, and later F#, the 11\textsuperscript{th} partial) introduced in mm. 25-27. For example, the G# in m. 29, and the D# and the C# in m. 39 are some of the inharmonicities that occur in this section.

These sforzando notes in Section B also reveal Chin’s unique method of establishing the CMm7 as the central harmony. To reinforce the identity of CMm7 in the midst of dissonances (the distant partials of C), Chin doubles the pitches that belong to CMm7 in each measure. Gradually, the distant partials are also doubled, to indicate greater inharmonicities. The chart below shows the pitch classes of the sforzando notes from mm. 26 to 42.

Table 3.3: Sforzando notes in mm. 26-42

<table>
<thead>
<tr>
<th>Measure</th>
<th>Sforzando notes</th>
<th>*Pitches in bold represent the doubled pitches that are members of CMm7</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>E, C, B♭</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>E, C, B♭</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>B♭, C, E, F#, B♭</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>G#, E, C, E</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>C, B♭, F#, E, F#</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>F#, E, B♭, E, C</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>B♭, F#, B♭, F#, E, G#, D</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>G#, B♭, E</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>B♭, C, C, F#, B♭</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>B♭, C, E, B♭, C, F#</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>G#, E, E, B♭, F#, E, G#</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>D E, A#, E, D, D, C, F#</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>C, B♭, G, F#, C, E, B♭, B♭</td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>D♯, G, C♯, D♯</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>F, B, D, B</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>F♯, C♯, E, B♭ (bass here changes to F♯)</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>F♯, B♭, G♯, B♭, B♭, C, B♭ (sounds whole tone)</td>
<td></td>
</tr>
</tbody>
</table>

Rhythms. Chin creates regular, yet divergent rhythms in Etude No. 1. Figure 3.3 below shows the rhythmic pattern of mm. 18-25 phrase by phrase (each new letter indicating a new
rhythmic group). Notice how Chin finishes each phrase with longer note values or a short rest before she begins a new phrase. These phrase endings are indicated by the letter x. Chin often ends phrases in the middle of beats, which emphasizes the lack of resolution.

1) a b/ c b/ d b x
2) e d/ b b/ e x'
3) b b/ e c/ e b/ d a/
   f e/ e b/ e a/
   e b/ e b/ d/ x
4) e a/ b g/ x'' (=g')

These two-beat group units sometimes mirror each other (e.g., “e b/ b e” from phrase 3), and sometimes vary one rhythm while the other remains constant (“a b / c b” from phrase 1)—varying but hinting at a regularity (a kind of pattern). Such rhythmic variety can easily be lost in this section because of the harmonic opulence and the frequent sforzandi, but the rhythmic groupings are what hold this section together and give forward movement.

Measures 41-43 display Chin’s skill in using rhythmic patterns to match the mood. This quintuplet section sounds almost chaotic, because of the rapid movement of dissonant dyads in both hands. This chaotic sound also derives from the different combinations of quintuplets between the two hands, whose patterns are far enough apart and hard enough to discern that
the music sounds irregular. Figure 3.4 shows the various pairing of quintuplets between the hands in mm. 41-43.

Figure 3.4: Various pairing of the quintuplets in mm. 41-43

Finally, Etude No. 1 reveals Chin’s careful attention to organizing time in music. In mm. 43-48, the tritone-based B♭-B♮-F chord repeats 12 times with a gradually increasing time interval. The B-flats are separated by rests of different numbers of quintuplet sixteenths. Beginning in m. 43 and continuing until the end of the piece, the lengths are 8, 9, 8, 10, 11, 11, 13, 12, 17, 15, 16, 16 (mm. 43-48). This series of numbers can be divided into two halves {8, 9, 8, 10, 11, 11} and {13, 12, 17, 15, 16, 16}. Both groups end with a repeated rest length. Containing six numbers, the groups have organizing and complementary patterns: in the first set, there is +1 from the first to the second number (8 to 9), and +2 from third to fourth number (8 to 10). The second set has -1 from the first to the second number (13-12) and -2 from the third to the fourth number (17-15).

**Etude No. 6, Grains**

**Introduction**

The sixth etude, *Grains*, stands apart from Chin’s other five etudes because of its unique focus on repeated notes. While the other five etudes display Chin’s characteristic colorful harmonies, polyrhythms, and virtuosity with fast scales and frequent jumps from chord to chord, Etude No. 6 appears comparatively bare and un-pianistic. At first glance, it almost seems that it should be played by a computer rather than a human pianist because of the
strange clusters and incessant repeated notes which appear on the score. Playing the repeated notes at ultra fast speed for a long time, for example, can be too formidable for a human performer because it would easily cause fatigue. In fact, this computer-like quality is the inspiration of this composition.

The title *Grains* comes from the electroacoustic music technique granular synthesis. As discussed in Chapter 2, granular synthesis creates complex sounds by adding together many thousands of very short overlapping sound bursts called grains (Roads, 1988). Each grain lasts usually less than 100 milliseconds, a tiny “tic” when heard by itself. Chin applies this idea of grains in electroacoustic music in piano music using short, repeated sixteenth notes as the individual grains. Often marked *pp*, the soft, short percussive sounds in the piano represent the short sound bursts of grains.

Etudes No. 1 and 6, which were composed around the same time, also share some similarities. Etude No. 6 (2000) was written one year after Etude No. 1 (1999), and is chronologically the fifth etude in the set. Both etudes are linked to technology and to music developed by technology—Etude No. 1 with its spectral music influence, No. 6 with its obvious name referring to a technique used in electroacoustic music. Both use extreme registers of the keyboard as the home ground, with notes spread out over the entire keyboard through most of the piece. Both begin with a single, startling, high pitch. Both bring out structural notes by using many sforzando markings. Both use the rich resonance of the low bass extensively.

It is interesting to note that Etude No. 6 is dedicated to Pierre Boulez. On the back of the score is written: “Commissioned for Pierre Boulez, on the occasion of his 75th birthday, by the Royal Festival Hall.” Boulez’s seventy-fifth birthday in March, 2000 was celebrated throughout Europe. For this celebration, the Royal Festival Hall commissioned twelve eminent composers to write short piano pieces in his honor, as part of a weekend of concerts, workshops, talks, and films. Chin was one of the twelve composers chosen, and this etude is the product of this commission. Chin undoubtedly had Boulez in mind as she wrote Etude No. 6. Several elements present throughout this etude reflect the compositional style of Boulez, although the etude remains in Chin’s own style, with her signature coloristic, simple harmony along with exceptional skill in developing a simple, molecular idea through variation.

The first stylistic trait of Boulez reflected in Etude No. 6 by Chin is that it is often aggressive. Described as having “sheer aggressiveness of creativity” (Whittall, 1999), Boulez expressed his strong personality in both his compositions and critical writings. Boulez (1989) even stated, “I believe that the fundamental unity of composing can only be found in the
rupture, in the accident constantly absorbed by the law, at the same time as the constantly repeated destruction of the law by the accident” (p. 290). For example, in his Sonata No. 1 (1946) for piano, Boulez frequently writes volatile, explosive dynamic and melodic gestures (Example 3.7).

Example 3.7: Boulez, Sonata No. 1, first movement, mm. 34-47
Chin’s Etude No. 6 has glimpses of this aggressiveness. Chin’s use of sudden fortissimo passages and frequent sforzando markings with accent or wedge-shaped staccato in this etude indicates bold expression—aggressive yet playful (Example 3.8).

Example 3.8: Etude No. 6, mm. 12-27

Etude No. 6 also relates to the music of Boulez in the aesthetics of serialism. Boulez sought to use the principles of serialism to control timbre, duration, pitch, and dynamics. Although Chin does not adhere strictly to serial procedures, her control of each musical element in Etude No. 6 is inspired by the rigorous organization of Boulez. For example, in Boulez’s *Structures Ia* (1952) for two pianos, he first divided dynamic markings into twelve different kinds and assigned numbers to each (Table 3.4). These dynamics were then used in the order determined from the two matrices he used for the pitches.
Table 3.4: Dynamics in *Structures 1a* (1952) by Boulez

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>pppp</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>ppp</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>pp</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>p</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>f</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>ff</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>fff</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>ffff</td>
<td></td>
</tr>
</tbody>
</table>

Chin is similarly very specific with how she assigns dynamic markings in Etude No. 6. Although Chin in general tends to use extreme dynamic markings in her scores, her other five etudes are relatively scant in dynamic markings. With Etude No. 6, however, she gives dynamic markings to individual notes, specifies the degree of crescendo and decrescendo, and categorizes certain passages or groups of notes by using consistent dynamic markings, as will be discussed in detail later in this chapter.

Boulez also applied serial procedure to control timbres. Griffiths and Hopkins (n.d.) point out that the organization of timbres in *Structures 1a* (1952) by Boulez was replaced by organization of ‘modes of attack’ (Figure 3.5).

Figure 3.5: Modes of attack in *Structures 1a* (1952) by Boulez

Like Boulez, Chin is particular with assigning articulation markings to each note in Etude No. 6. The articulation markings she uses in Etude No. 6 include sforzando, wedge, staccato, tenuto, sforzando with accent, sforzando with wedge, accent, and normal. Chin does not follow specific orders in assigning these modes of attack, but she is consistent in using them with specific passages. For example, Chin consistently uses staccato markings with the triplet passages (mm. 39-40, m. 54, mm. 72-73, and m. 100) and wedge markings for the highest few notes of those triplets.

There is a visual similarity found in the scores of Sonata No. 1 by Boulez and Etude No. 6 by Chin as well. Measures 101-112 in Chin’s Etude No. 6 closely resembles the Rapide section of the second movement, Sonata No. 1 (1946) by Boulez, in its use of polyphonic setting of the jagged melodic line in both hands (Example 3.9 and 3.10).
Example 3.9: Boulez, Sonata No. 1, second movement, mm. 16-27

Example 3.10: Etude No. 6, mm. 100-110
Etude No. 6’s association with Boulez extends to the area of electroacoustic music. In fact, one of Boulez’s chief contributions is in the field of electroacoustic music. Boulez was the founder and president of IRCAM (Institute for Research and Coordination in Acoustics and Music) in Paris. Here at the IRCAM Chin composed several pieces, and the Ensemble Intercontemporain that resides in IRCAM premiered many of her electroacoustic compositions. Chin may have intentionally chosen electroacoustic music as the subject of this etude to honor Boulez’s involvement and achievement with electroacoustic music, since it is the only etude with a title directly associated with electroacoustic music.

**Structure**

The structure of Etude No. 6 is less clear-cut than the other five etudes. Chin’s usual demarcation of sections, using new tempo markings, appears here as well (once in the middle of the piece, m. 56). This could suggest a binary form with coda, but section B is not completely different from section A. Yoo (2005) finds the structure of Etude No. 6 to be theme and variations with coda (Table 3.5).

Table 3.5: Yoo (2005)’s analysis of Etude No. 6

<table>
<thead>
<tr>
<th>Sections</th>
<th>mm.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theme</td>
<td>1-12</td>
</tr>
<tr>
<td>Var. I</td>
<td>13-56</td>
</tr>
<tr>
<td>Var. II</td>
<td>56-112</td>
</tr>
<tr>
<td>Coda</td>
<td>113-128</td>
</tr>
</tbody>
</table>

Yoo (2005) perceives the new tempo marking as the beginning of Variation 2. However, I do not consider the claim for theme and variations sufficiently compelling. Variation 2 is just a continuation of Variation I and is not based on new material—it is, rather, a continuous development of the first section with an increase of tempo. It is also unusual for a theme and variations to have just two variations. Even within Variation 1, music unfolds by phrases restating the opening few measures (mm.1-12), slightly varied each time. While Etude No. 6 certainly has variation features (the simple motive which is presented at the opening is elaborated and expanded throughout the work), the sections do not provide enough contrast to be called theme and variations. I see it as a rounded binary form, where the opening of the piece returns at m. 113 in a condensed version (Table 3.6). Measures 113-115 have F#, A#, E,
and G#, the four pitches that appeared in mm. 1-8. By contrast to the opening measures, where each pitch repeated several times, in mm. 113-115 only the G# is repeated. In mm. 116-128, the bass movement as well as the grace notes before F#s and G#s recall the opening, although they are very brief.

Table 3.6: Binary form of Etude No. 6

<table>
<thead>
<tr>
<th>Section</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1-55</td>
</tr>
<tr>
<td>B</td>
<td>56-127 (A returns at 113)</td>
</tr>
</tbody>
</table>

What is clear, however, is the ending of the smaller phrases. As Chang (2006) observed, Chin frequently marks the ends of sections with distinctive melodic gestures (Table 3.7). In the case of Etude No. 6, this gesture is an ascending or descending scurry of triplets across the keyboard, initiated by single thumping in the low bass and a set of repeated notes, which gradually fade away. This occurs four times in section A, marking the end of the phrases, which last from 12 to 15 measures.

Table 3.7: Phrases marked by a distinctive melodic gesture

<table>
<thead>
<tr>
<th>Phrase</th>
<th>Measures</th>
<th>Number of measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-12</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>13-27</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>28-40</td>
<td>13</td>
</tr>
<tr>
<td>4</td>
<td>40-54</td>
<td>15</td>
</tr>
</tbody>
</table>

In section B, the marking of the phrase endings is less obvious and the phrases are longer (19 measures each). It is, however, clear enough to distinguish one phrase from another, since there is usually a repetition of notes that fades away, while the other hand has a written-out ritardando (Example 3.11), followed by a brief silence.
The last section presents a rather complete restatement of material from the opening, with greatly increased space between notes. The result is a slower version of the opening. Because of its shorter length, it functions as recapitulatory coda. With this bigger picture in mind, the inner details of Etude No. 6 are easier to understand.

**Special features**

Repeated notes and sevenths. Etude No. 6 features repeated notes and the interval of a minor seventh. The repeated note is almost always G#4. The G#4 is first introduced in mm. 7 and 8. With G# as the center, the minor seventh interval is formed above and below the G#4. Above the G# are F#6 and E7, and below G# are A#3, C2 (from B♭3, the enharmonic spelling of A#3), and D1. The pitch content of this piece is shown most clearly at the end (m. 113-128), which is both a return of the opening material and a summary of the piece. The last three measures list all the pitches with the minor seventh interval that are used in this piece (Example 3.12).
Both hands begin at the ends of the keyboard and move toward the center, playing D1-C2-A#3 with the left hand and E7-F#6-G#4 with the right hand. The hands finish with A# and G#, also a minor seventh apart. These pitches also outline a whole-tone collection C-D-E-F#-G#-A#. Although Chin pairs these pitches differently in various contexts, she achieves a strong sense of unity in this etude through the frequent use of a minor seventh interval between the pitches.

The G#4 has two main purposes in this piece, providing both a line of symmetry that divides the registral areas of the other notes and also the occasion for virtuosity. It is near the middle of the keyboard, and because of its register, has relatively inconspicuous (or unobtrusive) sound, which becomes like the ongoing noise of a machine through the use of quasi-mechanical repetition. Since other pitches are placed either high above or far below the G#4, the hands must cross frequently, with one hand feverishly repeating the G#4, while the other hand reaches over to either the highest or lowest area in quick succession (Example 3.13).

Secondly, the G#4 provides the most important virtuosic element of this piece, the repeated notes. Repeated notes have been a standard element of keyboard virtuosity from Scarlatti to Liszt. Even the title, *Grains*, has to do with the repeated notes, since they imitate the fast repetition of grains in the granular synthesis technique. The repeated notes govern the entire etude. At the beginning of the piece the repeated G#s appear rather sparsely (2-3

Example 3.13: Etude No. 6, mm. 38-47

Secondly, the G#4 provides the most important virtuosic element of this piece, the repeated notes. Repeated notes have been a standard element of keyboard virtuosity from Scarlatti to Liszt. Even the title, *Grains*, has to do with the repeated notes, since they imitate the fast repetition of grains in the granular synthesis technique. The repeated notes govern the entire etude. At the beginning of the piece the repeated G#s appear rather sparsely (2-3
measures between each entrance), but as the music develops, the repeated G#s appear in almost every measure. The number of repeated notes at each entry also grows gradually, from just 3 sixteenth notes (mm. 7-8) all the way to 44 sixteenth notes (mm. 90-96).

Measures 1-11 introduce most of the pitches at the center of this piece: F#6, E7, A#3, G#4, and C8. All of these pitches are a minor seventh apart when organized by pair in the above order. The one pitch not yet listed here is D1, which pairs up with C eventually in m. 17. The first pitch heard in the piece is a brilliant, high F#6 in an explosive fortissimo, which is held through all five beats of the first measure. The above-listed notes are always in pairs, adding E7 to F# first at m. 3, and again at m. 5 and 7. The next pair uses A#3, a tritone apart from E (the interval also featured in Etude No. 1, which Chin uses to build tension). Though paired with C, this is spelled as A# to show its function as tritone. The paired note, C2 in m. 10 functions as in Etude No. 1 as the fundamental, shooting forth an overtone series immediately after being struck sforzando (mm. 10-11).

The final pitch in the series of minor seventh intervals is D1, also the lowest pitch found in this piece. It first appears in mm. 17, beamed with C, its pair (Example 3.14). This pair appears most frequently in mm. 41-47, and again in mm. 107-111. Often marked sf, sffz, or >, it adds a timpani-like percussive quality to the piece.

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Example 3.14: Etude No. 6, m. 17

14 For this opening F#6, Chin marks sus. Ped. für F# durchgehend gedrückt halten (damper pedal pressed continuously to hold for F#) at the bottom of the score. The direction is not clear as for whether the damper pedal should be applied for all of the F#s in this score. However, Chin had also said in the interviews with Yoo (2005) that she wants “enough pedal” for this entire etude. From this comment, Chin seems to prefer more ringing, resonating sound throughout, including the F#s which often appear alone with longer note values like the first F#6.
The minor sevenths sometimes appear all together as a group. This group is in fact a whole-tone scale, formed by pitches that run downward in minor sevenths (rather than upwards in major seconds) using octave displacements. When all the pitches sound together they produce a scintillating sound, due to the characteristic sound of a whole-tone scale. For example, in m. 26, the scurrying triplet gesture which follows the A#1 consists of C8-D7-E6-F#5-G#4-A#3-C3-D2-E1. Marked staccato and decrescendo from $f$ to $pp$, it is the most vigorous passage in mm.1-27. It is a response to a similar figure (based on the overtone series) in mm. 10-11, inverting both the dynamics and the melodic contour (Example 3.15a).

Similarly, m. 100 has a series of pitches that are a minor seventh apart, this time beginning with E7-F#6-G#5-A#4-C4-D3-E2-F1-A0 (A0 substitutes for the minor seventh G0, being the lowest note on the keyboard) (Example 3.15b).

Example 3.15a: Etude No. 6 mm. 26-27

Example 3.15b: Etude No. 6, m. 100
The largest section featuring the minor seventh is mm. 101-111 (Example 3.9). In the penultimate section of the piece, the zigzag melodic line in both hands, cross-accent, and the polyrhythm 7:6 create a frenzied atmosphere. Among the leaping pitches in the melodic line are sforzando notes that outline the interval of a minor seventh. The minor sevenths also appear between the notes in the zigzag melodic line. For example, there are two pairs of minor sevenths in the right hand in m. 101: G#–F# and C#–B, leaping upward. In that same section the left hand extensively uses intervals of a ninth, which can be seen as an octave displacement of a minor seventh. For example, in m. 101, the left hand plays D4–C#3 (a ninth) instead of using D4–C#5 (a seventh), mirroring the right hand by leaping downward.

**The clusters.** Besides the repeated notes and the intervalllic pitch organization, Etude No. 6 features three types of clustered notes: percussive clustered notes, arpeggiated clusters, and cluster-aggregate chords. The percussive clustered notes always come in the form of a staccato combination of two thirty-second notes and a sixteenth note (Example 3.16). These percussive clustered notes appear three times in the piece, with different pitches, and moving higher at each entry. In all three appearances the outer pitches of the chords have two repeated notes followed by a downward third, with top and bottom voices in parallel, while the inner pitches outline a descending line (e.g., m. 6 has a descending chromatic line C#–C–B).

Example 3.16: Etude No. 6, m. 17, m. 32, m. 51
The second type of clustered notes is the arpeggiated clusters, which appear throughout this piece. Chin varies the direction of the arpeggiation in six different ways: upward (m.16), downward (m. 53), up then down (m. 47), down then up (m. 99), both hands rolling inward (m. 39), and both hands rolling outward (m. 53). Whenever the hands play clusters that roll in the opposite direction within the same register (the hands overlap), they use opposing pitch content: the right hand plays all black keys and the left hand plays all white keys every time (Example 3.17).

Example 3.17: Etude No. 6, m. 39 and m. 99

The arpeggiated clusters consist of either single notes (playing one note at a time, Example 3.18a), cluster-rolls (using pairs of either white or black keys played simultaneously, (Example 3.18b), or a mixture of clusters and single notes (Example 3.18c).

Example 3.18: Etude No. 6, mm. 26, 72, and 47
The rolled clusters are also played lightly, as grace notes (mm. 64, 77, 86). The third type of clustered notes is the cluster-aggregate chords (m. 90, 99) (Example 3.19). Beginning with a single pitch and adding a note or few clustered notes at a time, the clusters pile up together like a snowball collecting more snow as it rolls down a hill, eventually using all ten fingers, with some fingers playing two keys at once. The cluster-aggregate chords simulate the process of using granular synthesis to create a complex sound, with the overlapping of thousands of grains, each at different frequency. Chin organizes these multiple different types of clustered notes in Etude No. 6 as rigorously as she does with dynamics or articulations.

Example 3.19: Etude No. 6, m. 90

**Other methods of varying the sound**

Besides the variety in types of cluster, Chin showcases her creativity by using a gradual expansion of intervals as a way of developing the music. For example, the jagged line of 32\textsuperscript{nd} notes that first appears in m. 19 appears five more times, each time with larger intervals. This line in m. 19 is a compact display of the minor seventh interval pairs which were introduced in mm. 1-11. In m. 25, some of the notes form clusters, featuring the interval of major second (Example 3.20).
Example 3.20: Etude No. 6, mm. 18-27

Intervals continue to expand, as m. 36 features the tritone, m. 52 a mixture of tritone and P5, m. 62 the sevenths (Example 3.21), mm. 79-81 chords made of clustered seconds with M7, d8, or m9. The notes with these intervals appear at many different registers, transposed. This organic growth of intervals creates a gradual thickening of the texture. The second compositional device Chin uses to vary a musical statement is to add or subtract one note at a time. In mm. 38-34, C8 repeats four times, each C preceded by grace notes which gradually lose one pitch at a time (F-G-A-B becomes G-A-B, A-B, and finally, B alone) (Example 3.22). Another example of subtracting one pitch at a time is found in the clustered notes, in mm. 102-108 (Example 3.10).

Detailed dynamic markings. Chin takes control over each musical element and marks dynamics in great detail. She assigns specific dynamics to almost every note or passage in Etude No. 6, to bring out the different registral and textural layers and to create the effect of sound in motion (as discussed in Ch. 3). Example 3.23 shows how Chin draws attention to the F#6 layer by assigning gradually softening dynamics from f, mf, mp, and p. Also, Chin sets apart the jagged melodic line made of 32nd notes (mm. 19, 25, 36, 52, 62-63, 79-81) by marking it p or pp each time it appears. Chin gives sound the feeling of having

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15 Transposition is a common technique in electroacoustic music, because the composer can change the frequency of the recorded sample on the computer effortlessly.
changing distance by using cresc. and decresc. almost obsessively. This is most obvious with the repeated G#4s, which are always marked cresc. or decresc. These cresc. or descresc. markings make the repeated G#s seem to travel near and far from the listener’s point view (Example 3.21).
Example 3.22: Etude No. 6, mm. 28-37

Example 3.23: Etude No. 6, mm. 20-23
CONCLUSION

Unsuk Chin’s Etudes for piano, No. 1, in C, and No. 6, Grains, highlight some of the important and original elements of Chin’s compositional style. Inspired by electroacoustic music, specifically its techniques and sounds, both etudes show similarities to elements of electroacoustic music, in aspects including organization of musical time, tone color, and dynamics. They also display meticulous organization of pitch structure and methods of variation including intervallic expansion and the gradual addition of new pitches. These elements contribute to the distinctive and colorful sound of her music.

The aspect of time in Etudes Nos. 1 and 6 reflects the influence of electroacoustic music. In electroacoustic music, sounds are organized in more pulse-free, fluid, and continuous manner using real time rather than time signatures. Chin adapts similar organization of musical time in the etudes for piano, as she prefers an organic approach to presenting a musical idea. Chin determines musical time by the duration of each presentation of musical happenings, or events, instead of meter-based time.

Another way Chin incorporates elements of electroacoustic music is that she explores distinctive tone colors and sonorities in Etudes Nos. 1 and 6. Electroacoustic music largely focuses on the transformation of timbre using various electronic or computer techniques. Using recorded samples, composers of electroacoustic music can create diverse percussion sounds. Etudes Nos. 1 and 6 reveal Chin’s familiarity with the possibilities of various percussion sounds. By focusing on the percussive qualities of the piano in different registers, Chin matches the registers with specific tone colors. Etude No. 1 uses dissonances in the high register, producing an effect similar to gamelan music; Etude No. 6 features the dry, dull, machine-like repeated notes in the middle register. Also, using accents, sforzandi, and staccato articulation, Chin either brings out the rich overtones or imitates specific percussion instruments at the piano. Such focus on timbre is deeply rooted in the aesthetics of electroacoustic music.

Etudes Nos. 1 and 6 correlate to ways of controlling sound in electroacoustic music in their use of detailed dynamic markings. Chin uses extreme crescendo and decrescendo to simulate the spatial effects of sounds covering a range of distances from far to near, as is found in electroacoustic music. When the overtone series is used as the generating principle, as in Etude No. 1, Chin assigns dynamic markings to each register to correspond to the dynamic level observed in the computer analysis of the natural acoustic phenomenon.
Besides incorporating elements of electroacoustic music, Etudes Nos. 1 and 6 emphasize an important element of her compositional style by their meticulous organization of pitch structure. The skillful organization of pitches produces iridescent colors, one of the characteristic features of her music. In the cases of Etudes Nos. 1 and 6, the iridescence comes from the frequent shifts between consonant and dissonant intervals. In Etude No. 1, for example, pairs of pitches that are a third and a sixth apart provide consonances, while the second, seventh, ninth, and tritone intervals provide dissonances. In the same piece, Chin obtains bright colors by increasing the number of consonant intervals, and dark colors by increasing the number of tritones within a passage.

Last, Etudes Nos. 1 and 6 highlight important elements of Chin’s compositional style in their presentation of a simple musical idea varied in seemingly countless ways. Chin chooses a simple organizing principle to provide variety with the piece, for example intervallic expansion in No. 1 and the use of minor 7ths in No. 6. Chin also varies a simple rhythmic pattern in No. 1, as she explores different ways for the hands to interact with each other rhythmically, with groups of four or five notes, providing variety that maintains freshness for the ear in each phrase.

Etudes Nos. 1 and 6 by Chin are unique contemporary piano etudes which not only provide virtuosic opportunities for pianists but also show the influence of electroacoustic music in music written for the piano. I hope that this paper will prompt further research in other contemporary piano works by composers of electroacoustic music, such as American composer Mason Bates (b. 1977) and Finnish composer Kaija Saariaho (b. 1952), and that Chin’s music will continue to attract interest from performers, scholars, and audiences.
APPENDIX

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Boulez, Sonata No. 1

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Lucia Castellini  
To: Doori Yoo  
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March 4, 2013 2:34 AM

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Best regards,

Lucia Castellini
February 25, 2013

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BIOGRAPHICAL SKETCH

Doori Yoo

Pianist Doori Yoo was born in Seoul, Korea, and has lived in the United States since 2001. She received her Bachelor’s and Master’s degree in Music, Piano Performance from Pensacola Christian College, and Doctor of Music degree from Florida States University. In 2012 Doori was the state representative of Florida for the Music Teachers’ National Association Young Artist Piano Competition. Doori is currently teaching Theory and Piano at Pensacola Christian College.