Oblique Strategies

By Douglas Geers

01. Introduction

A few years ago I experienced an awakening regarding the contemporary music world and my own music. At the time, I was employed by the Columbia University Computer Music Center and the Columbia Music Library to transfer archival analogue concert recordings to digital media (DAT and CD). These concerts were mostly graduate student composer concerts held at Columbia and Cornell Universities from about 1956 to 1991. For approximately three months I spent several hours every day listening to these tapes as they copied, to insure the accuracy of the transfers.

As the weeks of archiving and listening continued, I was eventually overwhelmed by how few pieces stood out from the crowd, through either style or strength of their content. Eventually I started giving a silent cheer to the composers who were actually able to catch my ear and pull me in! Maybe I should not have been surprised at my frustration, since I am sure that I would have had a similar reaction if I had listened to hundreds of hours of randomly selected music composed from 1756 to 1791, for example. Nevertheless, I wondered what some young archivist of the future might think of my music, and whether or not my works would sound at all distinctive to her or him.

I came out of this experience with a strong determination to give my compositions a stronger profile, and I went about this by increasing my critical awareness of both content and form. For instance, I now pare down my music to only the ideas I absolutely need to express. When choosing my materials, my priority is that they attract and sustain interest. I also attend more discriminatingly to issues of pacing—aiming to alter or alternate musical ideas before they grow stale. In relation to pacing, I strive to convey an overall sense of trajectory in the music, though it is designed to contain surprise and unpredictability. Obviously, all of these were concerns of mine before my archiving job, but since that time I have become acutely more attentive to them.

The exact implementation of these concepts varies significantly from piece to piece, but I think that specific examples of how I composed two recent works—*Reality House* and *Ripples*—will suffice here to illustrate my current approach to composition, including methods of construction as well as issues of taste. As I proceed, I will discuss the technical aspects of these pieces and also explain some of the reasons behind my compositional

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choices. After considering the specific choices I made in these two works, I will end the essay with a broader explication of my aesthetics and interests.

02. *Reality House*

In 1998 I was fortunate to have been selected by the Columbia Composers organization to write a piece for Ensemble Fa, a French contemporary music group. They were planning a series of concerts in the United States, one of which would consist of four premieres of pieces by graduate students at Columbia University, to be performed at Miller Theatre in New York City. The performers participating in this tour included conductor Dominique My, and instrumentalists playing flute/piccolo, clarinet/bass clarinet, trombone, violin, viola, cello, and contrabass.

While preparing to write for this group, I noticed that this instrumentation was the same as that of Gérard Grisey's *Périodes* (composed 1974), from his six-work cycle *Les Éspaces Acoustiques.* I had just spent the 1997–98 academic year studying composition with Tristan Murail, who was a friend of Grisey and, like Grisey, one of the earliest practitioners of spectral composition methods.[1] With these facts in mind, I decided to use this commission as an opportunity to explore some spectral techniques. Later, after Grisey's unexpected death in November of that year, this work also became an homage to him and his music.

The work I wrote for this occasion is a sixteen-minute piece in one movement, entitled *Reality House,* named after a methadone clinic located a couple of blocks away from my apartment in Manhattan. Given the limits of the essay, I will restrict my analysis of *Reality House* to my formation of its harmonic materials and its general form.

For this composition, I decided to follow a deliberately corrupted variation of typical spectral methods: First of all, while the majority of spectral compositions base their harmonies upon variants of one, or just a few, spectra, I decided to employ several sets of source spectra. Secondly, in a nod to my enjoyment of pop music, I took all but one of my source spectra from my favorite timbral moments on the Beatles' album *Sergeant Pepper's Lonely Hearts Club Band.* I added to these one other set of spectra, taken from the title track of the punk rock band the Clash's album *London Calling.*

I used a computer to identify and extract spectral data from these source recordings, following essentially the same procedure for each of them. I will now describe this at some length with an example of a particular set of harmonies that was derived from the transition between the first two songs—the title track and "With a Little Help from My Friends"—on the *Sgt. Pepper* album. The precise moment I was interested in is the 2.1 seconds when the band sings the name "Shears," so I began by isolating it from the Beatles recording by means of audio-editing software.

Next, I transcribed the timbral content of the recording into harmonies, using the computer music applications Audiosculpt and Patchwork.[2] First, in Audiosculpt, I performed a sonogram analysis of the recording. This displayed the spectral content of the composite timbre of voices, guitars, drums, etc., as a whole (see fig. 1). (Although figure 1 cannot show this, one of the joys of the Audiosculpt program is that it allows the user to zoom in visually and see intricate details of a sound's timbre, acting in effect as a kind of timbral microscope.) The analysis showed that as the Beatles sing the word "Shears" the timbre changes significantly, evolving from the initial *sh* through the vowel sound of the *ea,* the *r,* and then the final *s.* Given the variety of timbral content there, I decided to create a series of chords from this analysis rather than just a single harmony.

To get from a single analysis to a series of chords, I first instructed Audiosculpt to divide the analysis into shorter segments of time. I decided to divide the 2.1-second sound into twenty such segments, because I knew from experience that shorter segments would be more idiosyncratic and thus probably more interesting to me. Since I wanted each segment to be a different harmony for *Reality House,* I set the software to indicate the beginning of a new segment whenever the timbral content of the analysis had changed significantly from the beginning of the current segment. In order to divide the analysis into twenty segments, I found that I needed to set Audiosculpt to indicate a new segment whenever the timbre of the analysis had changed by 22 percent or more. Thus, each chord would share about three-quarters of its frequency content with its predecessor and its successor. In addition, since Audiosculpt used frequency content to determine where to begin each new segment, the duration of the segments varied widely, from slightly over 0.01 seconds to about 0.26 seconds. Where the timbre was stable the segments were relatively long, and where the timbre was unstable there were more, shorter segments. So, in effect I set the software to seek out the most novel timbral moments of the analysis. This was fine for me because I was looking for interesting timbre, not trying to duplicate the Beatles' performance.

After Audiosculpt had found twenty such divisions in the analysis of "Shears," I saved the data for these twenty spectra and then imported them into the Patchwork program for further manipulations that were not possible in Audiosculpt. This step was necessary because the timbre of a musical texture such as a Beatles song, even merely one syllable's worth, likely contains thousands of partials, and I wanted a set of frequencies small enough to score as harmonies. Thus, my goal in Patchwork was to discover and pull out the most salient pitches from each of my twenty spectra. Once I had configured the software properly, I instructed Patchwork to discard all of the partials except for the 32 strongest in each of the twenty spectra. This allowed me to retain, in effect, a simplified

Figure 1: Sonogram analysis of 2.1-second recording of "Shears." Vertical axis is frequency, 0–12,000 Hz (reading up); horizontal axis is time (L–R).

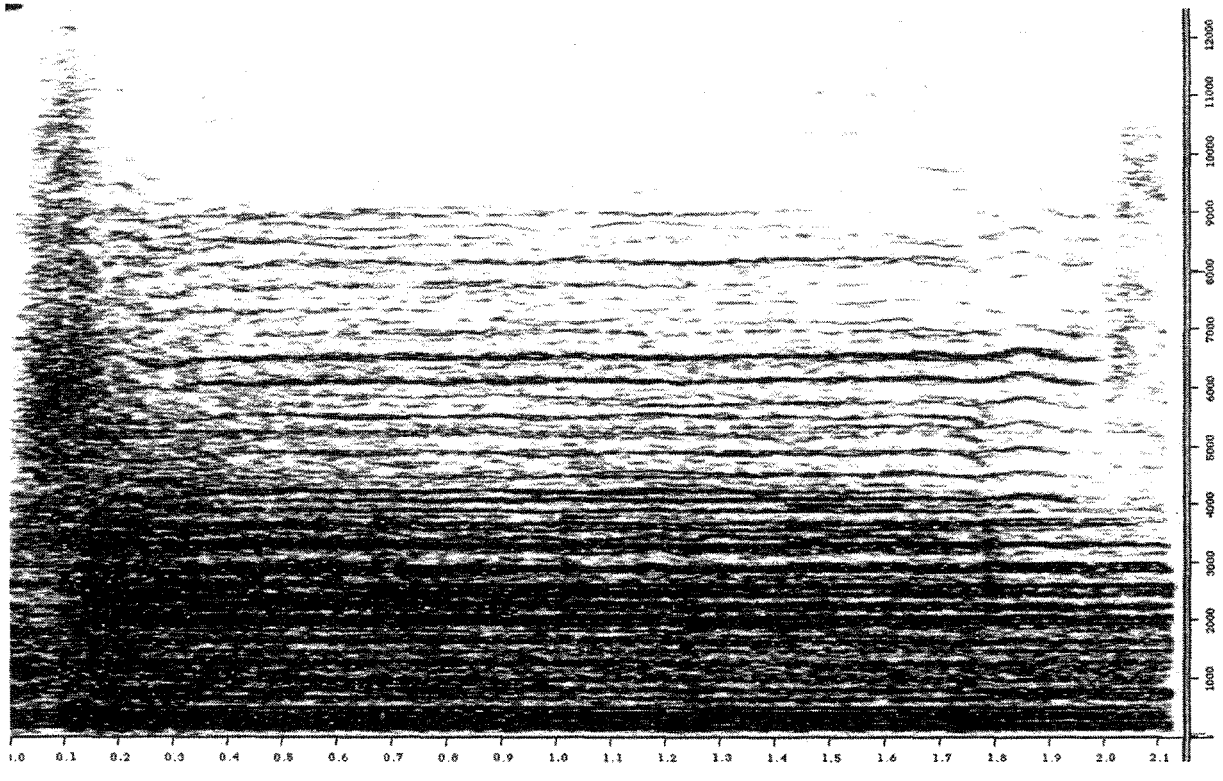
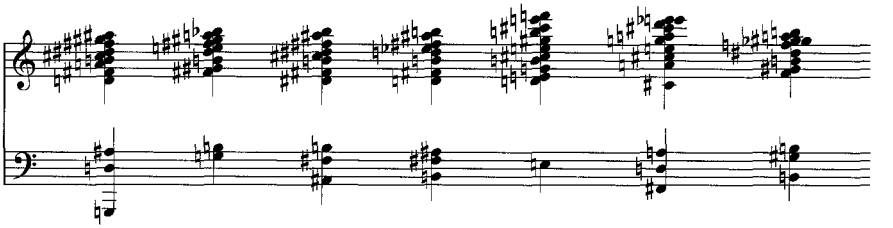


Figure 2: Seven chords derived from spectral analysis of "Shears."



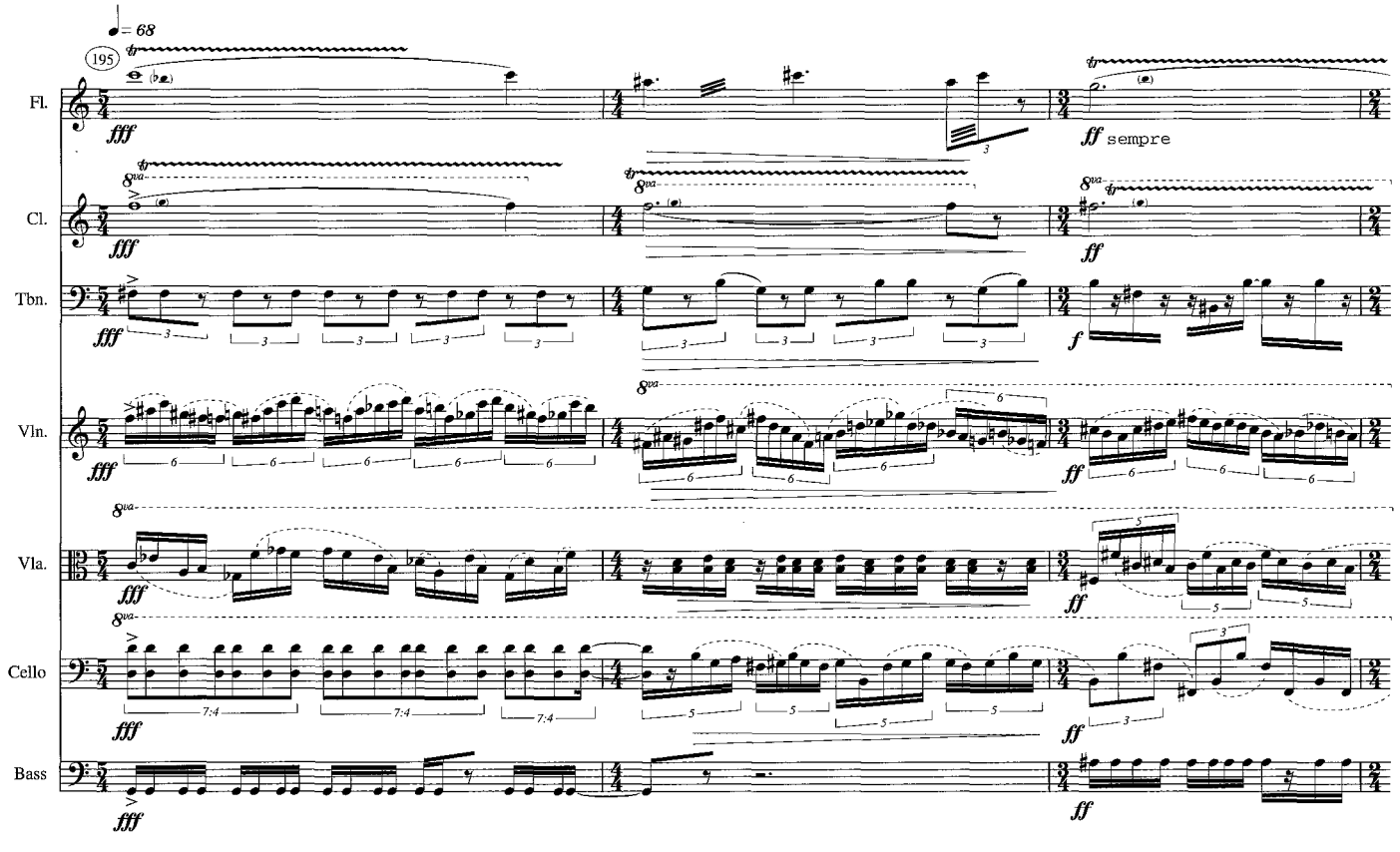
spectral outline of each segment, and these twenty 32-note pitch sets were now ready to be used as harmonies for *Reality House.*

It is worth reiterating here that these harmonies were representations of the timbre of the entire musical texture present during twenty tiny slices of time as the Beatles sang "Shears." Thus, each of the twenty chords contained a wide range of pitches, from very low to very high. Some of these were pitch-class equivalent to each other but there was no regular pattern of intervals between pitches, as in triadic harmony, for instance. In addition, quite naturally, the general pattern of intervals in the harmonies was that of wider spacing among lower pitches and tighter spacing among higher pitches, in rough congruence to the phenomenon of the overtone series (see fig. 2). Given the wide range they cover, one may also think of my "harmonies" as being non-octave-repeating scales.

Since my intention was to seek the most interesting timbral moments within the analysis of the recording of "Shears," I carefully listened repeatedly to each of the twenty chords. I found many of them uninteresting or redundant, and so I discarded those, leaving the seven chords of figure 2. I left these seven ordered as they had appeared chronologically in my analysis, but even though in the analysis they had had dramatically different durations, I now weighted them equally. Figure 3 shows an excerpt from *Reality House,* which uses this chord sequence with one harmony per measure. (Only the first three harmonies are shown in figure 3.)

As mentioned above, I followed essentially this same procedure when creating harmonic progressions from the other musical excerpts I chose to use for *Reality House.* The other sets of Beatles-based harmonic progressions came from the following locations on the *Sgt. Pepper* album: the last two beats of the first measure of the opening title track; the moment during the song "Getting Better" when a buzzing sitar note enters, just before the beginning of the last verse of the song; the first chorus of "She's Leaving Home," during the word "years"; and the second orchestral climax of "A Day in the Life." The harmonies based on the Clash tune were

Figure 3: Measures 195–97 of *Reality House,* using the first three chords from figure 2.



taken from the first beat of the song, an A-minor triad played by highly distorted guitars with accompanying drums.

While composing *Reality House,* I chose only one progression from these to use at a time. However, I played with the material freely, transposing entire progressions as I wished, running them only partially and/or backwards, and juxtaposing the progressions in whatever ways seemed most interesting to me.

For me, this method of creating harmonies for *Reality House* was quite satisfying. The use of spectral methods based on pop song spectra enabled me to create an homage to Gérard Grisey while simultaneously defying the conventions of his style and commemorating some of my favorite pop songs. Moreover, since I find the timbre of some pop music to be quite interesting, this piece became an experiment to see whether I could transfer those sound components from pop music to acoustic chamber music. The result sounded nothing like pop music, but to me it did capture some of the sonic attributes I enjoy in pop, which is what I wanted. The point for me in this endeavor was to create interesting harmonic colors for *Reality House*—not to simply imitate the Beatles—and I believe I achieved that goal.

I should add, however, that, technically, the harmonies I created for *Reality House* and the way I used them were more "spectrally inspired" than spectral. First, as I mentioned above, I used a very large set of spectra from sources that were unrelated to each other except for the fact that I found them all timbrally attractive. Secondly, for practical rehearsal/performance reasons, I decided to refrain from the use of microtones; thus, my harmonies were less precise approximations of the source spectra than the harmonies of most spectral pieces. In addition, I injected some sense of tonality into my harmonies in that I composed several sections of my piece by reusing progressions, transposed to new "tonics," based on a scheme of tonal centers derived from the succession of tonics of the songs on the *Sgt. Pepper* album. Finally, as mentioned above, I juxtaposed progressions from separate source spectra throughout the piece. I also linked progressions via common or related tonal centers rather than through the processes of spectral manipulation. Thus, I purposely chose to digress from conventional spectral composition methods in order to create my own sound and structure for *Reality House.*

With my harmonic scheme in place, I next planned the form for *Reality House.* In brief, the result is a chain of successive sections, which, like beads on a flamboyant necklace, tend to be fairly self-contained, recur in patterns, and often contrast with their immediate neighbors. The ordering of these sections in *Reality House* reflects my interest in combining overall trajectories with unexpected twists and turns. Thus, to unite the piece and imbue it with continuity, I decided that many moments would be variations on,

or recurrences of, musical ideas presented earlier. Then, to lessen regularity, I added sections of nonrecurring materials scattered among these. Moreover, the lengths of sections vary widely, and some end unexpectedly. I will now illustrate these techniques through contrasting examples.

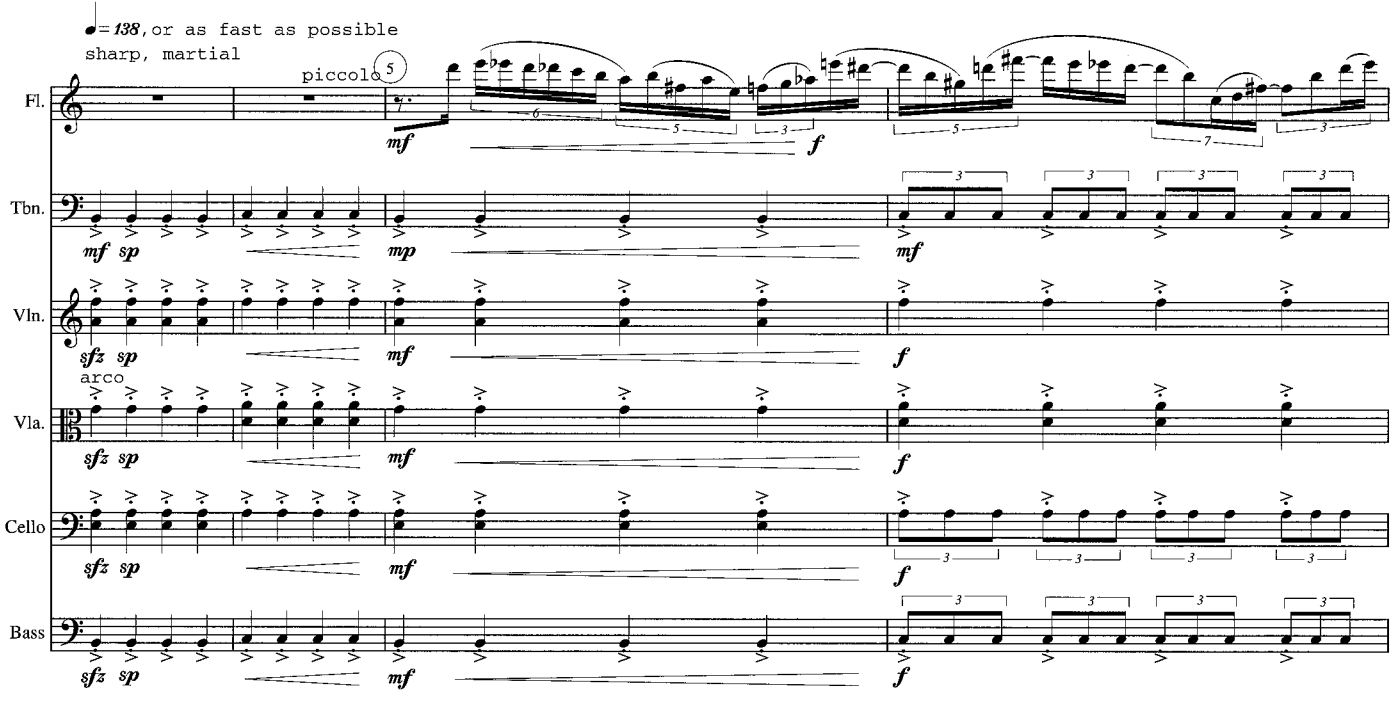
Reality House begins with a fifteen-second quick-cut montage of thematic ideas that reappear as the piece continues. One of these is a motto-theme I call "the 'London Calling' motto," which first appears in the trombone and strings, mm. 3–6 (fig. 4), and varies in length from one to four measures in its reappearances. As one might guess, this motto uses harmonies derived from the Clash song "London Calling." It also uses a signature rhythm of insistent quarter notes and triplets, also derived from "London Calling."

This motto is the most prominent of several thematic materials that recur quite clearly in the piece, and I conceived of it as constituting a "frame" around the other sections. My intention was that, just as a hiker in the mountains might regain orientation by sighting a particular peak from several points of view along the course of a day's excursion, listeners could recognize ideas such as the "London Calling" motto as they return, varied, in *Reality House.* The "London Calling" motto appears a total of six times (mm. 38–88, 155–58, 241–43, 299–300, 303, and 306–22), including its dramatic extension at the end of the piece. This particular motto gains further importance as *Reality House* continues, since it usually enters as an interruption, and is followed by different material after each of its appearances.

Other clearly recurring materials in *Reality House* include the following: the melodic theme introduced in mm. 5–6 (recurring in mm. 85–90, 211–30, and 274–79); a half-step upper-neighbor-note motion first seen in m. 7 (recurring in mm. 92–109, 126–31, 231–38, 272–73); a rhythmic pizzicato gesture in m. 8 (recurring in mm. 53–57, 280–84, and 291–94); and a short, rising melodic line first heard in mm. 23–27 (recurring in mm. 31–35, 42–45, 47–50, and 284–91). These, like the "London Calling" motto, are altered in each subsequent appearance. I believe that their referential nature helps provide continuity to the work—the "frame" idea I introduced above—while the uniqueness of both the treatment and the context of the material upon each appearance help the music express new ideas/emotional states. Since the variations of these materials are scattered through the piece, I see the result as a sort of weave-of-variations holding the piece together, while at the same time the alternation of sections of different materials creates an effect similar to the necklace analogy I made earlier.

Scattered among the recurring musical materials are several sections that are more self-contained and which feature materials that do not

Figure 4: "London Calling" motto from *Reality House,* mm. 3–6.



appear elsewhere in *Reality House,* or take materials that were peripheral earlier and treat them at length. An example of a unique section is the soft *Klangfarbenmelodie* interlude of mm. 244–59; and the technique of dramatically expanding earlier material is exemplified in mm. 263–71, 276–77, and 293–98, which are based on the harmony and glissando of mm. 1–2. Other examples are the three sections of mm. 58–84, 136–54, and 160–209, which do not share thematic materials with each other or with the rest of the piece. These sections *are* related to each other, though, in that all three are realizations of the same formal process, as I will now briefly explain.

The three sections of mm. 58–84, 136–54, and 160–209 are noteworthy from a formal point of view in that each is an iteration of a single formal process. Many of my works use processes to alter/develop material, and these sections of *Reality House* illustrate how I embed them into larger forms. The process utilized here is accumulation: each of the three sections begins with sparse, *pianissimo,* relatively low-pitched materials, and progresses into a loud, dense, heterophonic texture filling a wide pitch range. The first two instances are truncated, but the third one completes the process and achieves the most powerful climax of the entire work. (I will revisit the idea of *processes*—and how I utilize them—during my discussion of *Ripples.*)

While this explication of *Reality House* has focused rather more narrowly on issues of harmony and form, I think that it has provided some insights into my compositional methods. With these in mind, I will now move to my second analysis, which will focus on a quite different work: my electroacoustic tape-music composition *Ripples.*

03. *Ripples*

One strong influence on my music has been my use of computers for research and composition. The field of computer (electroacoustic) music is young and still evolving rapidly, and I find computer-assisted composition stimulating and exciting because the computer, more than any previous tool, allows one to develop and deploy complex algorithms to create and shape musical material. The most noteworthy ways in which I have used computers to compose are for the creation and development of materials for instrumental music, as with the harmonies of *Reality House;* for live synthesis and processing of sounds during performances; and for the studio composition of so-called "tape music,"[3] exemplified in my piece *Ripples.*

I composed *Ripples* in the spring of 1997, slightly more than a year before *Reality House.* Just as I later used *Reality House* as a pretext to explore the techniques of spectral music, during the composition of *Ripples* I pur-

posely decided to play with two ideas pioneered by composer Iannis Xenakis: stochastic algorithms and a "granular" approach to musical texture (both explained below). Freely adapting Xenakis's concepts, I decided to create and implement an algorithmic system that would produce music according to rising and falling waves of note densities. Meanwhile, quite unlike Xenakis, I decided to map these ideas to a stable major-scale pitch set, clearly pulsed rhythmic material, and a sound world highly influenced by techno music.

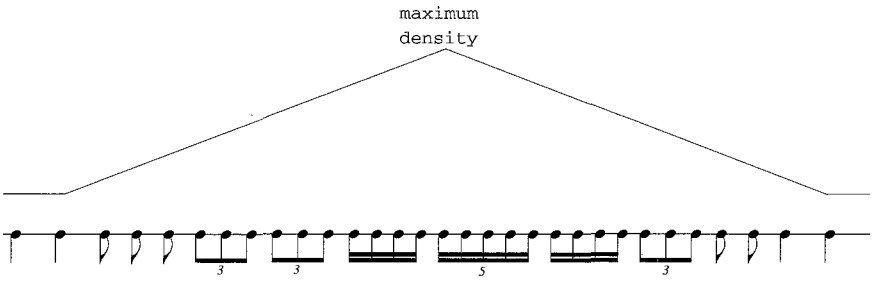
Put simply, a stochastic algorithm is a mathematical procedure that utilizes probability theory to influence its decisions. In music, this means that a composer can set up situations that require choices, and allow the computer to make these choices by following statistical distribution rules. For example, one could generate a primitive stochastic melody by instructing the computer to choose every subsequent note via the following rules: 40 percent of the time move down a step, 40 percent of the time move up a step, and 20 percent of the time repeat the same note.

For *Ripples,* I decided to use stochastics to control rising and falling densities of notes in time. From previous experience with computer music, I knew that as a regularly pulsed stream of notes gets faster (denser in time), eventually the listener's mind switches from perceiving it as a series of individual notes to hearing it as a single continuous sound. This notion intrigued me, and I decided to explore perceptions of this boundary in *Ripples.* I conceived of each rise and fall of note densities as a wave of musical energy, and determined that during the piece these would grow and diminish in their extremity; thus the title, *Ripples.* The final composition was created by connecting and layering many instances of this basic process, run with different input.

I wanted the music in *Ripples* to be pulsed and, at least initially, feel "performable." To accomplish this, I implemented the density changes by creating more, and then fewer, equal subdivisions ("tuplets") per beat, beginning with quarter notes, then eighth notes, then triplets, sixteenth notes, quintuplets, sextuplets, and so on. After the process reaches its "peak" number of tuplets, it progresses back from the highest-tuplet level to quarter notes once more. Each of these processes, from quarter notes to some *x*-tuplet to quarter notes again, would constitute one "ripple" (see fig. 5). Of course, since this was a computer and not a live performer, there was no limit to how high I could push my tuplets. If I wanted tuplets of 23 notes per beat at quarter note = 90 (and sometimes I did!), this was completely possible.

To realize this *rippling* algorithm, I wrote my own software in the computer language C, which did the necessary calculations and wrote a "score," and which I then synthesized into audio by using the RTcmix[4]

Figure 5: A simple example of the process of rising and falling note-density pattern used in *Ripples.*



computer music composition environment. Each time I ran my program, I set values such as tempo, the highest tuplet level to which I wanted the music to progress, a dynamic level for the beginning, a dynamic level to which to progress, and the amount of time to get there and back. To give the ripples more shape, I soon altered the original plan so that each "ripple" would contain two density-rises and -falls: first to the specified peak-tuplet level and back, and then to a second peak level and back again. I also added instructions for the music to move back and forth across the left–right stereo field as it played.

Rather than merely having one pulse of notes following this algorithm at a time, I devised my software to create a musical texture of sixteen musical lines, each at a different pitch level, all following the density wave simultaneously, but stochastically offset from each other. In other words, I turned my ripple instrument into a sixteen-member ensemble of "ripplers." Moreover, because part of what makes instrumental music interesting to me is the fact that an ensemble of live musicians cannot possibly play perfectly in time together, I employed stochastics so that each rippler would perform slightly differently from its peers. For instance, although technically all the ripplers begin at the same moment, I actually wrote my program so that each one would manifest small, random time offsets. In addition, I employed stochastics to individualize each of these ripplers even more, allowing each one to choose its own subset of pitches from the scale (described below), as well as a unique time within a specified distance from the "ideal" time to reach its peak tuplet level. I used similar stochastic values to determine the tuplet level to which each rippler progressed, its dynamic levels, and how often it would insert a rest rather than play a note.

I employed an E♭-major scale as my pitch-class set throughout *Ripples.* Over the course of two rising- and falling-density waves of each iteration of the ripple algorithm, each rippler chose notes from the scale four times.

First, during the acceleration towards the first peak-tuplet value, each rippler could choose only two pitch classes. Next, while slowing down from this peak to quarter notes again, each rippler was free to use all of the seven pitch classes. Then, during the rise to the second peak, each was limited to three pitch classes, and finally during the second return to quarter notes, each rippler could choose from all seven notes once more. Every time the software chose subsets of the scale, it did so entirely at random (although it performed a check to make sure that it did not choose the same pitch class more than once for each rippler at any given time). Within each segment of music, once a rippler had chosen a set of pitches to use, the software chose at random from this group. Thus, although the pitches were those of an E♭-major scale, the use of them was not designed to emphasize tonal relationships. As a result, sometimes one may perceive it as being in E♭ major, at other times as in F Dorian, or even at times as being in C Aeolian.

I mentioned above that each of the ripplers was placed at a different pitch level; I would like to explain a bit further how this was done, and the consequences of my choices. The sixteen ripplers' pitch levels were spaced at the interval of an octave, from the octave C(−3) (seven octaves below middle C) to octave C12, eight octaves above middle C. This pitch range may sound a bit crazy—and maybe it is—but it also demonstrates the joys of working with computer music, where one need not be limited to what conventional instruments can do. The lower limit of human hearing is generally between C0 and C1, and the upper limit is somewhere between C10 and G10. So my piece was constructed to go beyond these limits, and this produces interesting results, as I will now describe.

Because of the limitations of the 44,100 audio-sampling rate I used for *Ripples,* and a technicality of digital sound known as *foldover,* all pitches that were supposed to sound from around E♭10 and above are misrepresented as lower, nontempered pitches (so, no, *Ripples* will not drive dogs crazy). On the other end of the pitch continuum are notes that are too low for humans to hear, but as these notes play faster and faster tuplets and faster and faster tempos, they begin to be perceived as pitches, in relation to the rate they occur (this happens at about 16–20 beats per second). For instance, if a pitch of eight Hertz (approximately C(−1)) played as sixteenth notes at a rate of quarter note = 480—which is entirely possible with the *Ripples* software—then a listener would hear a pitch of 32 Hz, which is very near C1. While I do not have the space to discuss these effects in more detail, it suffices to reiterate that they added interesting, relatively unpredictable pitch and timbral information to the music of *Ripples.*

Beyond this, let me mention two other ways that I composed the timbre of *Ripples.* First, early in the process of composition I produced a timbre for RTcmix to use when synthesizing notes for *Ripples.* This timbre consists of a

single frequency spectrum and amplitude envelope shape, both created by me through intuitive experimentation. Although one may not guess it when listening to *Ripples,* every note in the piece employs this timbre.

My use of the same timbral shape for all of the notes in *Ripples* might seem simplistic at first, but I knew that this would not be a problem because of the second additional way that I composed timbre in the piece. This method is directly linked to the "ripple" process that pervades the piece, and operates as follows: While *Ripples* begins with clear successions of notes, as the music proceeds the basic ripple process repeats and moves to more extreme realizations—faster and faster tempos. As the density of notes increases, eventually the sense of successive notes, each with its own timbre, dissolves into the perception of a single, complex, evolving timbre, now the "line" of the music. In fact, the tempo of *Ripples* eventually rises to a maximum level of quarter note = 720, so that even when each of the ripplers is only playing quarter notes it is already performing twelve notes per second!

Music such as this, in which thousands of very brief individual notes are combined linearly to form large-scale audio events, is known as "granular synthesis." A simple analogy is that in granular synthesis each note has a role similar to that of each grain of sand on a beach: it is an individual, but also a tiny element of a much larger structure. The concept of granular sound was first employed in composition by Iannis Xenakis, and was used by many computer music composers during the last quarter of the twentieth century. My interest in *Ripples* was, in effect, to build a piece around the concept of granularity, allowing the music itself to trace a path from distinct single notes toward an increasingly granular manifestation and back again.

The basic shape of *Ripples* as a whole is the same wave of increasing and decreasing density realized in each individual ripple. As such, the essential slow–fast–slow pattern is easy to discern at the end of the work, and the musical development within seems generally smooth and organic. However, while the finished piece seems to flow quite naturally, it is actually the fruit of an involved compositional process.

To create the final composition, I developed my *Ripples* software until it gave me musical output that I found intriguing and satisfying. Then I ran the program time and time again, repeatedly altering the settings of the initial values. The most significant settings that I altered were the tempo and peak-tuplet levels for each ripple; the piece employs materials at tempos ranging from quarter note = 20 to quarter note = 720. Each time I ran the program the software realized music within the parameters I had set, using stochastically weighted randomization so that no two runs of the program, even with the same settings, were exactly the same. I listened to

these segments of music carefully and adjusted my program settings repeatedly, fine-tuning the settings to move the results closer and closer to what I had in mind, until I found just what I wanted, or—sometimes—something even better.

Eventually I was able to create a large number of musical segments embodying a wide range of realizations of the *Ripples* algorithm, and chose from among them only those I found most successful. I then ordered the chosen segments, edited them, and layered them into a composite mix, according to my overall formal plan. I arranged the connections between them so that in the final piece not all of the sections manifest the entire rising-and-falling density pattern. In fact, most often the connections between sections are quite blurred, and a new iteration of the algorithm, at a new tempo, begins before the previous one has ended. Moreover, as in *Reality House,* sometimes processes are unexpectedly truncated, such as in the abrupt transition back to the opening material at 5′35″ into *Ripples.* Finally, I processed each segment with several kinds of audio-signal-processing software (reverberation, flanging, etc.) to create more subtle timbral variations among sections of the piece.

As the preceding paragraphs illustrate, my creation of the *Ripples* software was clearly part of the act of composition, since the design of the program implemented elements of the work's form, its rhythmic and melodic/harmonic material, tempo, number of voices, and the relation of these voices to one another. However, it is also important to note that even though on one level the composition is intensely algorithmic, I exercised "rigorously intuitive" discrimination regarding which materials to choose and how to deploy them in the final composition. Among other things, I chose the tempo settings for each section, the peak-tuplet values, the dynamic levels and their changes, the ordering of the sections, how the sections would join one another, when they would overlap and how much so, and how much of the entire sparse–dense–sparse process each segment would manifest in the finished piece.

Another aspect of *Ripples* worth mentioning is the harmonic structure. Essentially, the harmony in *Ripples* is static, employing a single set of seven pitch classes, those of the E♭-major scale, throughout (although, as I mentioned earlier, factors such as foldover add unexpected pitches). I composed *Ripples* this way for both practical and aesthetic reasons. First, my software had no mechanism to automatically change the pitch collection. To add planned harmonic changes to the piece would have required that I spend significantly more time programming the software or that I run it separately for each harmony, which would have greatly increased the time needed to realize the piece, and would have disrupted the continuity of the musical processes. However, a further reason for the static harmony

relates to my own interest in musical styles that have little or no harmonic motion, including minimalist pieces and Indian classical music. Since the concept explored in *Ripples* is the rhythmic/timbral progression, I felt that complex harmonic relations were not necessary and that the relatively stationary harmony was satisfying.

04. Discussion

I hope that I have been able to give some insight into my compositional ideas and procedures with these brief analyses of *Reality House* and *Ripples.* I believe that each of these pieces depicts characteristic ways that I think about and write music, highlighting some of the materials and techniques that I have used repeatedly in my compositions. Together, these elements give a reasonable overview of my style, and I think it is worthwhile to summarize them, with references to some examples in the pieces, before moving forward. These stylistic elements include: the use of processes to develop material, such as the densification of textures throughout *Ripples* and in mm. 160–209 of *Reality House;* tempering the predictability of musical processes by means of elision and truncation of sections, seen both in *Ripples* (at 5′35″) and in *Reality House* (mm. 85, 155, and 211); providing a sense of tonality via assertion rather than functional harmonic progressions, as heard throughout most of *Ripples* and, for example, during mm. 39–50 of *Reality House;* prominent use of a recognizable pulse and, at times, regular meter, as in most of *Ripples* and in mm. 306–19 of *Reality House;* an interest in timbre, seen in the granular sounds in *Ripples* and in the use of spectral harmonies in *Reality House;* and the incorporation of materials from—and references to—popular music, seen, for instance, in the pulsed, synthesized sound of *Ripples* and in the "London Calling" motto of *Reality House* (mm. 3–6). Having established some notions of how my music works and what it sounds like, I would like to continue by going further "behind the music," concluding my essay with a short discussion of the personal background, beliefs, and attitudes that guide my compositional choices.

Among their other similarities, both *Reality House* and *Ripples* highlight my use of the computer as a compositional tool, which, though not a stylistic attribute itself, clearly has affected the ways that I conceive of and create music. Tremendous innovations arose in music-related technologies during the twentieth century, including music recording, mass production of recordings, broadcast radio and television, electronic musical instruments, and computer-based instruments and tools. I believe that this technological revolution will prove to be more important to the future of music than any theoretical or stylistic innovations that happened within the Western art-music tradition during those years, and although the computer is one of the more recent of these inventions, I think it will prove to

be the most revolutionary of them. The computer gives composers and performers a wide range of powerful abilities to plan, structure, record, edit, and disseminate their music. For composers, it allows us to develop and deploy sophisticated algorithms to create and control both compositional materials and the sound of the music itself with unprecedented precision. To me, these computer tools and instruments represent the most exciting avenues for shaping a distinctive musical fingerprint, and, as a result, nearly all of my composition today involves them in some way.

Another point of comparison between *Reality House* and *Ripples* is (1) the fact that I employed musical materials from jazz and pop music in both of them, and (2) the manner in which I did so in each piece. In *Reality House,* this includes Beatles- and Clash-derived harmonies, one instance of Clash-derived rhythms, and—though not discussed earlier—a conception of melody inspired by the saxophone solos of John Coltrane and the playing of other jazz artists. In *Ripples,* my choice of a major scale, the timbre of the voices, and the pulse were inspired by electronic dance music. Though it may not seem especially noteworthy on the surface, the use of these materials is significant to me.

Essentially, pop music—seen in broad terms, from the musical-theater songs of Rodgers and Hammerstein to the folk of Bob Dylan to the rock of U2—was the only genre of music I knew well during my childhood and youth. When I went to college I discovered the traditions of classical music and "serious" jazz, essentially simultaneously. Both interested me, though at the time I intuitively felt that jazz was more closely related to pop, possibly because of the instrumentation, rhythms, song forms, and specific tunes that it shared with pop music. During this time of discovery, jazz and classical music seemed equally valuable to me, and they still seem so today. (And although I have just described my introduction to "serious" jazz as something apart from pop music, within the remainder of this article I will include all jazz, together with the vernacular styles mentioned above, under the term "pop," to simplify the terms of this discussion.)

As a result of my background, I still feel somewhat like an "immigrant," even after years of being involved with the contemporary classical music scene, a milieu that I think is excessively biased towards the European modernist tradition. On the other hand, I know that over the years I have definitely found music and ideas that I love in this "new world." I sense that now I am some kind of dual citizen, with one foot in the pop world and one in the modernist world, trying to reconcile my conflicting thoughts and decide what is most honestly me. I also realize that it is possible to work in these styles simultaneously and be successful in both.

Nevertheless, each piece I write addresses this conflict in some way, and I try to retain some musical materials of my "origin" in all of my works. My compositional process always includes a choice of where to strike the

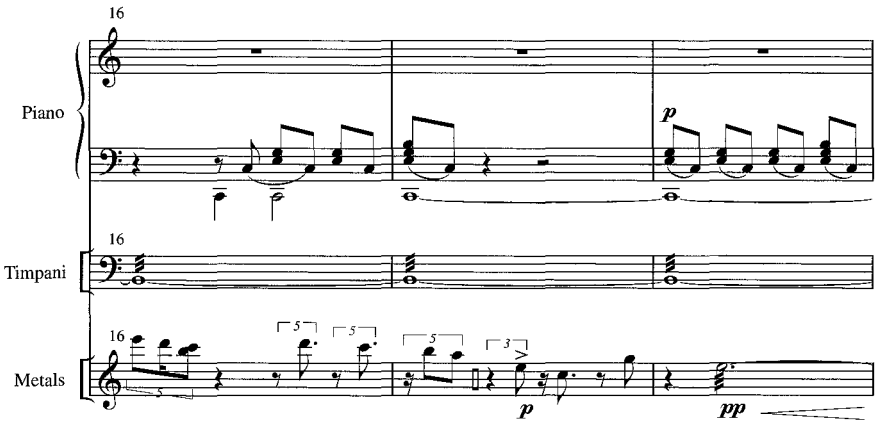
balance: what pop materials to use, and how—including how overtly—to present them. Sometimes my use of them is rather abstract, as in the case of my creation of the harmonies for *Reality House* from recordings of the Beatles and the Clash. Other times it is quite overt, such as the "London Calling" motto, which appears six times in *Reality House,* or the references to John Lennon's song "Imagine," which arise at the end of my work *Carol's Cliff,* for piano and two percussionists (see fig. 6).[5]

Beyond my mere enjoyment of them, another issue to mention regarding my use of style traits from pop is its sociopolitical aspect. To me, the deployment of these materials is a way of overtly stating that I value these styles and that they—and the people who practice them—are legitimate and worthy of attention. On a very personal level, I use these musical references to demonstrate to my friends and family that I have not "lost touch" with them, to show them that I still value things (in this case, music) that they value and, through this, that I still value having them as part of my life. On a more philosophical level, I believe that categories such as "serious" or "art" music vs. "pop" or "commercial" music are too simplistic, and I enjoy crossing these artificial boundaries. To me, both of these reasons are political statements, attempts to mitigate any tendencies in myself towards a limiting or elitist attitude. This consideration of the political messages in my work reflects my basic wish as a composer to communicate to audiences with a distinctive artistic voice, and I would like to end this essay with some comments on this topic.

To me, communication in composition involves several things: the extramusical ideas that inspire a work, the materials I choose to express these ideas, and consideration of who my intended audience is for each work. In the case of *Reality House,* for example, my extramusical inspirations included my interest in exploring spectral techniques, my love of the Beatles and the Clash, and—as evident in the work's title—my awareness that as I composed this chamber music the Reality House methadone clinic was just a few blocks from my door. The materials for *Reality House* flowed quite clearly from the first two inspirations; and though I cannot quantify this, I believe that they arose from my contemplation of the latter, as well. The intended audience for *Reality House* was any person or group interested in contemporary music, including—as always—myself.

These, to me, comprise the circuit of communication that composers should work within, with presentation to an audience and feedback from its members as the final steps. When a composer presents new work to a particular audience, s/he should contribute to that community by informing, provoking thought, and providing entertainment. Thus, it is completely natural that a composer might adjust his or her compositional materials and techniques to some degree when writing for different listening occasions and/or communities of listeners—when composing for chil-

Figure 6: References to John Lennon's song "Imagine" during section six of *Carol's Cliff.*



dren, for instance. I see it as an exciting challenge to work within different sets of limitations for different pieces, while all the time retaining characteristic traits that make my music sound like "me."

Beyond purely musical concerns, I have also pursued notions of communication in my compositions by means of my choices of performance venues and media. I find it stimulating and refreshing for both composer and audience to move outside of traditional concert halls and modes of performance, and have presented my works in coffeehouses, theater settings, as parts of gallery installations, outdoors, and on the Internet, among other places. I also believe that combining music with visual and verbal arts can create fresh, powerful expressions when done effectively, and thus for several years I have pursued multimedia collaborations with poets, choreographers, actors, filmmakers, video artists, and sculptors. At times, these works include live interaction of musicians with computer-controlled art, achieving a fairly new kind of performance communication in which, for instance, the musician can stimulate and react to sounds, sculptures, and video as s/he performs.[6]

Finally, casting aside all of the issues presented above, let me try to summarize my approach to composing in a few final sentences: I write music because of a personal desire to express intellectual and emotional ideas and conflicts that I find significant, combined with a basic interest in the act of construction/creation. My goal as a composer is to take ideas and materials from whatever musics interest me and combine these in effective, interesting ways. From South Indian Karnatak music to John Coltrane to György Ligeti to Björk, I believe that nothing should be out of bounds for potential musical inspiration. Ideally, I want to set up auditory experiences that will lead listeners somewhere new, interesting, and—though

essentially abstract—somehow meaningful. Whether writing a pop song or a concerto, I strive for each of my compositions to possess a clear, intriguing surface that novices to that style will appreciate, while simultaneously providing details for aficionados to recognize and enjoy. Of course I don't know how successful I am most of the time, but for me the intrigue, the joy of my endeavor, is in the experimental nature of it all. My compositions are artifacts of my search to identify who I am and what I think of this world. As such, they exhibit a multitude of traits, and are not entirely consistent in style and intention. In the end, I can only hope that they contain ideas that audiences can discern, listen to with interest, and find within some kernels of value that they can relate to their own lives.

Notes

1. Simply put, spectral music refers to compositions that derive their harmonic material (and possibly rhythmic, melodic, and other structural/formal material) from analyses of the partials present in existing sounds. Spectral composers choose one or more spectra from the analysis, determine the most salient frequencies in these spectra, and use them to create their musical materials, such as the pitch content for their harmonies. Part of the intent of spectral composition is to blur the distinction between harmony and timbre, and thus most spectral composers employ microtonal intervals to more accurately approximate the frequencies of the original spectrum in their harmonies.

Spectral composers often perform mathematical manipulations on the partials of the original spectrum to generate harmonic development, using techniques such as ring modulation and frequency modulation to create a series of additional spectra related to the original, but with alterations to the strengths and frequencies of the original partials. The source sounds for spectral works have ranged from individual notes of solo instruments—as in Grisey's seminal work *Partiels,* based upon the analysis of a note played by a viola—to natural sounds, such as those used in Murail's *Le Partage des Eaux,* based on analyses of recordings of waves at the seashore; and some composers have analyzed bits of their own compositions (e.g., Joshua Fineberg's *Empreintes*).

2. Distributed by IRCAM (Institut de Recherche et Coordination Acoustique/Musique). www.ircam.fr

3. The term "tape" is now technologically outdated since these pieces are produced most often as CDs or digital soundfiles such as WAV, AIFF, or MP3. Please see http://music.columbia.edu/~geersde/cm for an MP3 recording of this piece and other related materials.

4. http://music.columbia.edu/cmix/

5. For an MP3 recording and full score, please see http://music.columbia.edu/~geersde/cm

6. For examples of my most recent works, please see http://music.columbia.edu/~geersde