music in architecture
music | space | outer space | gravity | floating | light | visual light | brightness | opacity | reflection | image | metal | cold | concrete | heavy | dull | knife | thought | music | speed | (varied) | tempo | time signature | key | tone | note value | passage (note) | accents | accidentals | note runs | rhythm | percussion | precise | loud | powerful | impact | moving air | explosion | disassociating parts | manipulating people | disassociating people | isolation | lonely | dark | love | cold | slow | melodic | broad | tunnel | cylindrical | rich | thick | difficult to move | constraining | narrow | small | geometric | Aztec | stacking stones | stacking notes | chords | vibrations | piano strings | numerical note values | pounding air | impact hits | rings of air | planet rings | orbit | rotation | unfixed | unattached | independent

**music in architecture**

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Please note: this book is intended to be a supplement only to the created project animation and should be used in conjunction with the supplied CDROM (located on the back cover) or VHS cassette.
forward

For my final thesis presentation, I have created a 14 minute video presenting my ideas of representing sound and music visually / graphically. These ideas are displayed in a variety of ways. Some are presented in the form of 'building and space' while others simply represent music and sound through the use of solid geometry. Music entices a broad spectrum and requires a vast array of representational devices. In any case, movement plays an important role.

Although this presentation is in a final form, it is by no means intended to be a final product. This thesis investigation was designed to rather serve as a design catalyst presenting perhaps just as many questions about the role and direction of architecture (and archimusic) as answers.

A second crucial item to the thesis investigation was the definition of "architecture." Rather than investigating architecture directly, I chose to explore several of its components such as geometry, light / absence of light, movement, scale, etc... After these components were developed to music, they were then applied and implemented as design components. By first developing these components rather than the "architecture," a new architectural vocabulary was created upon their application, and thus, formed a more accurate translation and architecture unique to sound and music.
The creative limitation of architecture is the presence of rules: programmatic requirements, structural requirements, and even the presence of gravity. It is this reason that many other arts have to ability to be more expressive. For example, no rules exist in the world of art and music. Therefore, to accurately translate music in to a visual form, traditional "rules of architecture" were eliminated. The result is a more conceptual / psychological / visionary approach to architecture and solid geometry, where many of the ideas could only be constructed in a virtual world, simply because of the above stated limitations and the fact that current architectural construction methods and contemporary geometries can not accurately show the graphic value of music.

Just within the last fifty years, progression in musical technology has rendered traditional musical theory obsolete. Similar advances in architecture (with the advent of the computer, advances in materials and construction methods) show the same evolution taking place within the visual world, but have yet to be fully explored. It is this reason that i have chosen to show the strong correlation between music/sound and 'architecture." I feel that, while advancements in architecture have changed the way we work and design, they have yet to change what we design and how we approach "architecture" to the extent that the advancements in music have changed the things we hear. Form and space have yet to be explored as thoroughly as music. Architecture should exceed building just as music exceeds sound.
movement one

**SOUND = GEOMETRY**

My initial studies began with direct, one-to-one conversion of sound to visual form. The geometry was derived from many different elements of sound, including the tonal quality, duration, articulation, intensity, and psychological response. The actual pitch of each note determined its placement in the y-plane. For example, a note low in pitch, with a heavy accent, may be represented as a visually heavy rectilinear volume placed low on the y-plane, while a bright, 16th note passage played by upper woodwinds, would translate into much lighter, smaller curvilinear geometries.
This was my initial attempt in translating sound into geometry. A short selection of music was analyzed and began to reveal different possibilities of musical contrast.

The camera first passes around several repetitious block volumes representing a low brass ostinato passage.

A short transitional segment is represented visually as the camera travels from the featured low brass section to that of the woodwinds.

In contrast to the low brass section, the woodwinds are represented by these slender, vertical elements, which are intersected by an assigned datum line.

The melodic line crescendos (represented at the diagonals on the ground plane, as well as, the inverted cone) and terminates at the sphere wall.
The melodic lines of the low woodwinds were a first attempt in using completely organic objects to convey musical character. These two objects (at right) relate and react to each other visually as they do audibly. The red geometric form rapidly appears in contrast to the once predetermined stage.

In contrast to the cones, the viewer in this initial study travels a very slow and linear path where musical elements are animated (such as this yellow nurb surface/flute entrance) giving life to what could be consider a very two-dimensional journey.

The final sequence in this exercise is the ribbon. It ascends vertically from the ground plane in correspondence with the first note sounded. Its continuous curvilinear form represents a long, flowing (yet very aggressive) French horn melodic line, which eventually collides with the viewer, bringing the phrase [and study] to a close.
the whales
[crescendo-ing trumpet notes with accented releases]

low brass quarters
[rectangles]

percussion hit
[spheres]

16th runs
[cubes]

SOUND = GEOMETRY
Differing from \textit{geometry = sound}, Movement two focuses on the concept of a musical work, and the emotions invoked, rather than creating new geometric tools from which to design.

I began this process by selecting, "The Death Tree," composed by David Holsinger, and reviewing the composer notes. Then, after also studying the emotional quality of the piece, derived a list of criteria with which to work.
the death tree composer notes

so it begins...alone...
the solitude of a garden...
ripe with an unexplainable undercurrent...

a sense of foreboding...dead...impending doom...

swift, zealous, agitated activity!
the attackers come!
and HE waits...

a captive in the chaos of THAT moment of unspeakable betrayal...
yet even as evil reigns, a majestic melody, a "christ motif," is nurtured...
purity...in the mist of darkness...

a flurry of thunderclaps!
unrelenting despair seizes the moment...
heaviness...dissonance...a collage of images assaults us:
...a muted heartbeat...a remembrance of a
garden quite...a cascade of coins...hammer strokes...
voices of the crowd...nervous,
questioning whispers...apprehensive murmurings...

a crescendo of voices, threatened, desperate,
clamoring...building...
expanding to the very edge of madness!

and a song begins...
a lamentation...a new voice,
but ancient words recalled in grief...

but even as the black grief-filled clouds fold and refold above the earth,
a change is sensed...

poundings! fanfares! a new, yet old music erupts!
soars! careens from atmosphere to atmosphere...

sounds of a PROMISE that
a victory unlike any the world has ever experienced
is but moments away.
The departure portion of movement two is a 4 second transitional element at the beginning of the movement. The viewer is first exposed to this element (top image), which is derived from a \textit{geometry = sound} of the musical portion. After this initial exposure, the viewer is then transported through the element (at left and bottom) at an increasing speed to relay the notion of crescendo. At the climax of this crescendo, the viewport fades into the next portion of the movement (at top right).

\textbf{STORY TELLING}

\textit{departure}
estrangement
nonconforming
technology
crippled
a mercy
masterdom
disorientation
desertion
control
helpless
dominion
seclusion
regression
preponderance
host organism
isolation
gripe
puissance
omnipotence
might force
filter
lordship
STORY TELLING

within the cubes
movement three

Urban Composition

The third and final movement represents yet another design approach, the **structured method** as well as the culmination of all previous design tactics up to this point. The movement is designed around the work of Ken Whitten's. Each event, according to the structure of the movement, which contains a **structured method**.
Each musical part is transformed into a graphic representation using this matrix. Each note is plotted relevant to its pitch and duration. Then, other geometries can be assigned according to predefined criteria. For this exercise, accents were displayed as thick red lines while slurs translated as yellow rectangles enclosing the notes within the phrase.

structured method
The graphic at left represents the three previous parts combined. Note that some accents align while others remain juxtaposed against one another. This was one of the goals of this exercise: to show how very different sounding musical parts can combine to form a new, unique passage, but still retain their identity. It was this method that was used to derive the plan of the city featured in this movement.
Movement three begins in one of several event nodes (at left). Slowing, the viewer is exposed to more of the machine city until experiencing the first theme node: movement with light. Within this node, the viewer remains stationary while the space appears to move with the aid of quickly firing lights in sequence with the music.
movement with light

urban composition
The **assemblage of architecture** node shows the linear process of the creation of a three-dimensional object. Each element is set into place [in sequence with the music] to express how it contributes to the collective work such as individual musical instruments contribute to the complete ensemble.
Between the previous and following nodes, there is a transitional passage which the viewer passes through. During this transition, the musical note, represented by each node, is superimposed on top of the existing score.
architecture as a *machine*
The color dream sequence represents a metaphysical journey within the node. Since the nodes represent events rather than space, they are timeless, infinite, expansive...all of these things or none of them. They represent progress rather than a destination.
Overtone: A tone produced on a stringed instrument by lightly touching an open or stopped vibrating string at a given fraction of its length so that both segments vibrate.

A wave whose frequency is a whole-number multiple of that of another.
In the overtones sequence, the small linear geometries placed in the foreground represent the sounding overtones, while the large transparent planes in the background represent geometry of the actual passage.
During the last sequence, the viewer is exposed to the cityscape for the first time. Ideally, the city would be composed of many different musical passages, but because of time scheduling, is composed here of the same passage copied multiple times.
After one exits the city by passing through the final node (above), a last overall image is briefly shown in gray scale mode to signify the completion of the journey.
suggested readings

related architectural works
Stretto House // Steven Holl
Grand Center-St. Louis // Studioworks
Villa Thiene // Palladio
Various works by Marcos Novak

special thanks to:
1999-2000 archi/tec/share studio
BSA Design, Inc.
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Douglas Reddington
Jack Wyman

music in architecture
5th year thesis presentation
Ball State University
- John Barnett 2000

musical contributors
Samuel Barber
Don Davis
David Holsinger
William Walton
Eric Whitacre