From musical notation to urban form:

Why and how does a multidisciplinary and transdisciplinary experience modify an understanding of architecture?

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Art, architecture and science should be equal forms of knowledge production and understood as a cultural practice. In this light, architectural design can be rethought as a form of research and experiment, as a self-critical process between thinking and making. A cross-disciplinary approach where design methods are explored and developed by students through transdisciplinary experiences as a form of knowledge production and continued experimentation.

Sometimes what is called "mainstream practice" loses this perspective and therefore only responds to technical and financial demands in a way that is certainly professional and very exquisitely done, but, lacks the capacity to make a cultural statement. Architecture is a public art - a collective experience and in this sense, there is an analogy between architecture and music for the reason that music is an immersive experience, it is all around you as is architecture. Because Architecture is a public art, architects should add something to culture with every gesture that is inserted into the city. This of course translates into things you do through buildings, but also leads into a cultural discourse: bringing out new ideas to change cities and the ways we live.

"The history of architecture ever since has been punctuated with similarly ambitious attempts to recategorize architecture through crossovers into other disciplines. " [i]

The idea of sharing, overlapping and translating disciplines such as art, architecture, music and science are design strategies used by contemporary architects such as Daniel Libeskind (architecture and music) and Steven Holl (architecture, music, dance and sculpture) because both of them see this merging of the different arts as central to certain moments in culture that are very inventive and productive.

Since ancient times, analogies, affinities and bonds existing between architectural and musical compositions have been the object of research. (For example, see the work of Vitruvius, Alberti, Schelling, and Xenakis).[1]

Transdisciplinary action between architecture and music: Chamber Works: Drawings by Libeskind, 1983

The disciplines of architecture and music both conventionally communicate their ideas through notational systems made up of temporal and spatial symbols. These symbols are extensions of their authors' ideas or instructions, generally manifested through drawing or score, which are visual modes of defining arrangements of activity waiting to be interpreted by the viewer/performer/builder.

Libeskind was a professional musician before he moved into the field of architecture and therefore his knowledge of music became the basis from which he generated drawings and projects as an architect.

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[1] Lefaivre, Liane, 2003, *Everything is Architecture, Multiple Hans Hollein and the Art of crossing over,* Harvard Design Magazine 18 pp. 2

The Libeskind drawings titled Chamber Works made for his AA exhibition in London 1983 form a critique of the tradition of drawing in architecture that are reflecting the conventions of architectural design as a procedure for determining architecture as a building proposition. In this sense, representation is clearly not the aim in these drawings. As Robin Evans notes in his essay "In the front of lines that leaves nothing behind, "There can be little doubt that Chamber Works are in some way systematic, but they are certainly not a system of conventionalized notations or representation." As indeterminate notations, the graphics of Chamber Works do not communicate specificity related either to architectural conventions of space in particular visual ways (façade etc.) or to ideas or instructions related to architectural construction.

They are not regulated to site, scale, orientation, ground and other usual architectural references. In their drawn format, they are unbuildable without architectural reference to size, depth or material.

Chamber Works is the Libeskind drawing collection nearest to the field of music. The link between his artistic expression and music is already evident by the title that means Composition for a chamber group of instruments. The title" Chamber Works" in itself evokes a "chamber architecture," in the same way in which we might speak of "chamber music," a complete composition in all its parts, realized through the use of a reduced number of elements.

Chamber Works, Architectural Meditations on Themes from Heraclitus consists of 28 drawings completed in 1983 by the architect as he served as the head of the Architecture Department at the Cranbrook Academy of Art in Bloomfield Hills, Michigan. The work is divided into two series—one vertical and one horizontal—each with 14 numbered black and white ink drawings. Additionally, each series can be followed in (at least) two ways. The drawings can be viewed in pairs—the numbers of the paired prints always summing up to 15 (i.e., #1 + # 14=15, or # 2+# 13=15) or tracked as a linear progression from 1-14 (as shown on Libeskind's homepage).

[2] The drawings decrease in breadth or width from 2:1 and are made out of lines end up turning into a line, evoking the thought that every line could be a world to itself composed also of a multitude of lines. In other words, the overall set of 28 drawings becomes 2 distinctive lines, one horizontal and one vertical.

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[2] Libeskind, Daniel, *Studio Libeskind*, last viewed April 2nd, 2018, http://libeskind.com/work/chamber-works/
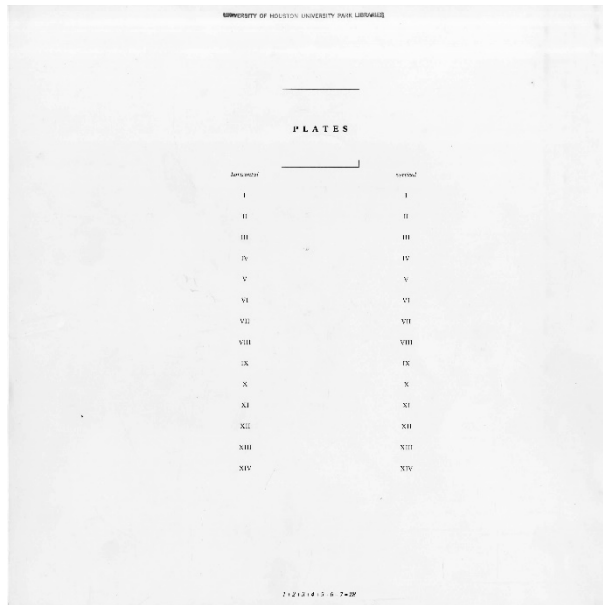
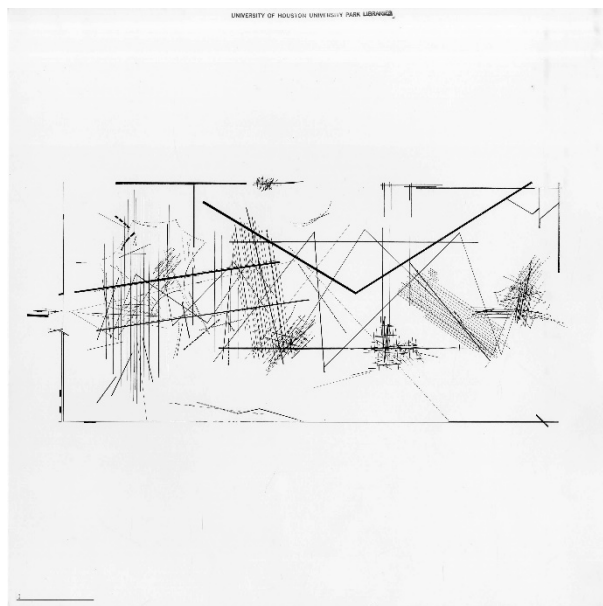*Fig. 1 Daniel Libeskind: Chamber Works, 1983: Plates*

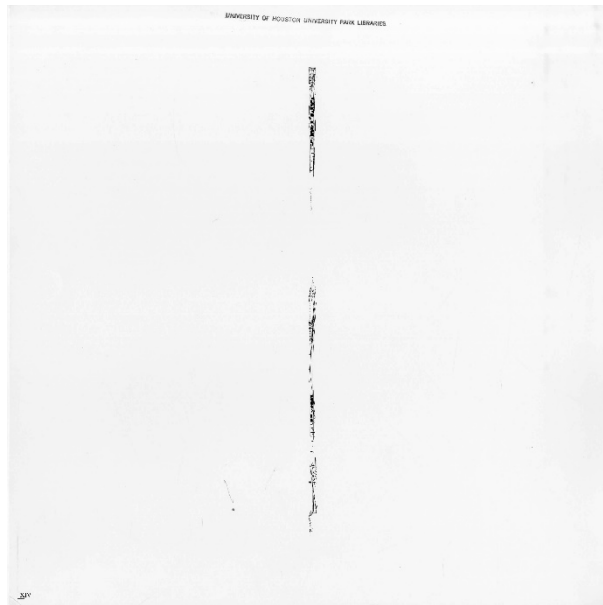*Fig. 2 Daniel Libeskind: Chamber Works, 1983: Horizontal Plate I*

Fig. 3 Daniel Libeskind: Chamber Works, 1983: Vertical Plate XIV

Viewed the second way, the first pair in each series serves as both a beginning and an ending, and the last pair is either an ending or a midpoint that sends the viewer back along the series to the initial pair. As originally hanged in the AA exhibition, there was a strong suggestion of a plane rotating on a horizontal and then a vertical axis. According to Kurt W. Forster 's short introductory essay "Chamber Works from the Work Chamber of Daniel Libeskind, "together with Libeskind's folio reproduction of Chamber Works, the two series of these drawings, the horizontal and the vertical, form a continuum of graphic interventions that he defines as spatial music: they are spatialized scores, musical translations.[3] Libeskind Chamber Works could be viewed as a collection and layering of lines that represent the same double axial structure of sounds; melody and /or chords, horizontal and/or vertical structure, regulated by the common principle of liberal variation. Libeskind explains in an interview with Lampugnani that Drawings as an act have many different levels." I would see a drawing as a series of zones that can be oriented both vertically in depth but also on a horizontal plane like the spectral fracture which falls into inexplicable zones and therefore has a certain definite sequence."[4]

The lines may be Libeskind's, musical ideas of space and time through vertical and horizontal relationships as seen in the structure of a musical score achieved through the drawing medium which are neither architecturally nor musically definitive. In this sense Chamber Works could be seen as a precedence in linking ideas that are openly multidisciplinary, but, presented as architectural drawings. Juhani Pallasmaa's argument parallels and extends that of Forster's when noted in his essay" Images in the Libeskind Macroscope that is an Interpretation of these architectonic drawings as "a new multi-dimensional space-time experience which evoke associations to sound clusters of Ligeti and

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[3] Forster, Kurt W.,1983, *Chamber Works from the Work Chamber of Daniel Libeskind*, Architectural Association, E.G. Bond Ltd and G&B Arts Ltd (box cover), London, pp. 9-11.

[4] Libeskind, Daniel, 1991, *Between method, idea and desire*, Domus no. 731, October pp. 24

Penderecki" in visual form and so making a connection to experimental music notations in the 1960's and 1970's.[5]

During a lecture in Berlin 1997 on Chamber Works Libeskind interrelated himself to innovative avant-garde composers like Luigi Nono, Alfred Schnittke and John Cage and noted that when discussing music and architecture "one cannot talk only about the fifths and the thirds and the chords of music, but also about the sound itself".[6]

In this sense, Libeskind referred to Cage's lifelong interest in sound itself culminated in an approach that yielded works in which sounds were free from the composer's will.: "When I hear what we call music, it seems to me that someone is talking. But when I hear traffic, the sound of traffic—here on Sixth Avenue, for instance—I don't have the feeling that anyone is talking. I have the feeling that sound is acting. And I love the activity of sound [...] I don't need sound to talk to me."[7] When one can hear that which could be considered "noise" strongly connected to the objects of the city, the tonality of the city, it is possible to engage in the exploration of musical interception.[8]

Libeskind's Philharmonic Hall in Bremen, Germany is a building that was framed by the architect as a musical interception. Here Libeskind was interested in the -music of the city-, and that's of course a metaphor but it is also not a metaphor if one listens to John Cage's 49 Waltzes for the five boroughs from 1977.[9]

In his work Cage develops and exploits visual narration as a platform for questioning conventions, such as continuity in musical progression, as being an appropriate method to represent his musical intentions. Unlike conventional note-to-note continuity, Cage spaced sounds (in time and on the page), as separate dislocated "events", free to be investigated independently and without hierarchy. The indeterminate structure he employed does not determine the performance, but rather is a part of it, as the performer investigates each sound, and sound "event" within the score for itself in order to create an aural outcome. Of particular note is Cage's distinction of sounds, which can be separated by space (in time), and, as Cage acknowledges in conversations with Joan Rettalack, is an effort to create a sculptural experience in music, that of space with sound.

For Cage, space on the page is equivalent to time. Cage's work is spatial in ways that are unlike other compositions by other composers because Cage proposes that we can think of music as a space, in time, rather than a point in time.[10] As such, the score is graphically distributed with non- proportional

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[5] Pallasmaa, Juhani, 1981, "Images in the Libeskind Macroscope Libeskind", in Libeskind, Daniel (eds), *Between zero and infinity: selected projects in architecture*, Rizzoli, New York City, pp.104

[6] Libeskind, Daniel, 2000, *Daniel Libeskind the space of encounter*, Universe Publishing, New York, pp. 53

[8] Sebestik, Miroslav, 1992, *Listen: John Cage- in love with another sound 01*, in an interview with Miroslav Sebestik , a documentary film by Miroslav Sebestik, last viewed April 4th, 2018 https://www.youtube.com/watch?v=2aYT1Pwp30M

[9] The first version of this composition utilizes a graphic city map of New York, comprising its five boroughs: Manhattan, Staten Island, Queens, Brooklyn, and The Bronx. It contains numerous lines and points, determined through chance operations. The second version consists of a list of 147 New York street addresses, arranged in 49 groups of three. For a 1980 None such LP recording (no longer available), this was interpreted as a list of places where recordings of existing waltz melodies may be made, mixed with the sounds of the city. Cage indicates that transcriptions may be made for other cities by assembling a list of 147 addresses and arranging these via chance means into 49 groups of three. This was interpreted as a list of places where recordings of existing waltz melodies may be made, mixed with the sounds of the city.

[10] Rettalack, Joan,1996, Musicage, Cage muses on words, art, music, Wesleyan University Press, Hanover, pp.182

spaces across its pages, which the performers locate themselves within, in order to interpret and perform what is notated. The sounds (no intentionally produced sound) that are produced in performance are organized by space between the "events" notated in the score, and the details of the performed, aural experience. (example Cage, Fontana Mix, 1958).[11]

The composer developed indeterminate processes and graphic notation systems to suit his musical intentions, realizing his compositional objectives in a manner that contests the boundaries of discipline specificity and was a dismissal of established rules in notation and performance at that time.

The visual and aural outcome also demonstrates Cage's dismissal of conventional structure as being an appropriate method to convey his musical intensions. Other conventions dismissed by Cage include proportional counting, that is 1,2,3,4, and prescribed relationships such as repetition and variation.

The investigations by Cage and Libeskind are necessarily inconclusive, but, they open up an area of exchange between music and architecture as an ongoing potential design strategy for architecture. Musical and architectural ideas about time, space and sound relationships that reflect the disciplinary context in which the authors operate.

In an interview with Libeskind conducted by Lampugnani with the title "Between Method, Idea and Desire," Libeskind emphasized that he does not see a split between his previous work with drawings, models and metaphors of architecture and his buildings. "In my own experience, what I am doing now (a building) is rather an extension, not just the Berlin Museum, but of my own thinking and work." The author proceeds "My drawings come from my experience at the beginning and at the end of the project. They do not participate in the production of the project itself."[12] Libeskind's understanding of the design process is that of a happening for the reason that "one cannot do this process without being in it or being out of it; this is not a condition that can be simulated. It is reality, and because it is between it is a happening; because it is happening…But, it is a differential process and one cannot see it all at once, one cannot see it even once the building has been completed"[13]

Pop-Academy, Downtown, SLC,

In this part of the paper I will discuss a 2nd year design studio for the 3+ Students (interdisciplinary design beginners from a non-architectural background) with the development of a Pop Academy (Music Center) as a cultural anchor on an empty building lot in Downtown Salt Lake City, UT. In a first step, students reflected upon the relationship between music (as art of time) and architecture (as art of space), the parallels as well as differences with regard to experience, representation and performance. In a second step student analyzed abstract (visual) notation – score and plans – and explored the potential translation from one discipline (music) into a spatial composition (architecture): design as

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[11] Fontana Mix by Cage has a graphic score consisting of 10 sheets of paper with curved lines and 12 transparencies, 10 of which contain a varied number of randomly distributed dots, 1 with a straight line, and the last with a grid pattern. According to Cage's instructions these sheets could be superimposed upon each other and then interpreted so as to indicate differences in such elements as tone, duration (time), or volume of a variety of different sound events. Thus, it was a type of manual for creating a piece of music that could be realized using traditional instruments, electronic sounds, random samples, or virtually any other type of sound making device.
Cage, John, 1958, Electronic Music, Fontana Mix (Vinyl Rip), last viewed on April 5th, 2018,
https://www.youtube.com/watch?v=05wBPhWD44U

[12] Libeskind, Daniel, 1991, *Between method, idea and desire*, Domus no. 731, October, pp. 24

[13] Libeskind, Daniel, 1991, *Between method, idea and desire*, Domus no. 731, October, pp. 28

knowledge production. In a third step a process of constant reinterpretations and editing from 2d representations to 3d models and vice versa is initiated. In a fourth step, students were asked to layer and overlap the building program with the urban context, which introduced another process of editing, re-interpretation and alteration.

1. Analysis and reflection of readings about Spatial Music and Musical Space

Starting the project by reading a selection of texts[14] about Spatial Music and Musical Space and comparing its main argument with the drawings of Daniel Libeskind "Chamber Works" to reflect upon the relationship discussed between music (as art of time) and architecture (as art of space) in order to demonstrate where each discipline exceeds, underscores or multiplies the arguments made in the other discipline. A Focus was set on forms of abstract (visual) notation – score and plans – and the idea about design as a bridge between the two arts of architecture and music.

2 a. Translation of a piece of music into a Drawing

Students were asked to choose a piece of music and transform this piece (a motif) into a two-dimensional representation or translation in black and white drawing. The students selected works of 20th Century composers like John Cage, György Ligeti and etc. with an eye to the geometric potential of translation to architecture. This drawing could be employed digital as well as analog techniques, as an original drawing as well as a re-mix of existing visual materials (collage), layering, sampling, scaling, etc. in black and white.

The act of scribing, drawing and notating is something that architects and composers do as a way of experimenting and resolving their ideas. Since architecture differs from music fundamentally (art of space versus art of time), the challenge was to rethink the means of visual representation to achieve the temporal complexity and thickness of music.

The goal was to explore and test these interdisciplinary ideas and media as an act of inventive inquiry.

In this sense spatial-temporal relationships are being identified and exploited via experimentation to extend the boundaries of architectural design methods.

2 b. Drawing Detail

In a second step students focus on a specific part of their musical drawing/notation, for the reason to zoom into a detail of the drawing and re-interpret the set of lines and planes to a three -dimensional representation that is, as an architectural plan, section or elevation or a combination of thereof. For a moment it was important to concentrate on the quality of the drawing alone, not (yet) as a building, but rather as a spatial complexity in analogy to the experiential spatiality of music.

2 c. Translation from 2d drawing into a 3d model

In a third step the task was to re-interpret the spatial drawing of step 2b and transform the two-dimensional representation/notation of a three-dimensional musical space into a truly three-dimensional model. This step initiated a process of constant reinterpretations and editing from 2d representations

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[14] Selected references for student Readings on: Spatial Music and Musical Space
Libeskind, Daniel,1983, *Chamber Works from the Work Chamber of Daniel Libeskind*, Architectural Association, E.G. Bond Ltd and G&B Arts Ltd (box cover), London
Evans, Robin, 1983, *In Front of lines that Leave Nothing Behind*, Architectural Association files 6
Libeskind, Daniel, 2000, *Daniel Libeskind the space of encounter*, Universe Publishing, New York,
Sebestik, Miroslav, 1992, *Listen*: *John Cage- in love with another sound 01*, in an interview with Miroslav Sebestik , a documentary film by Miroslav Sebestik, last viewed April 4th, 2018 https://www.youtube.com/watch?v=2aYT1Pwp30M

to 3d models and vice versa to develop the design research process further and to increase the translational capacity of students.

3.a Site documentation

To understand the given site within its contexts, not only from an architectural point of view, students are asked to document the project site by producing different types of documentaries. This documentation might include photographs, a movie, sound, conceptual models, etc. The documentation was multimedia based, once the students had their collection of material, they were tasked with curating them into their own site. Here students are instructed to develop an experiential narrative situated on site that projects how the existing perceptual qualities embodied within the physical site can inform the design response.

3.b Site analysis

In this situation students are asked to consider the dimension of time (as it relates to revealing changes) within physical and cultural conditions or behaviors as an additional layer. Here students are confronted with trying to answer Why and When the context of the site transformed itself and How can they provide voice to the invisible and respect the memory of prior histories and cultural conditions.

Students are simultaneously working both between quantitative and qualitative site readings- and being forced to understand the interaction between two or three site factors. They are Working in-between the qualitative and quantitative site realities for the reason to discover Why and How driving forces embedded within the site relate to perception-based, field observations.

4. Layering Site conditions and building program

In the fourth step, students were guided to layer and overlap the building program with the urban context, which introduced another process of editing, re-interpretation and alteration.

The presentation of student examples showed the different stages between abstract notation, first spatial translations, reiterations and also dead-ends (as a result of non-alignment of the student's interpretation derived from music with the requirements of the program or site), which led to second attempts, different readings and alternative translations. In my teaching, I employ architecture as a continued form of experimentation from the beginning, centered on the question of "why" rather than "how", where design methods are explored and developed by the students individually from their cross-disciplinary experiences.

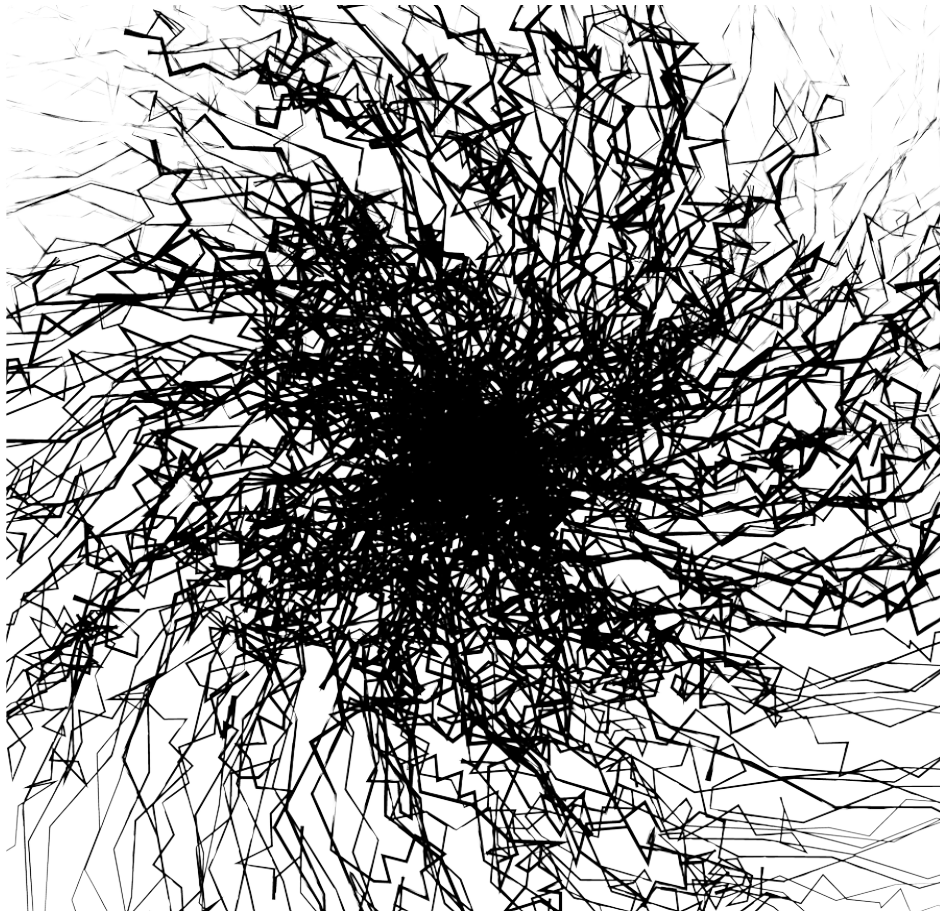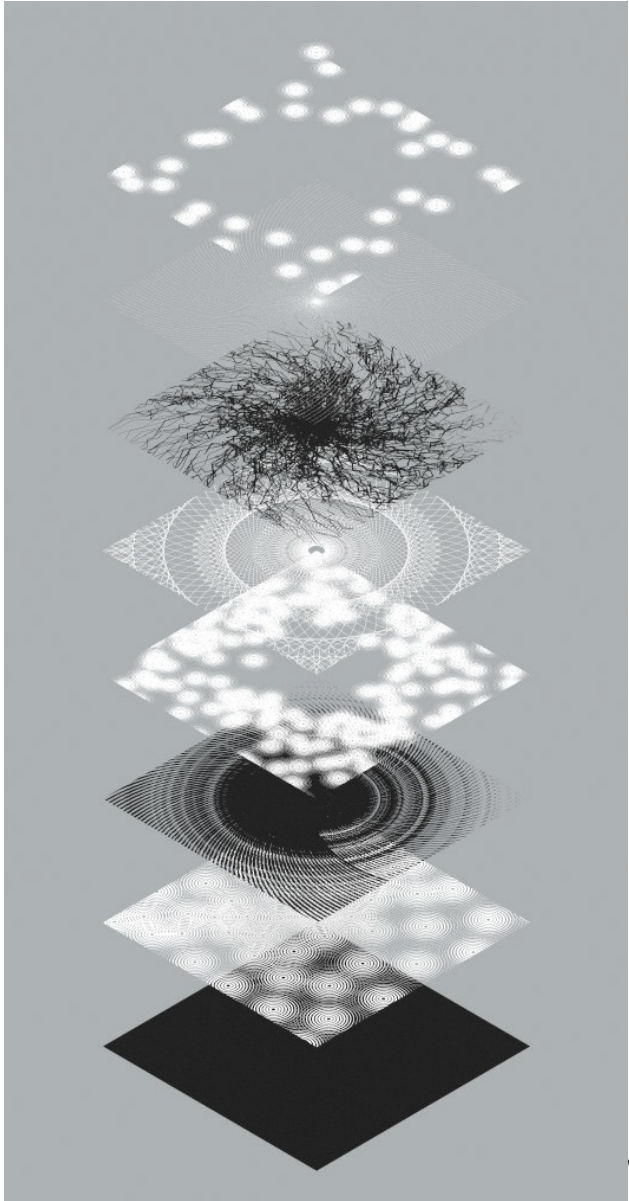2 a. Translation of a piece of music into a Drawing

Fig. 4 Joseph Briggs: 2D-Drawing (layered and shifted) based on Ligeti, Star Gate Requiem for Soprano, Mezzo Soprano

2 a. Translation from 2D drawing into 3D Representation
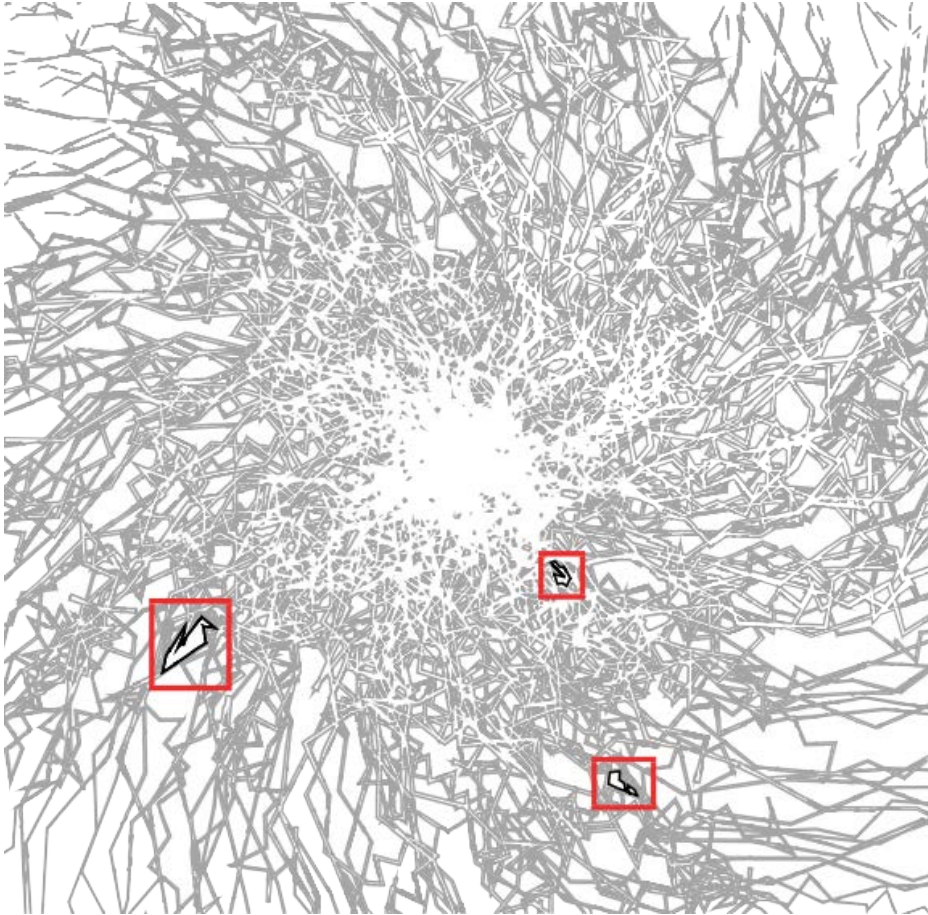
(...l and shifted)

2 b. Drawing Detail

Fig. 6 Joseph Briggs: 2D Drawing inverse of Fig. 5 with 3 selected areas of focus

Fig. 7 Joseph Briggs: Figure Ground of Building Footprint by layering selected Details of Fig. 7

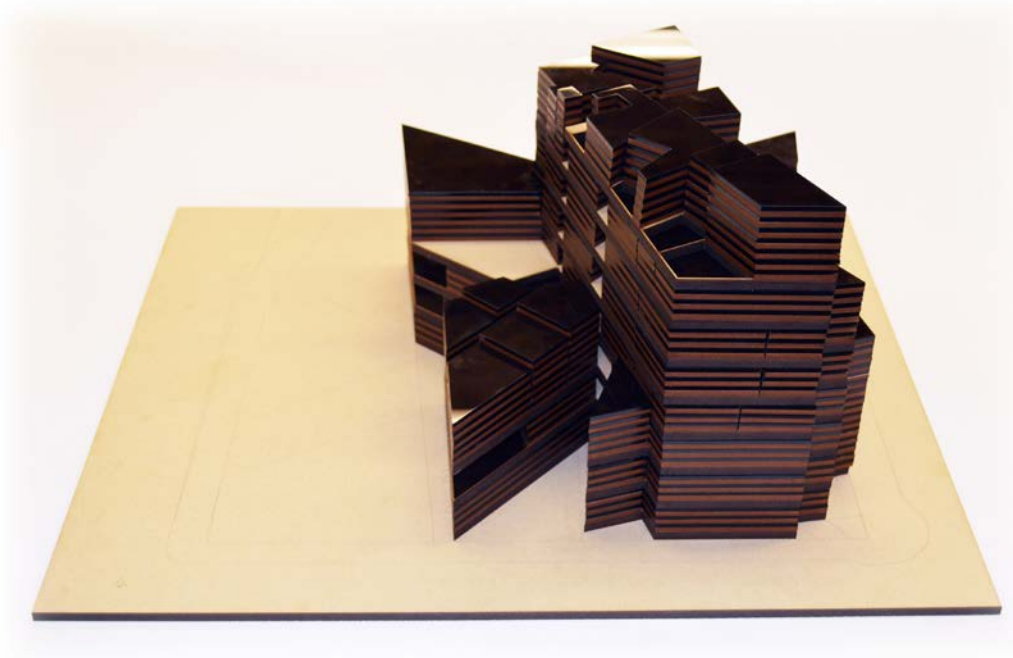## 2. c Translation from 2D drawing into 3D Model

Fig 8 Joseph Briggs physical Model, layered

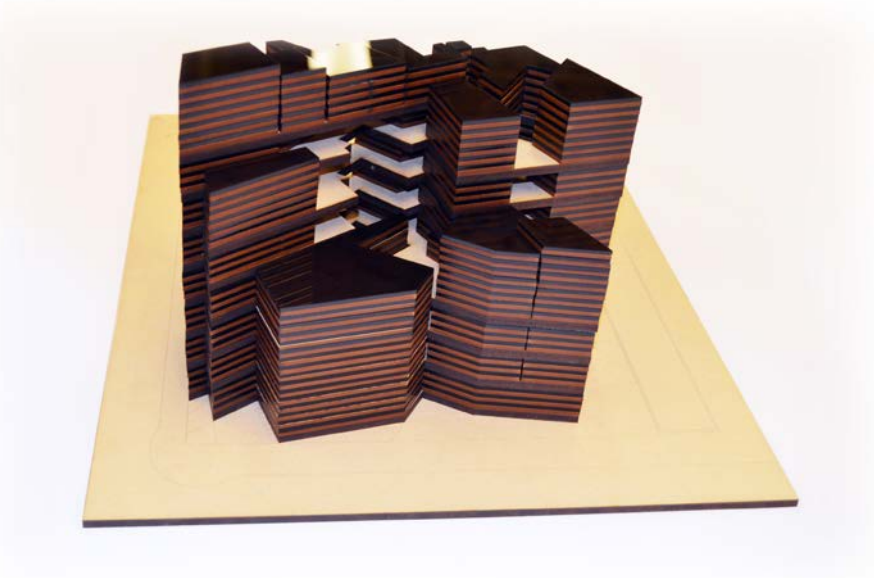## 2. c Translation from 2D drawing into 3D Model

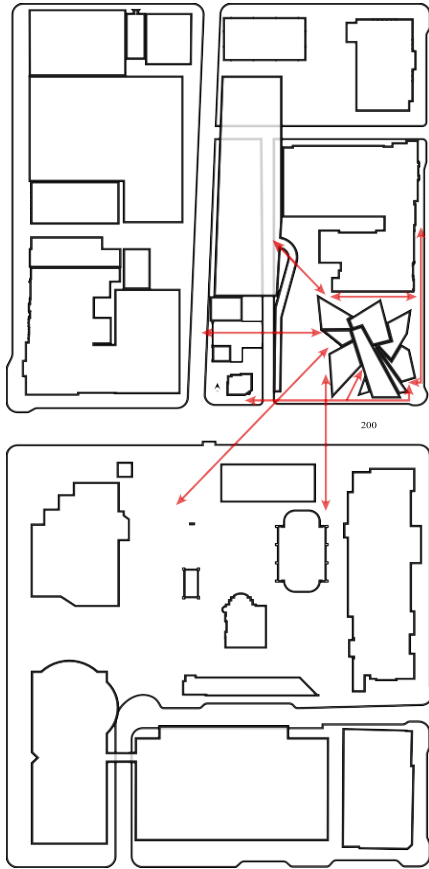*Fig 9 Joseph Briggs physical Model, layered*

3. b Site Analysis

4. Layering site conditions and building program

Fig. 10 Joseph Briggs: Site Context Pedestrian patterns

Fig. 11 Joseph Briggs: Site Plan Layering existing site conditions and

building program like tracing of circulation, human activity on site.