FORM FOLLOWS FUNK

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JAN HENRIK HANSEN

ONEsense

MATERIAL MUSIC

FORM
FOLLOWS
FUNK

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OVERTURE

This project is about the materialization of music.

Since 1999 we are working on a procedure to transfom muscial notations into spacial scenes to explore the synaesthetic of music and space.

After trying serveral concepts we wrote our own software that allows for a translation of musical notes into spacial objects. This approach goes beyond a mere visualization of music as known from todays sound players, since it connects two potent software worlds - music-production and computer aided design with a missing link - a translation procedure.

The definition of a translation configuration is the creative part. The tool is as open as a pencil or a brush by admitting completely free translation concepts. It delivers 3D-scenes that can be inspected, navigated through and manipulated within virtual space. We wished to translate music into a workable result in order to use it for architecture and art. This step has now been taken.

Since we confined ourselves on virtual space in the first years compositions have only been realized in the computer. Now it is time to bring spacial interpretations of musical pieces into real physical space - materializing music in a way you can not only see but also walk around and touch. 3D computer-models will be manufactured as architectural prototypes and sculptures using different techniques and materials.

The following pages show the development of the project from the present time to day one.

Jan Henrik Hansen and Christian Patron
November 2006


gP
Musical Notation &
Architectural Form

DISCLAIMER

The following concepts deal
with space and time.

Music unfolds in time.
Form unfolds in space.

Paper can not really express these
two realms but on an abstact basis.
It has to turn time into fragments
(film stills) and space into limited
perspectives (points of views).
Music can only be conveyed by a
convention of notation.

CONCEPT

„Architecture is frozen music“ – Goethe

Eversince artists of all kinds have been fascinated
by joinig the realms of our senses and their separate
perceptions into one artefact - the synaesthesis of senses.
Thesedays computers enable us to handle architectural
and musical production with new techniques and tools.
In both cases respective work is stored as digital data
and created or edited by means of graphical user interfaces.
Being broken into 0 and 1, two aesthetical worlds meet
on a fundamental layer.

Here it is attempted to engage the simliar principles
of structure found in architectural as well as musical
perception and thinking to achieve a translation of
music into space and back.

„Every facade can be read as a piece of music“ – Sigfried Gideon

OneSense

Synaesthesis

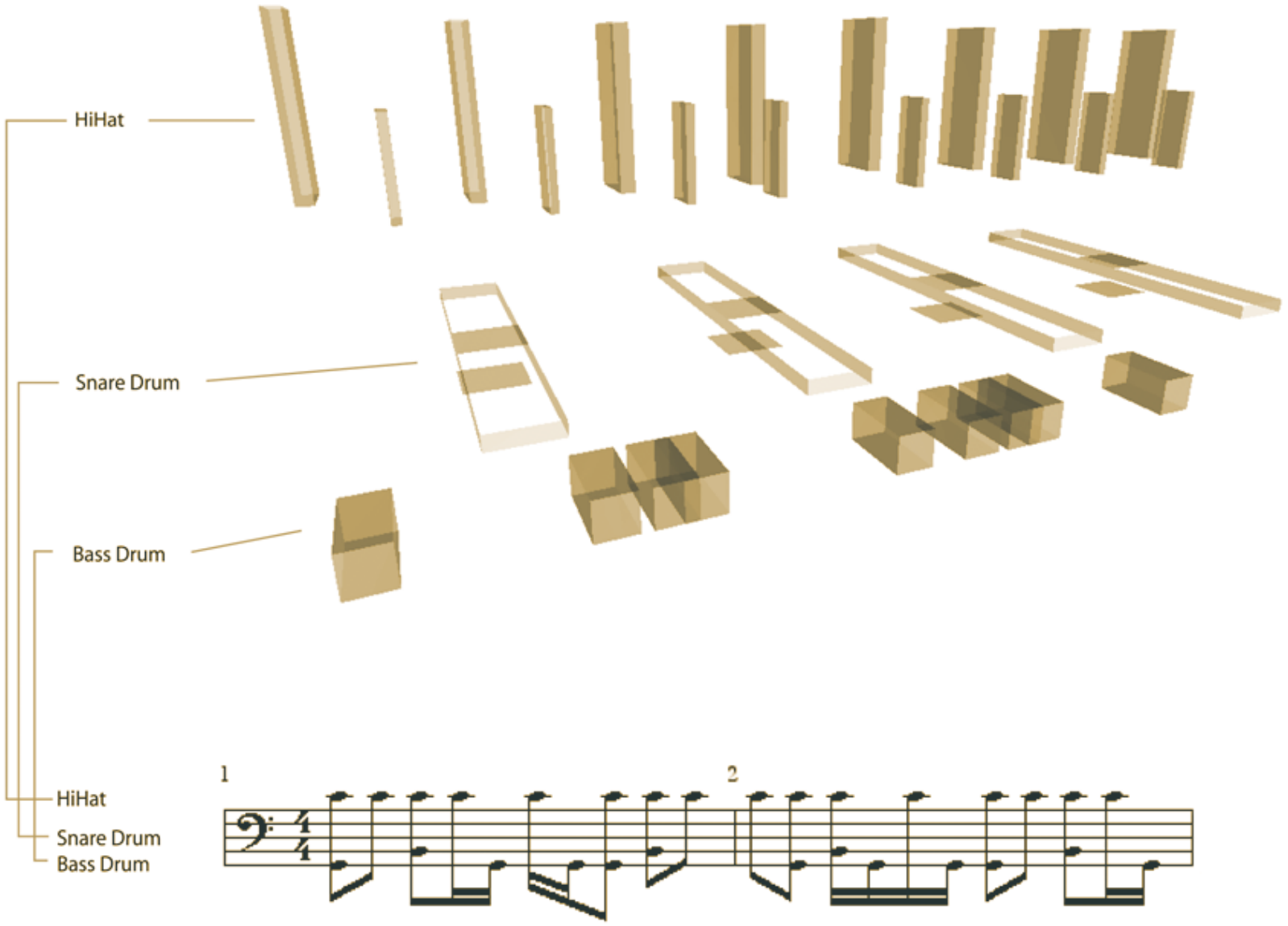
Translation of

MUSIC

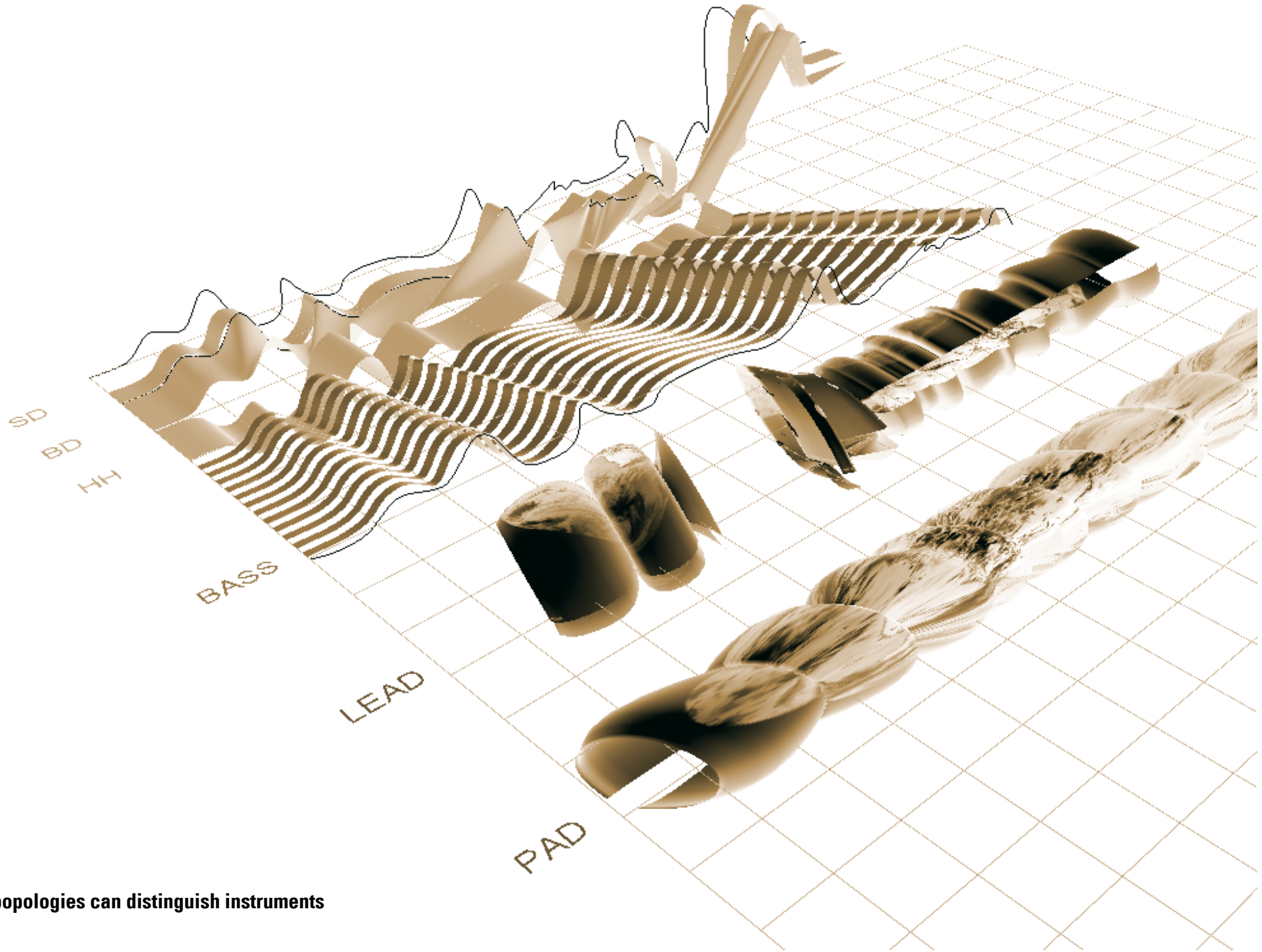
into

SPACE

and back



Interpretation - notes receive bodies

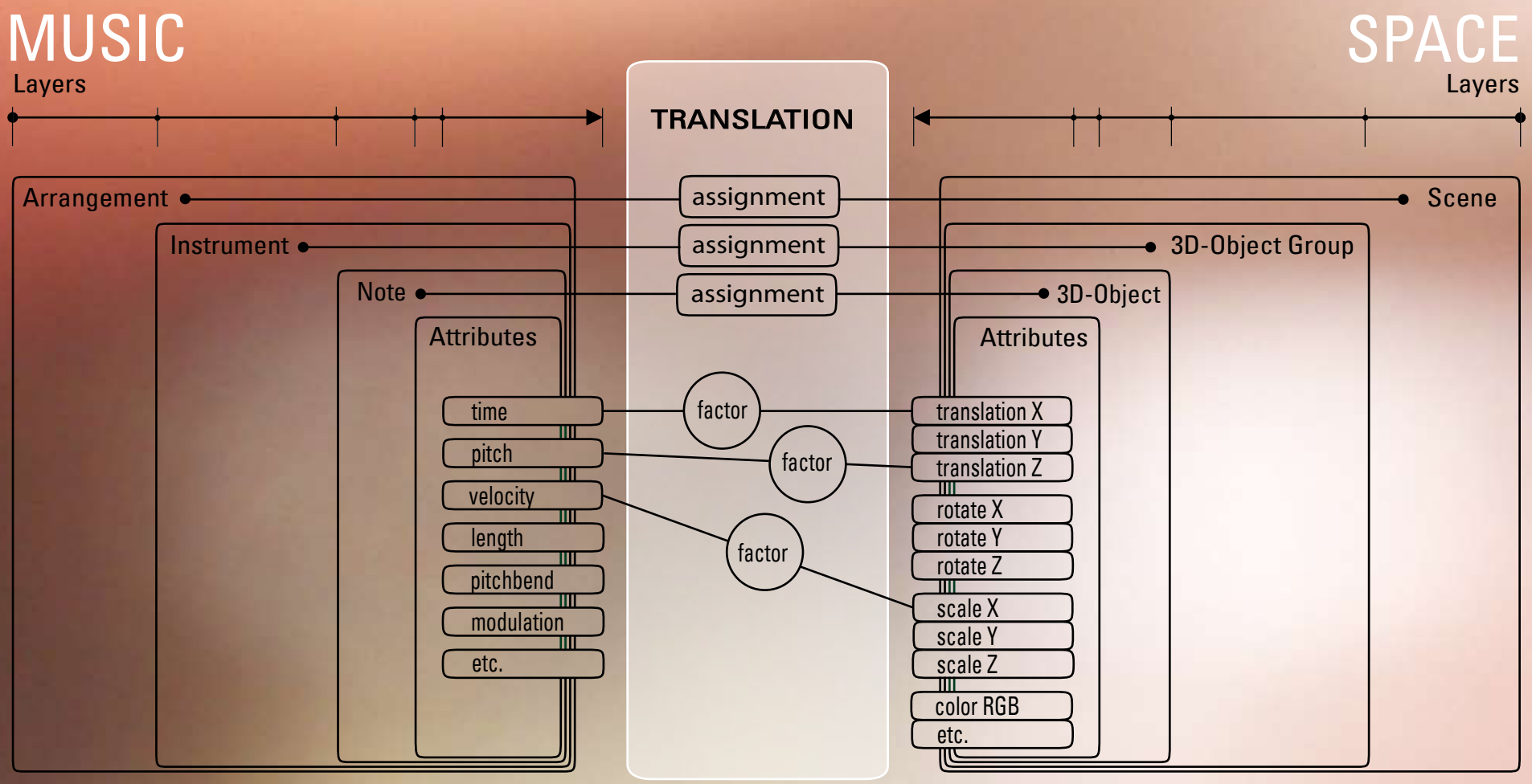


formal typopologies can distinguish instruments

RELATION

STRUCTURAL & CONCEPTUAL SIMILARITIES

MUSIC	ARCHITECTURE
VOLUME / RYTHM / TEMPO	SIZE / STRUCTURE / SPEED
ARRANGEMENT / COMPOSITION	ORGANIZATION / COMPOSITION
TONAL / RYTHMIC PROPORTION	SPATIAL PROPORTION
MEASURE / QUANTISATION	SCALE / BREAKDOWN
NOTATION	PLAN / MODEL



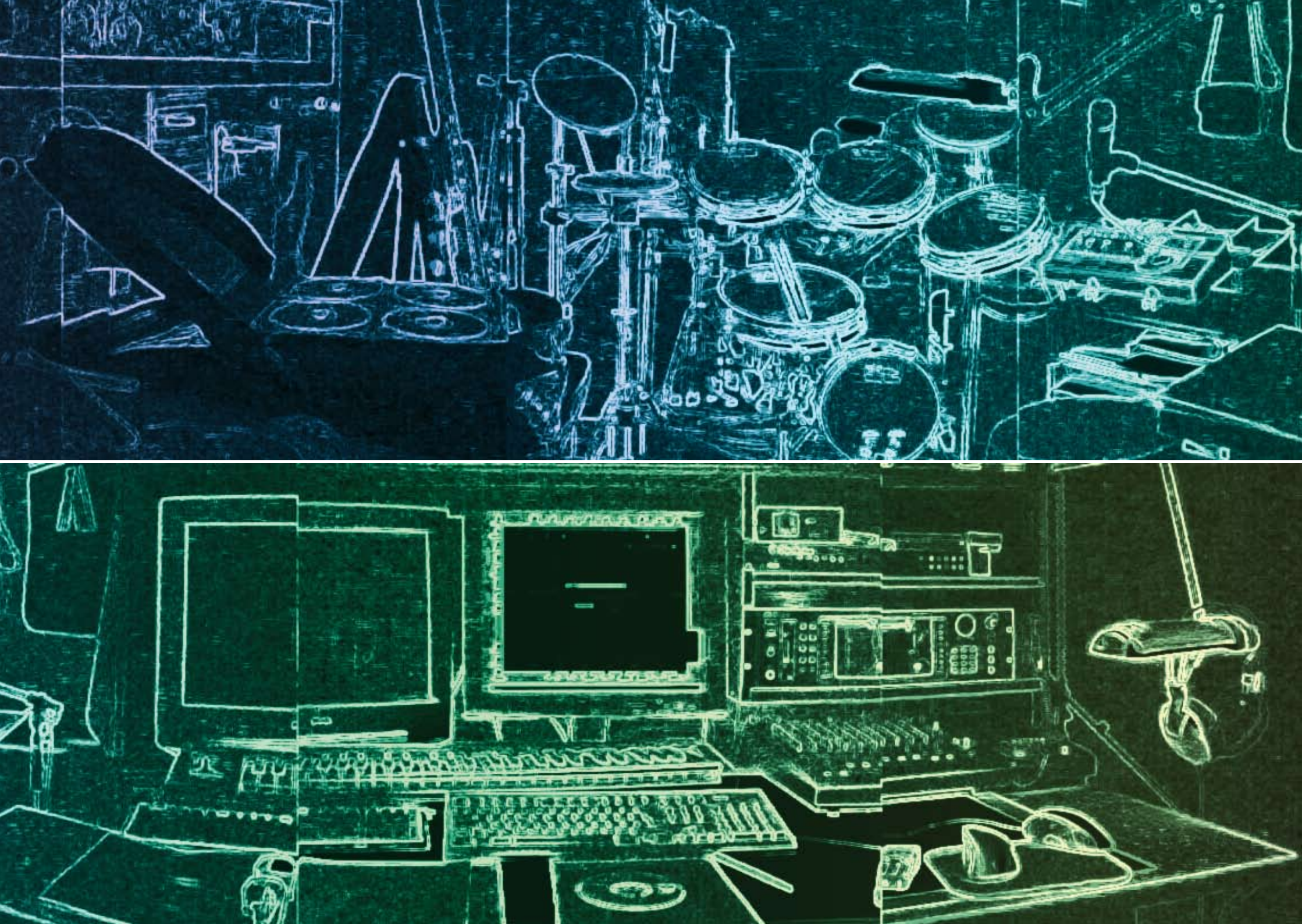
DEFINING A TRANSLATION

1 Assignment of layers, objects and attributes

2 Ajustment of factor values

3 Alteration of the translation rule is possible while translation is happening

Translation Concept



FORM FOLLOWS FUNK.COM

MUSIC Sequence

SPACE Notation

THEORY

Dr. Funkenstein
cloning the FUNK

3D

As an architect one encounters the wide spectrum spanned between 2D and 3D quite intensely.

The third dimension not only adds one to two, but produces a quantum leap in terms of information depth and complexity. Every step on the way from 2D via 3D to 4Dspace provides certain facettes of reality to human minds, and therefore applies for certain representations.

Being exposed to 3D-CAD as an architect, and Audio/Midi-sequencers as a drummer, I was startled by the similiarities of the two SoftwareWorlds.

Both worlds become alive when time is introduced (animation < > sequencing), and they both or their representations unfold in space.

I began to wonder if their respective strenghs could be linked or even joined – an imagination that holds my fascination to this day.

Would it be possible to write and edit music realtime in 3D space, with the advantage of experiencing a formerly abstract notation as a physical, intuitive and interactive counterpart ?

Is it possible to inform architectural design with the structure, presence and radiation of musical phenomena ?

Texts from the thesis
„Form follows Funk / OneSense ,
three - dimensional notations of music“,
2000 Jan Henrik Hansen
ETH Zurich, Faculty of Architecture

RECORDING MUSIC SPACIALLY

Since MIDI (Musical Instruments Digital Interface) has been introduced in 1983, it revolutionized electronic music-production. Generally it allows for the interconnection of various instruments of global manufacturers, that are equipped with the standardized interface (synthesizer, sampler, keyboards, digitaldrumkits, computers, multitrack-mixer, effect-, lightning- and other peripheral devices).

Event-based messages can be communicated between the participating modules of a MIDI-Setup, e.g. a digital drumset can trigger sounds from a remote synthesizer, or a computer may conduct a whole electronic orchestra, or both at the same time.

The basic structure of object-oriented CAAD-modelling and MIDI-sequencing is comparable. Objects and MIDI-events are more or less characterized by attributes, being fed with variable input. Pressing a key on a keyboard will cause the MIDI-Interface to send a so called „NoteOn“ event-message with 4 specific attributes :
time, channel, note, and velocity.

A receiving device, lets say a Sampler, will understand and execute this message by playing a sound at a certain time that refers to one of 16 available MIDI-instruments (channel), with a certain pitch (note) and amplitude (velocity).

Although many other musical parameters (NoteOff, PitchBend, Modulation, etc.) can be transferred parallely, the above suffice for an example.

As the electronic music-world is completely MIDI-compatible already, the only missing part is a 3D-CAD-software that grasps and even talks MIDI.

Instead of only calling a sound from a sound-module, a MIDI-message can be passed on to another computer running CAD-Software, which also understands the MIDI-message, but interprets it spacially, i.e. creates a 3D-object, channelling the MIDI-parameters to its spatial attributes (e.g.position, type, color, size etc). Thus each note of the musical score will obtain a physical body in 3Dspace, the sum of all notes of all the voices of a piece of music aggregating to architectural complexity.

**“Funk is
whatever it needs to be
at the time that it is”**

George Clinton

Article by HEKMAG / published April 2006

SNOOP DOGG IS IN THE HOUSE

Architect Jan Henrik Hansen has discovered a way of transforming music into three-dimensional structures. He calls the result "Form Follows Funk," and he uses it as inspiration for his architectural designs. But can't a lot more be done with it? And what does Kraftwerk's music actually look like?

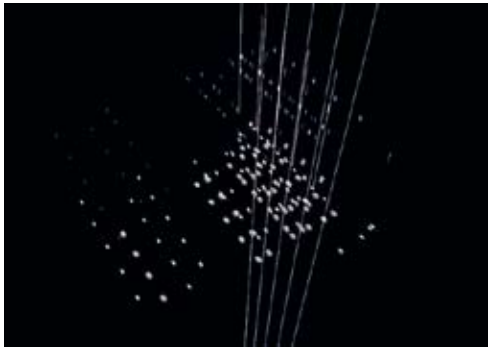
In Zurich in the summer of 2000, a drumbeat thuds endlessly through a student apartment. Two young men crouch among assorted electronics and stare at a monitor. Suddenly, spherical images appear – some big, others smaller. The more the beat goes on, the more images materialize. Jan Henrik Hansen and Christian Patron smile. They've done it. *On screen is an exact representation of the drumbeat in three-dimensional space. It's music you can see.*

To Hansen, the mass of scattered spheres is a dream come true. The architect and drummer has been working on combining sound and images for a long time, drawing pencil sketches whose abstract, repetitive forms look like rhythms and designing shelf units reminiscent of sound waves frozen in time.

But it wasn't until just before completing his architecture degree that it actually happened. Hansen was sitting at home in front of his computers, an architectural program with 3-D models open on one monitor, on the other a sequencing application converting music into digital data. Looking from one monitor to the other, Hansen examined the spaces, then the music. Two forms of expression, described in the same language: ones and zeroes. *"What if I brought them together?" he thought.*

Christian Patron

Jan Henrik Hansen
Photo Susanne Voellm



A world premiere: the first drumbeat translated into three-dimensional space.

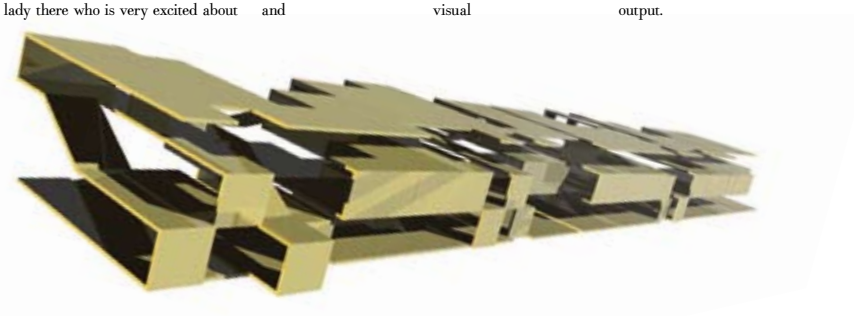
Hansen then visits his friend Christian Patron in Munich, who is busy doing his doctorate at the Virtual Reality Lab. One evening over a beer, he tells him about his idea of translating music into three-dimensional forms, concluding with the words, "But I don't think it's possible." Patron takes a long draft of his drink. "I do." Later he visits Hansen in Zurich. In only two days, he succeeds in linking the sound software with the architectural application: the first small spheres appear. Hansen and Patron call the new method "OneSense" and begin to make more and more pieces of music visible.

At first, the young architect used the discovery above all as an inspiration for his work at his architect's office, Whist. *He calls it "Form Follows Funk," an evolution of the famous "form follows function"* made popular by American architect Louis Sullivan at the end of the 19th century. The first project Hansen worked on can be found in the Zurich restaurant Forum Bar, where he and his colleagues designed a wall made of walnut, which bears vertical grooves of different widths and depths. "It's a translation of song lyrics into bar codes – if you translate it back, there's something written there,"

explains Hansen. Three quotes, to be precise, all from funk tracks. The lines "Most of all we need the funk" and "Everything is on the one" are from funk legend George Clinton, while the third, a longer section of lyrics, is by the band Osiris.

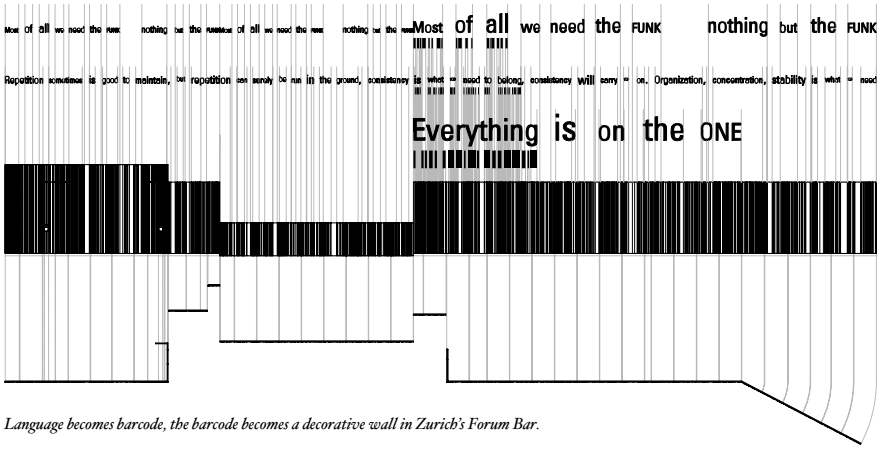
Form Follows Funk has given rise to a number of other projects. Whist is currently planning two single-family homes whose facades are translations of musical inspirations. *Most of the designs, however, still exist only as models on the computer* – a series of futuristic apartment buildings ranging boldly along a stretch of Seychelles coast, for example. To produce them, Hansen took a sequence of bass, beat and hi-hat and transformed it into a loop. Will the design ever be turned into buildings? Hansen is optimistic. "I'm flying to the Seychelles soon. There's a lady there who is very excited about our designs." Apparently the influential daughter of a major landowner hopes to build a resort with 16 guest apartments. The bungalows are to be flexibly divisible and linkable: the musical techniques of sequencing and sampling, translated into architecture.

Working with OneSense is not a set technical procedure, however, but a creative process: "The magic is in the translation," says Hansen. *"Pure chaos can come out, or something that makes sense,* depending on how I set the regulator." The software functions like a parallel interpreter: while he plays on the keyboard, it generates the associated spatial scenarios. A "creative act in real time" is what Hansen calls this simultaneous production of musical and visual output.



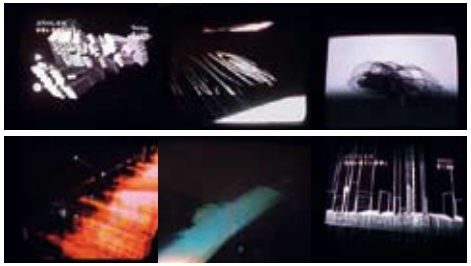
Sound under construction: the translation of a simple drumbeat becomes...

...a bold design for 16 guest houses on the Seychelles.



Language becomes barcode, the barcode becomes a decorative wall in Zurich's Forum Bar.

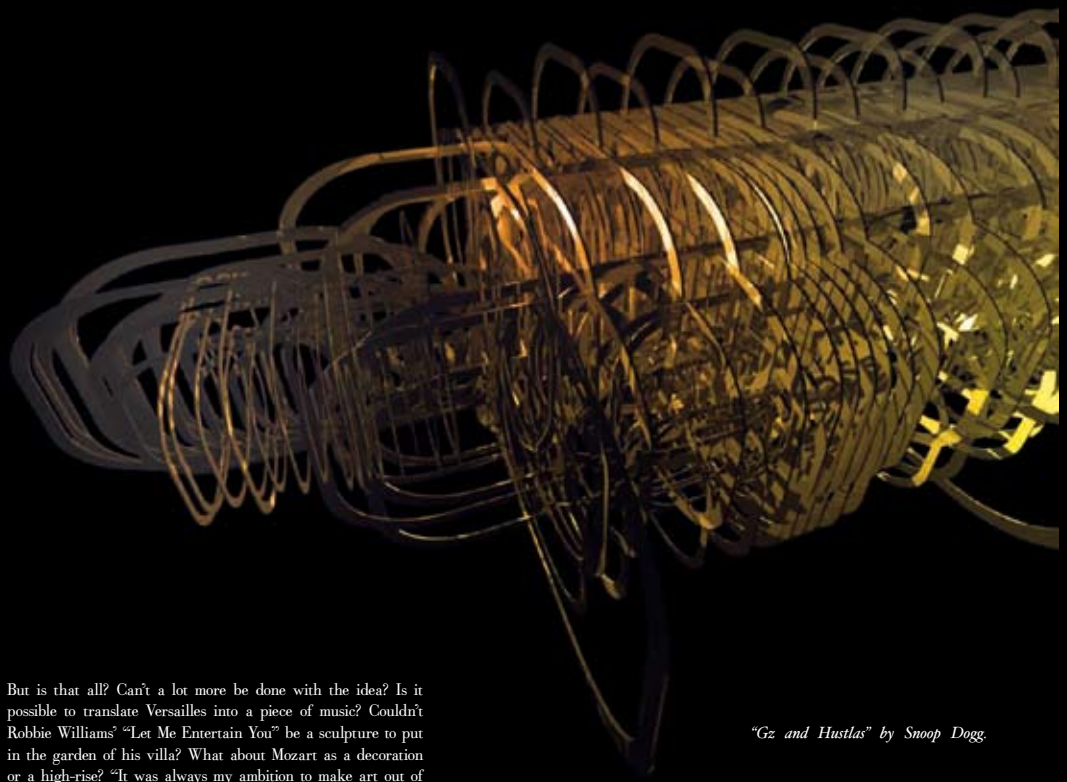
One group of people knows exactly what he means by this. "Synesthetes," a term derived from the Greek word for "parallel perception," are people who, when stimulated in one of their senses, also experience sensations in another. Approximtely one in 500 people is capable of "colored hearing," for instance, when listening to music, such a person will see colors and shapes in front of his or her eyes. Anyone who listens to Aphex Twin's "Xtal" and sees something like a low, slowly



Forms from another world: OneSense at work.

rotating dark cylinder while luminous streaks pass by and lemon-colored rays flash across the field of view is very probably a synesthete. Drawn-out tubes, nested levels, rows of drops and spheres – it is astonishing how similar the 3-D constructs are to those described by synesthetes. But what exactly is the difference between that and the visual effects produced by Windows Media Player or Apple iTunes? "These applications create rough two-dimensional equivalents of audio frequencies and illustrate them – fleeting pictures are produced, but nothing spatial. Our 3-D notations, on the other hand, can be "built," and the music can also be reconstructed. They are a new form of musical notation, since the translation works in both directions." Hansen and his

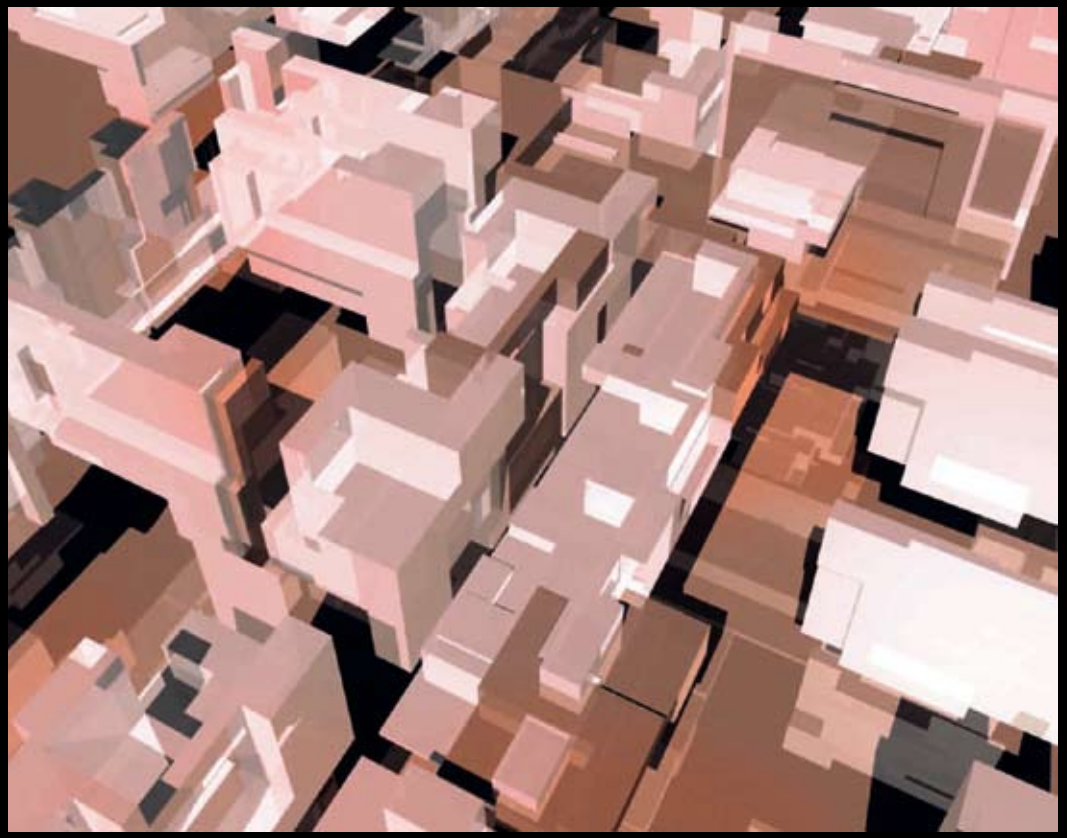
companions undertook a new, ambitious project especially for Hekmag. They translated three milestones in musical history that could hardly be more diverse: four measures of a Mozart piano sonata in C major, a section of Kraftwerk's "Autobahn," and part of the Snoop Dogg classic "Gz and Hustlas." The results are extraordinary: *Mozart's sonata becomes a green worm, Kraftwerk's "Autobahn" becomes an urban grid and the Snoop Dogg piece turns into an object resembling a spacecraft.*

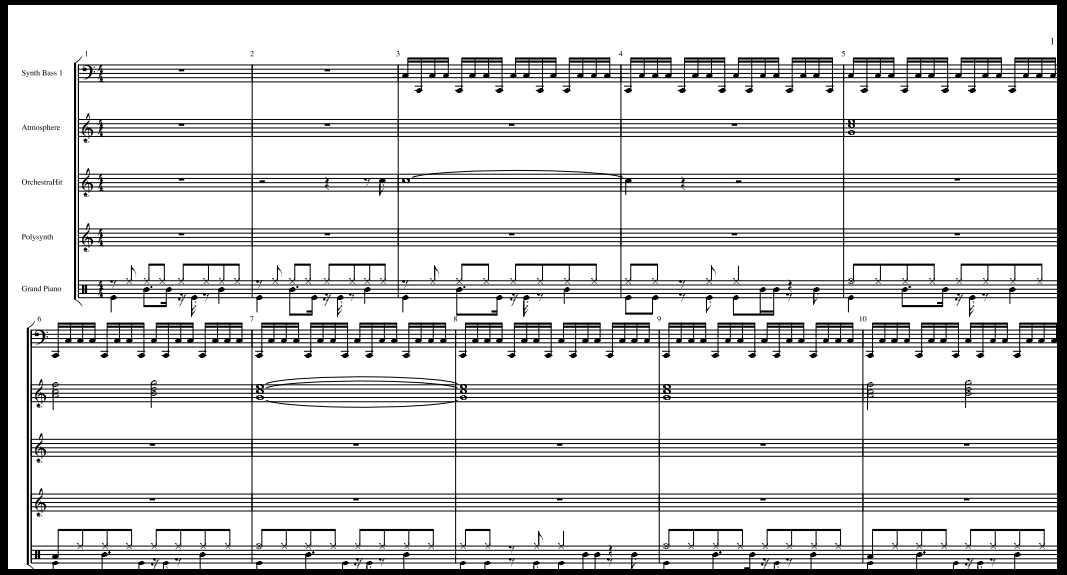


"Gz and Hustlas" by Snoop Dogg.

But is that all? Can't a lot more be done with the idea? Is it possible to translate Versailles into a piece of music? Couldn't Robbie Williams' "Let Me Entertain You" be a sculpture to put in the garden of his villa? What about Mozart as a decoration or a high-rise? "It was always my ambition to make art out of it," he says, but because of the breadth of opportunities, he has remained focused on what has been closest – architecture.

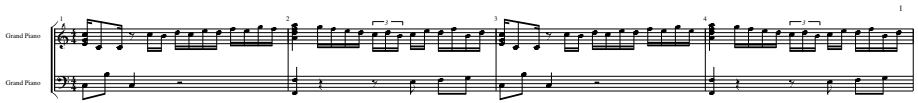
That, however, is all about to change. Last year, Hansen worked as an assistant at the world-famous *Eidgenössische Technische Hochschule* in Zurich, in their Department of Digital





Kraftwerk's "Autobahn" as a futuristic city: "The magic lies in the translation".

Biomorphic object: four stanzas from Mozart's Piano Sonata in C major.



Production. There they have a giant robot that produces three-dimensional printouts. As if by magic, the machine sculpts an exact replica of a form defined by computer from a block of material. It was there that Hansen came a step closer to transforming his virtual 3-D models into prototypes you can touch. ***In 2006, he plans to turn some initial notations "into physical reality" using digital tools.*** The procedure is expensive and time-consuming, which is why output will be limited at first. But at some point he hopes to mount an exhibition containing a whole range of materialized "musical sculptures." And who knows – perhaps Snoop Dogg will drop by and order himself a whole house.

Text Chris Knipping
Drafts and Renderings by Jan Henrik Hansen/ WHIST (www.whist.ch)

STUDIES

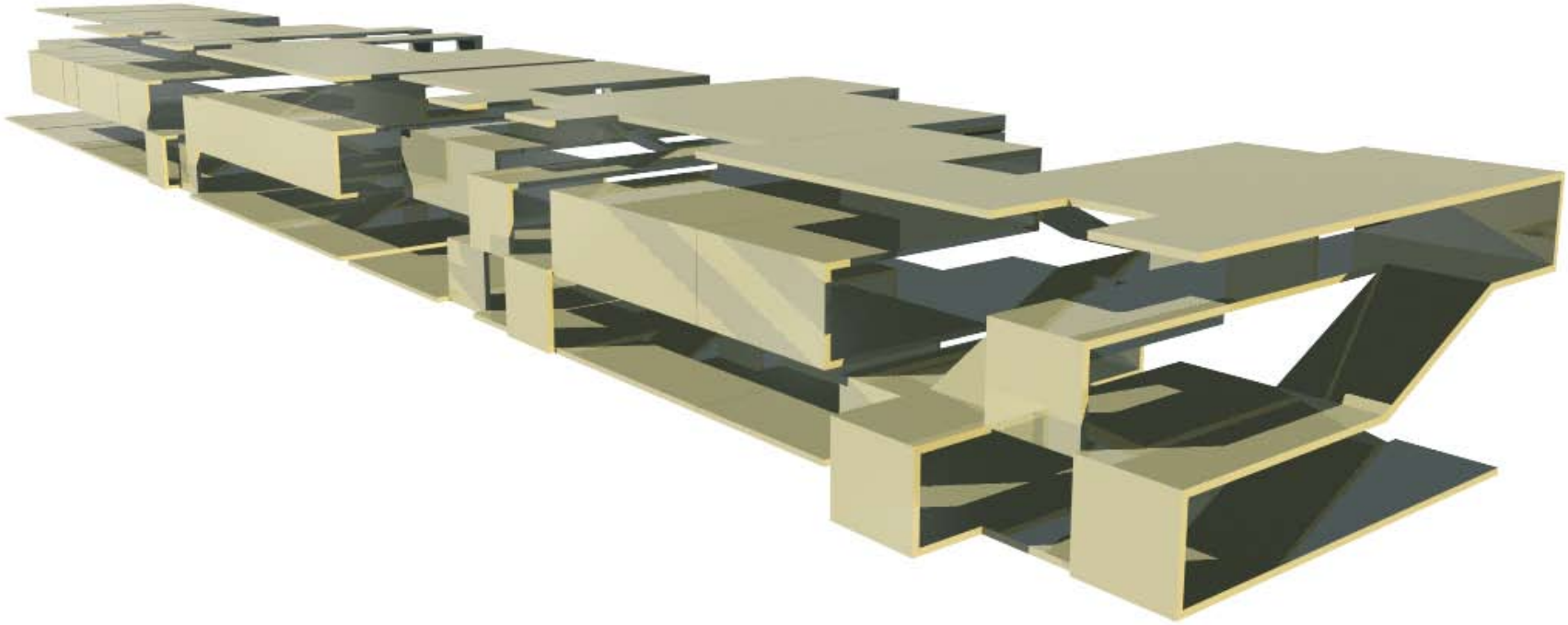
Since the beginning of the project in 1999 a lot of experimental material has been produced. The following pages show some examples of musical notations in different scales and environments.

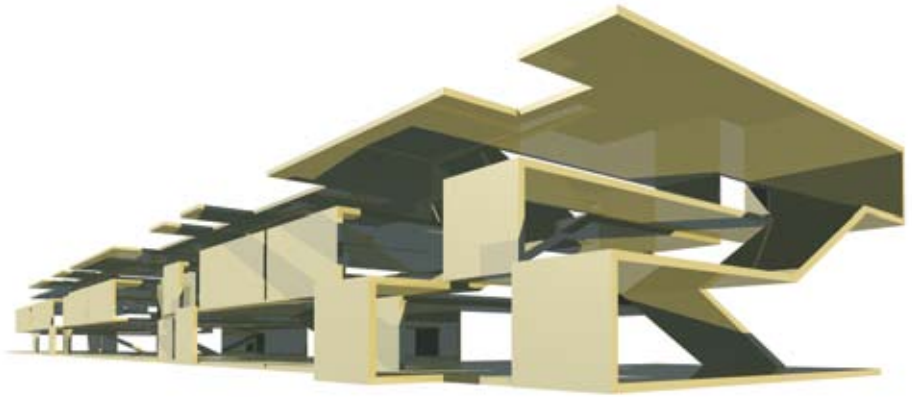
Some of them can not be linked to a known musical piece as we often used own compositions or simple melodies or grooves as source material.

The selection of studies goes back to the early days when our rendering capabilities were quite limited. Although better results can be achieved thesedays a rendering will still never compare to the existence of a real physical object.

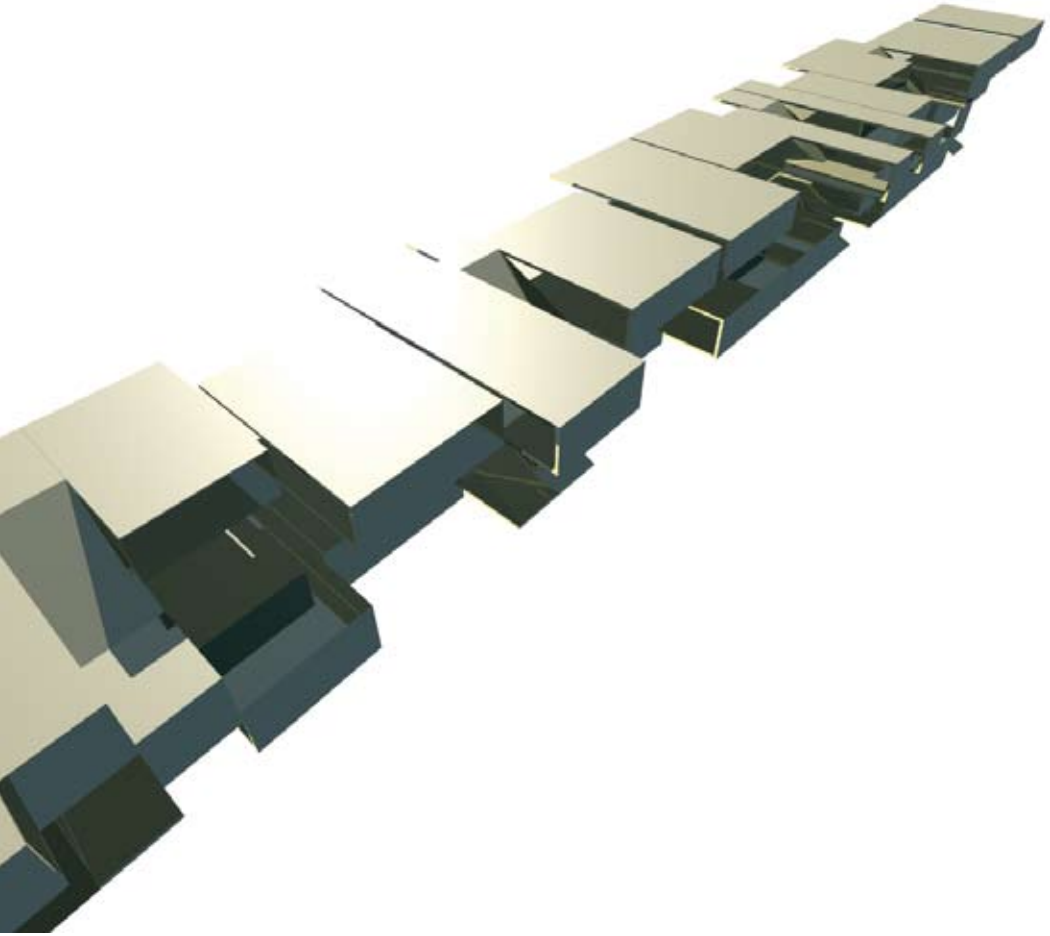
That is the main reason why we wish to take the project one step further and materialize future translations and understand the recent renderings only as a first hint to possible transformations as they could come out as architectural bodies in real 3D space.

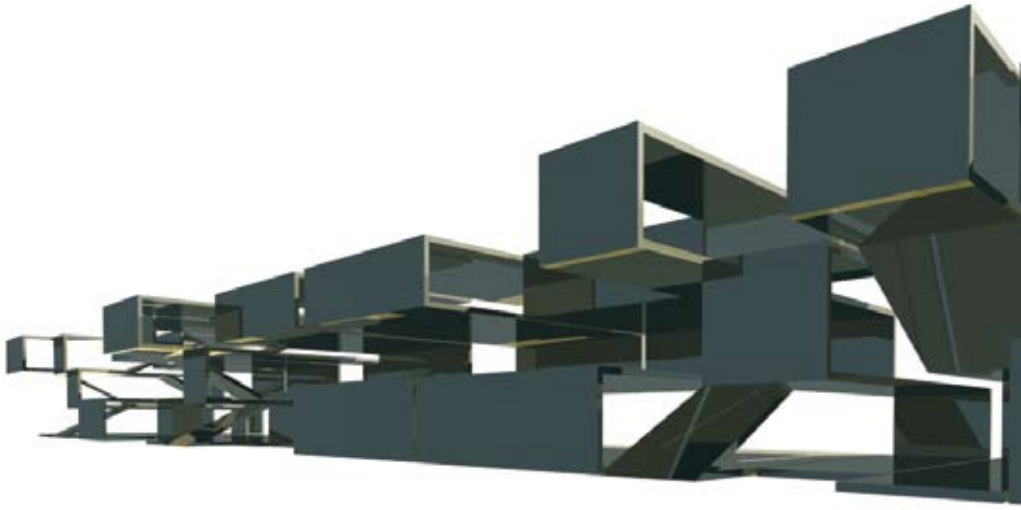
PICTURES
ACESSCOIRES
SCULPTURES
FURNITURE
WALLPAPER
ROOMS
FACADES
HOUSES
LANSCAPES
URBAN STRUCTURES



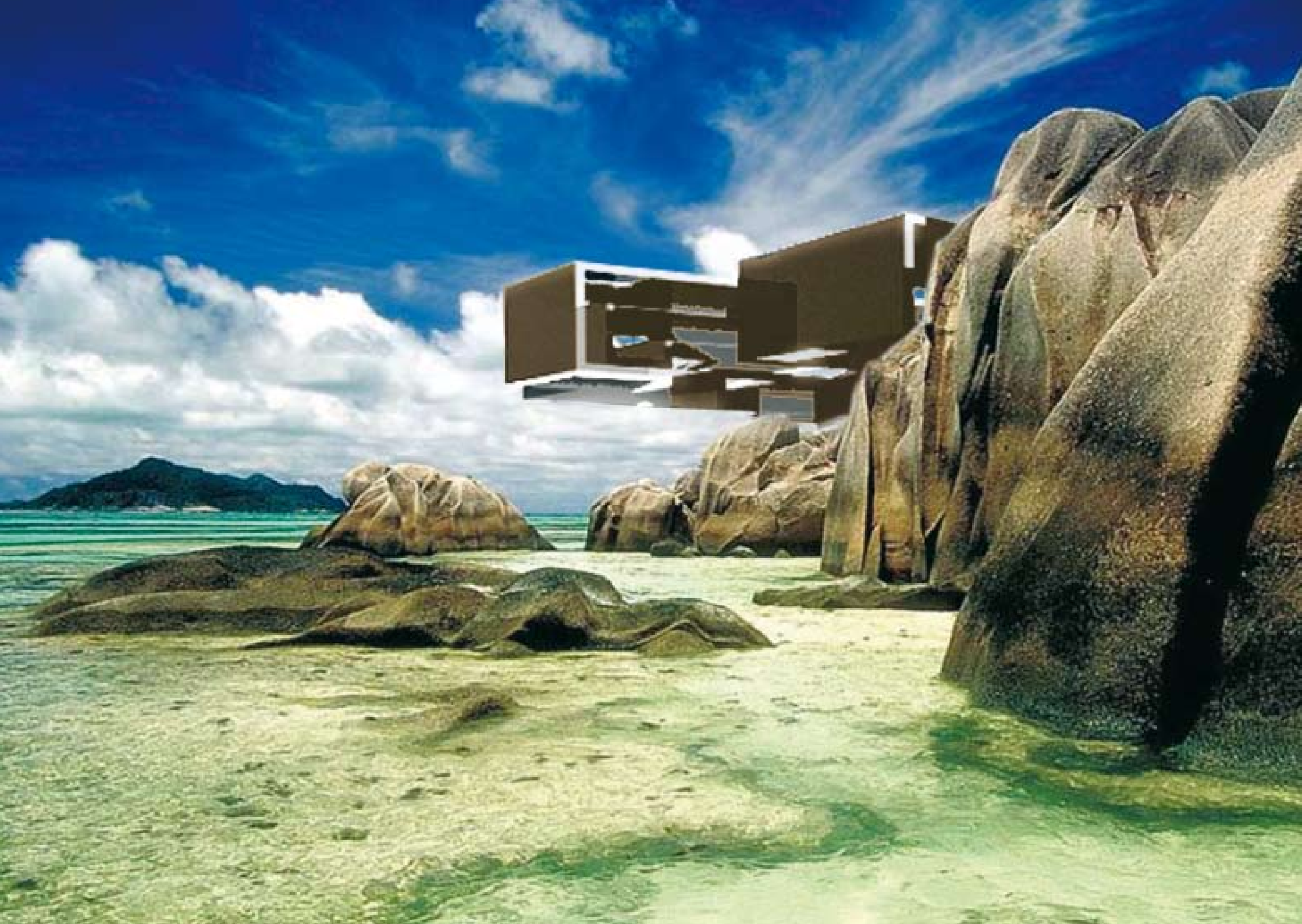


design of 16 guest houses on the Seychelles -
building sections arranged and configured by a rythmic sequence

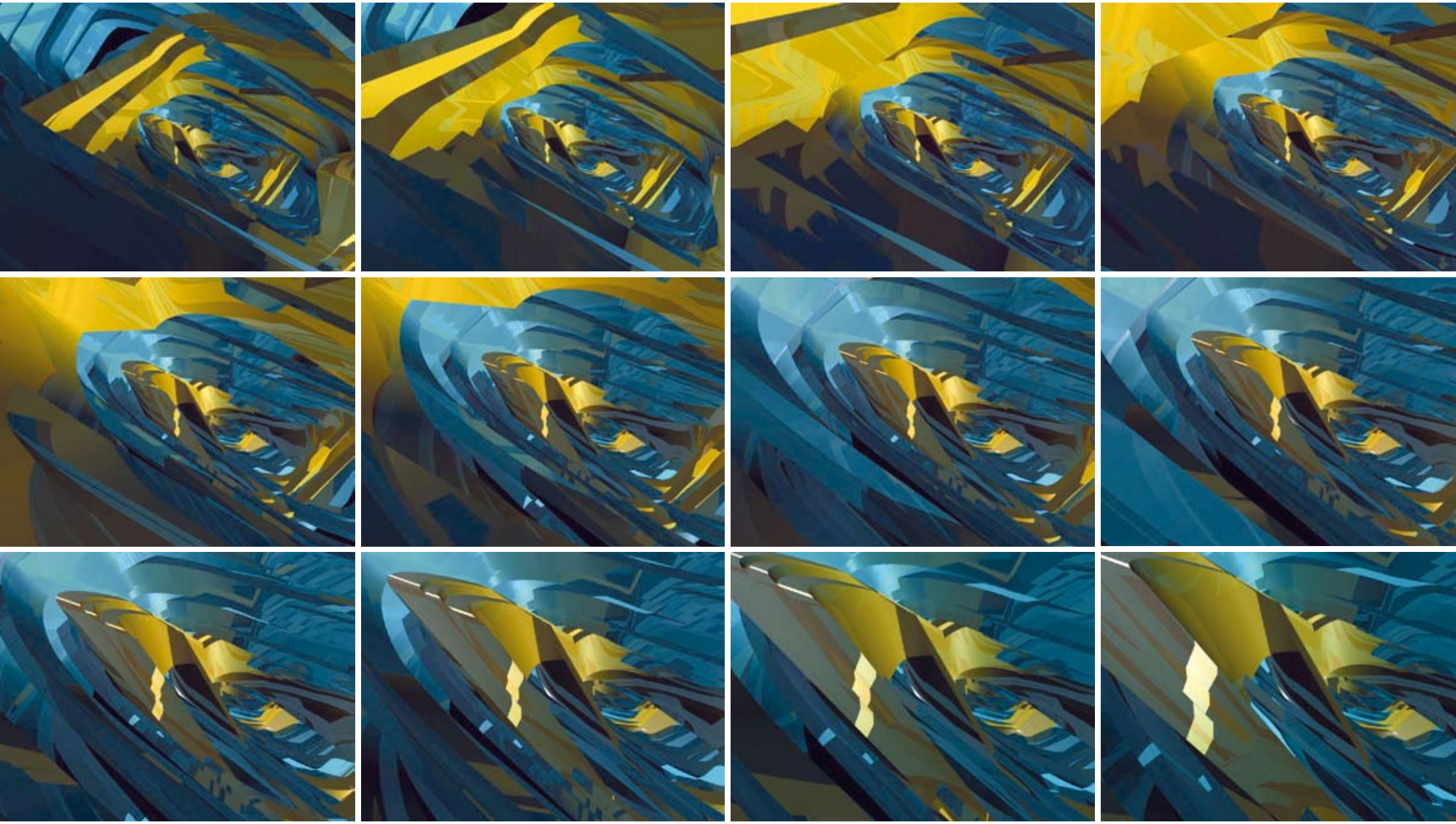




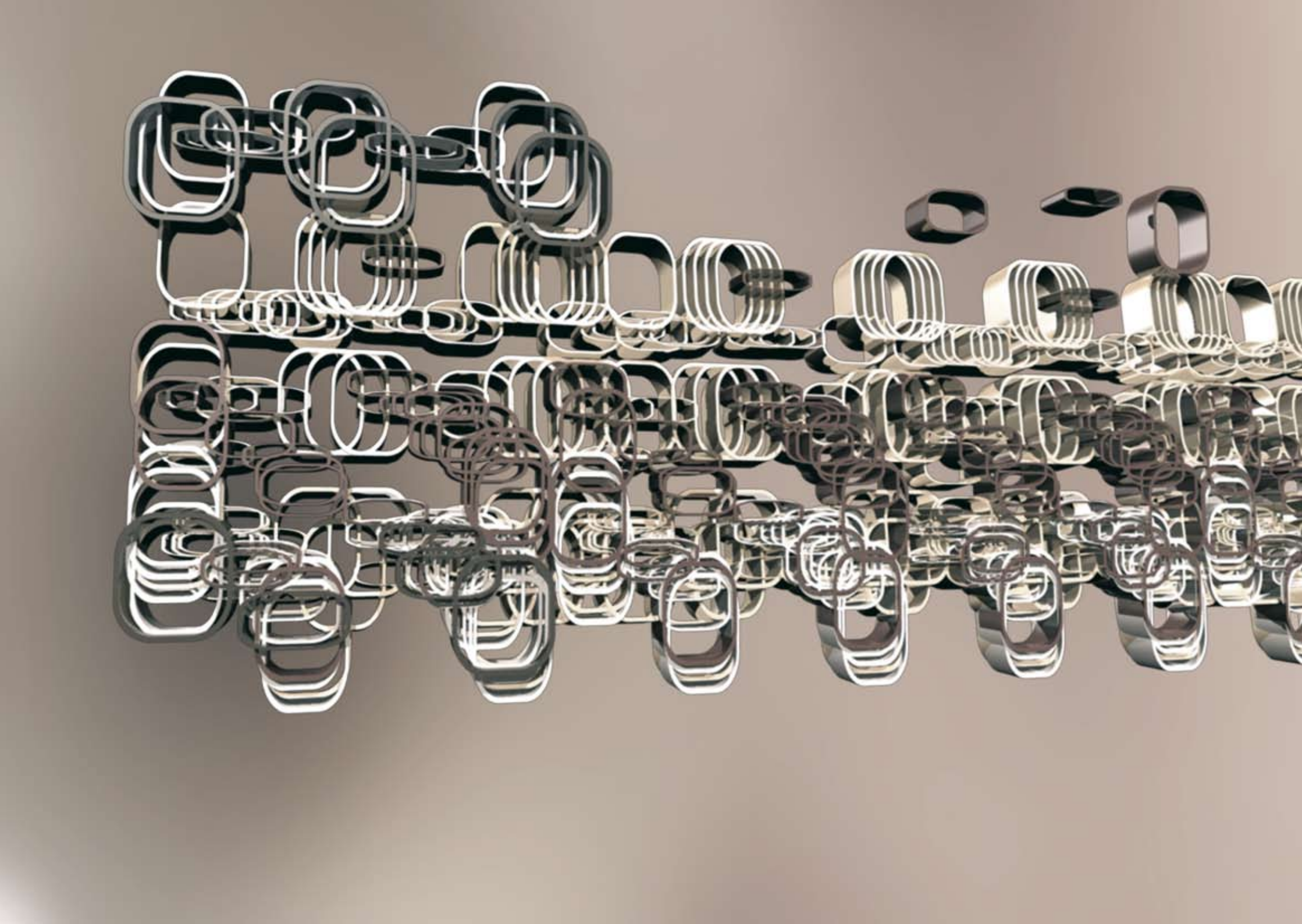
interior view

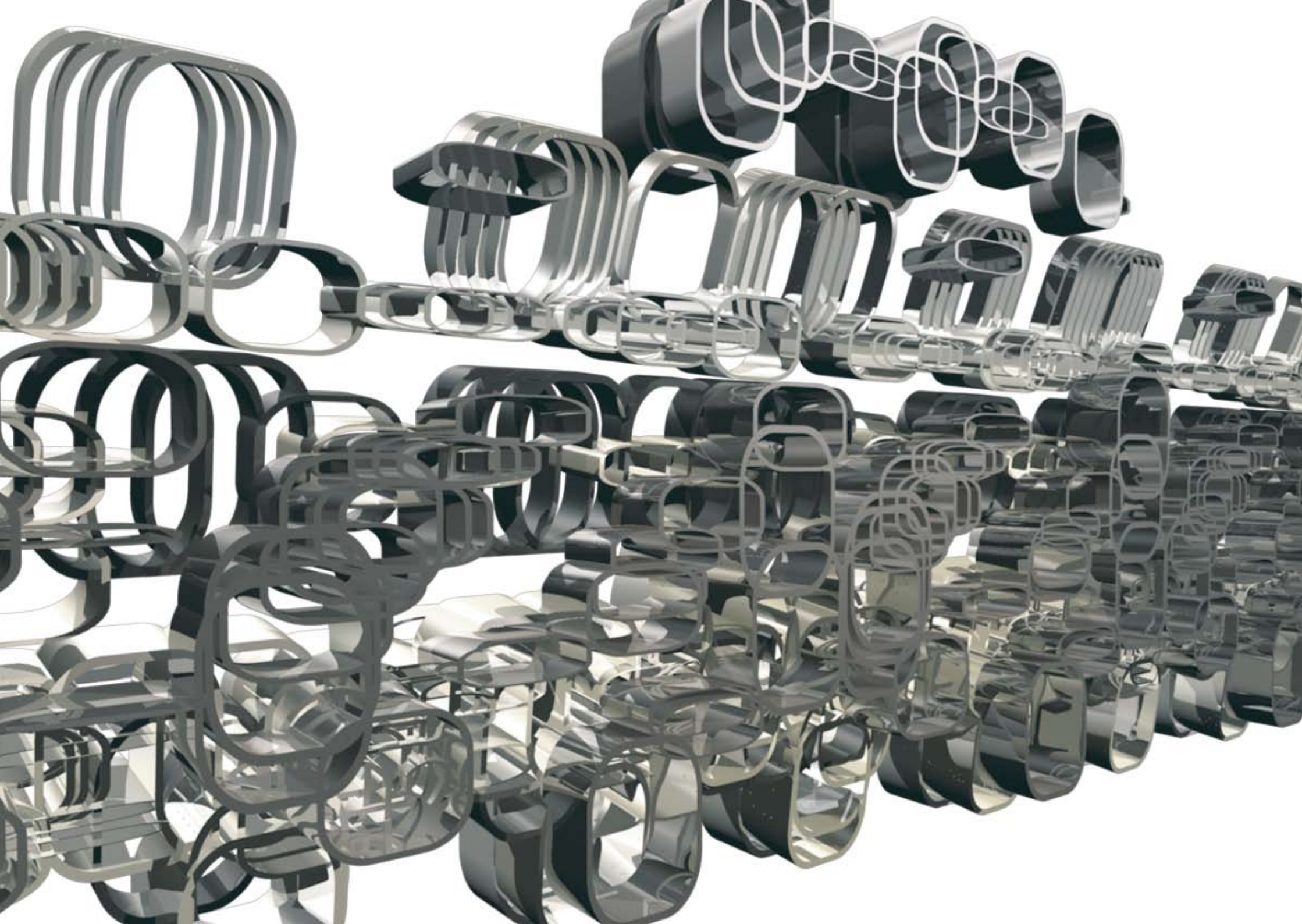


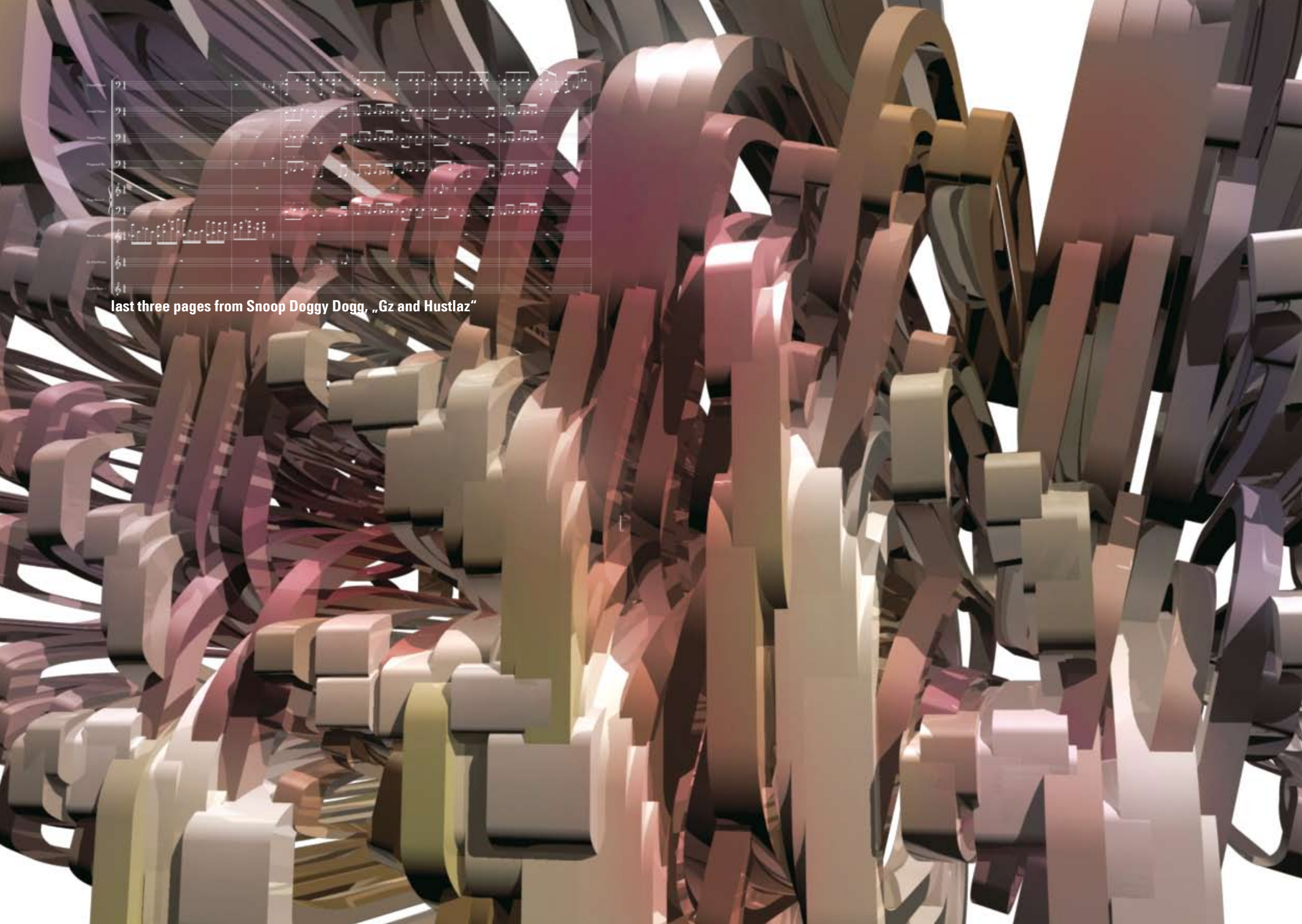
rythm tunnel



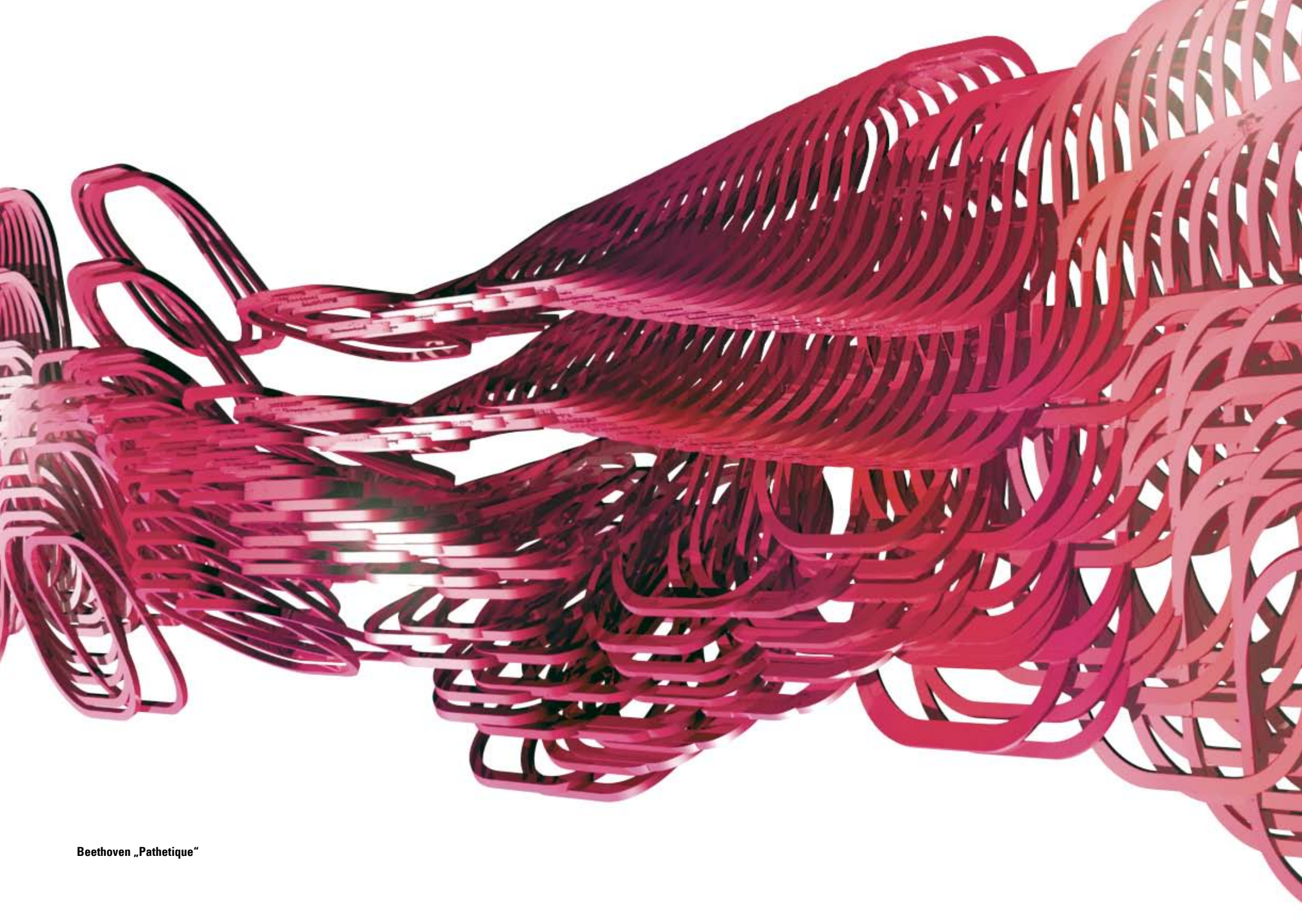
film stills of fly-through



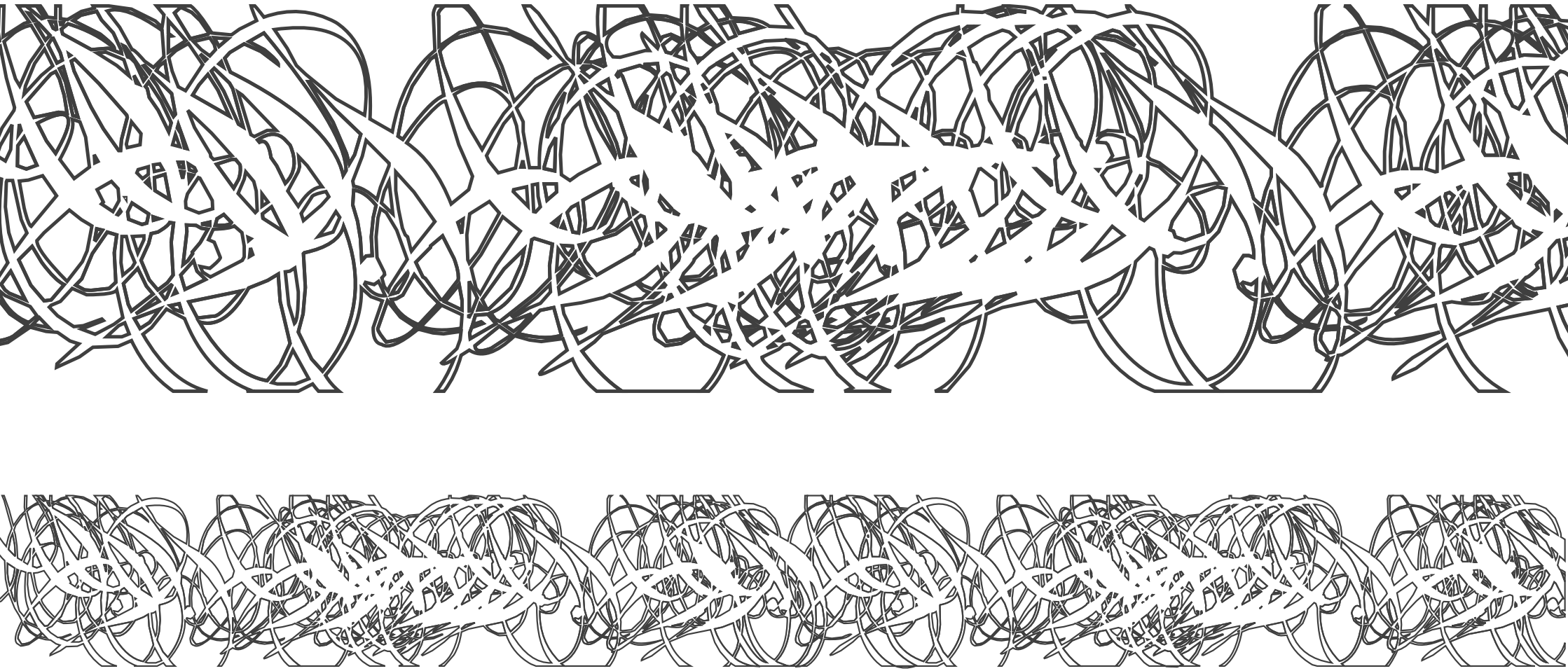


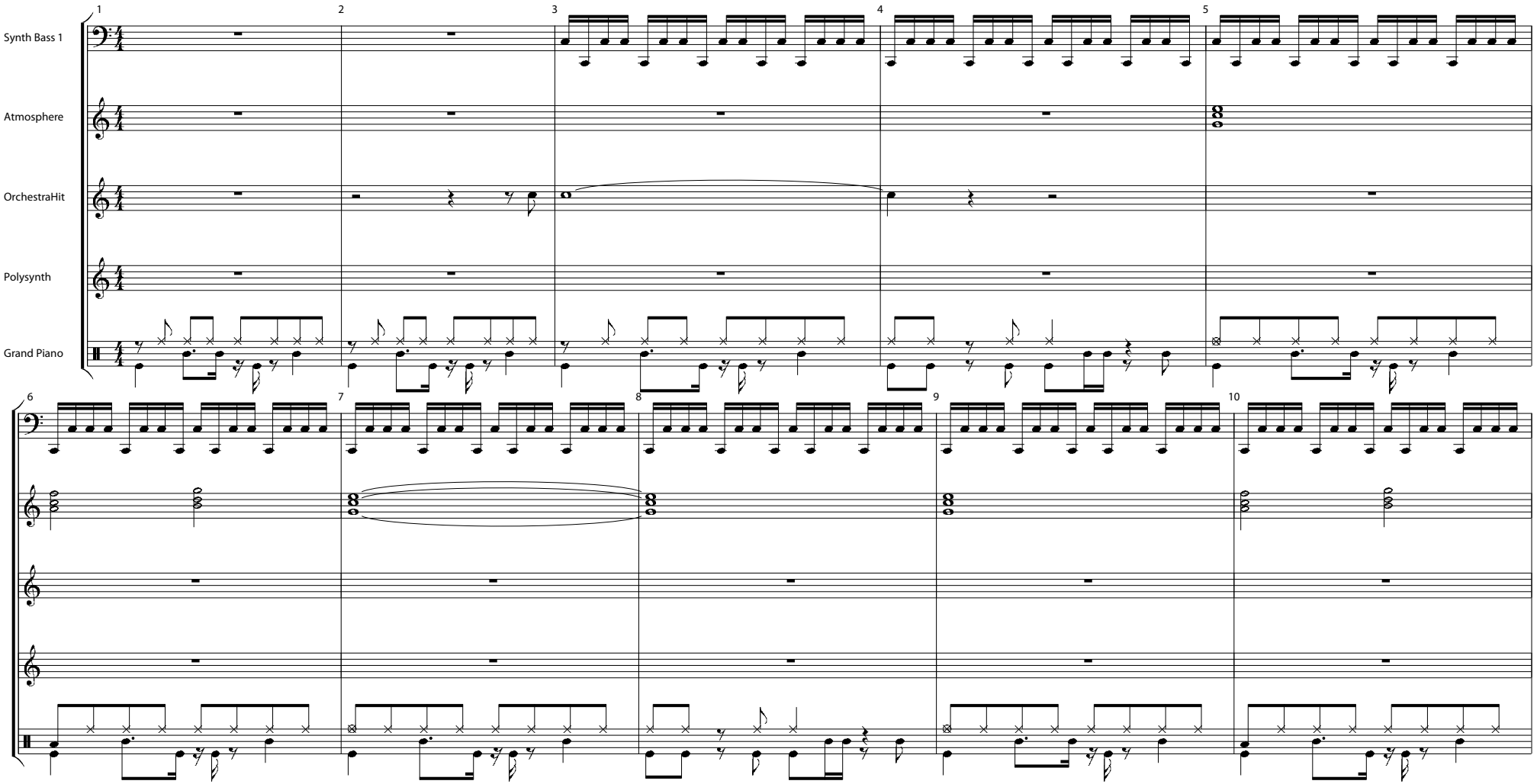


last three pages from Snoop Doggy Dogg, „Gz and Hustlaz“



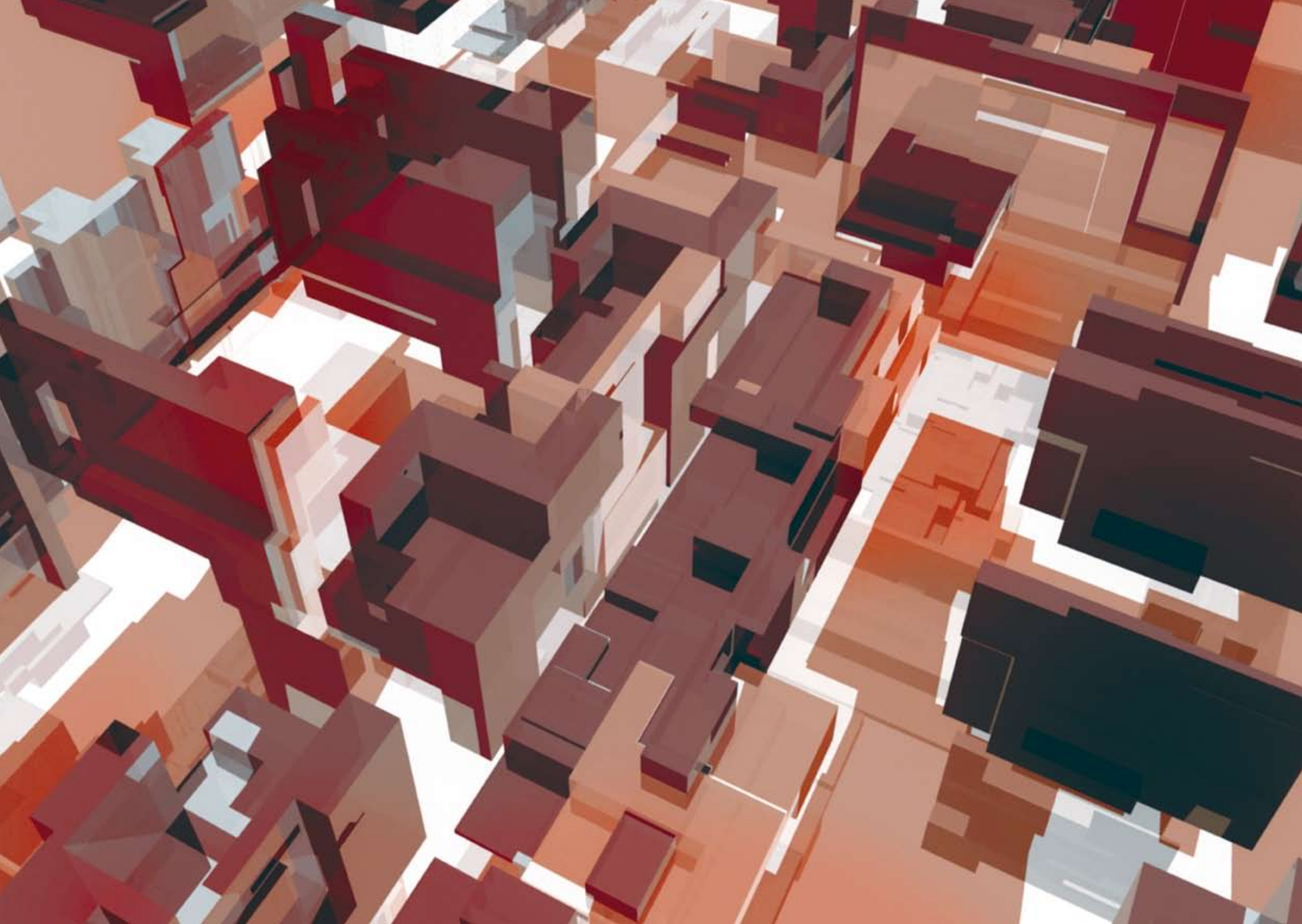
Beethoven „Pathetique“



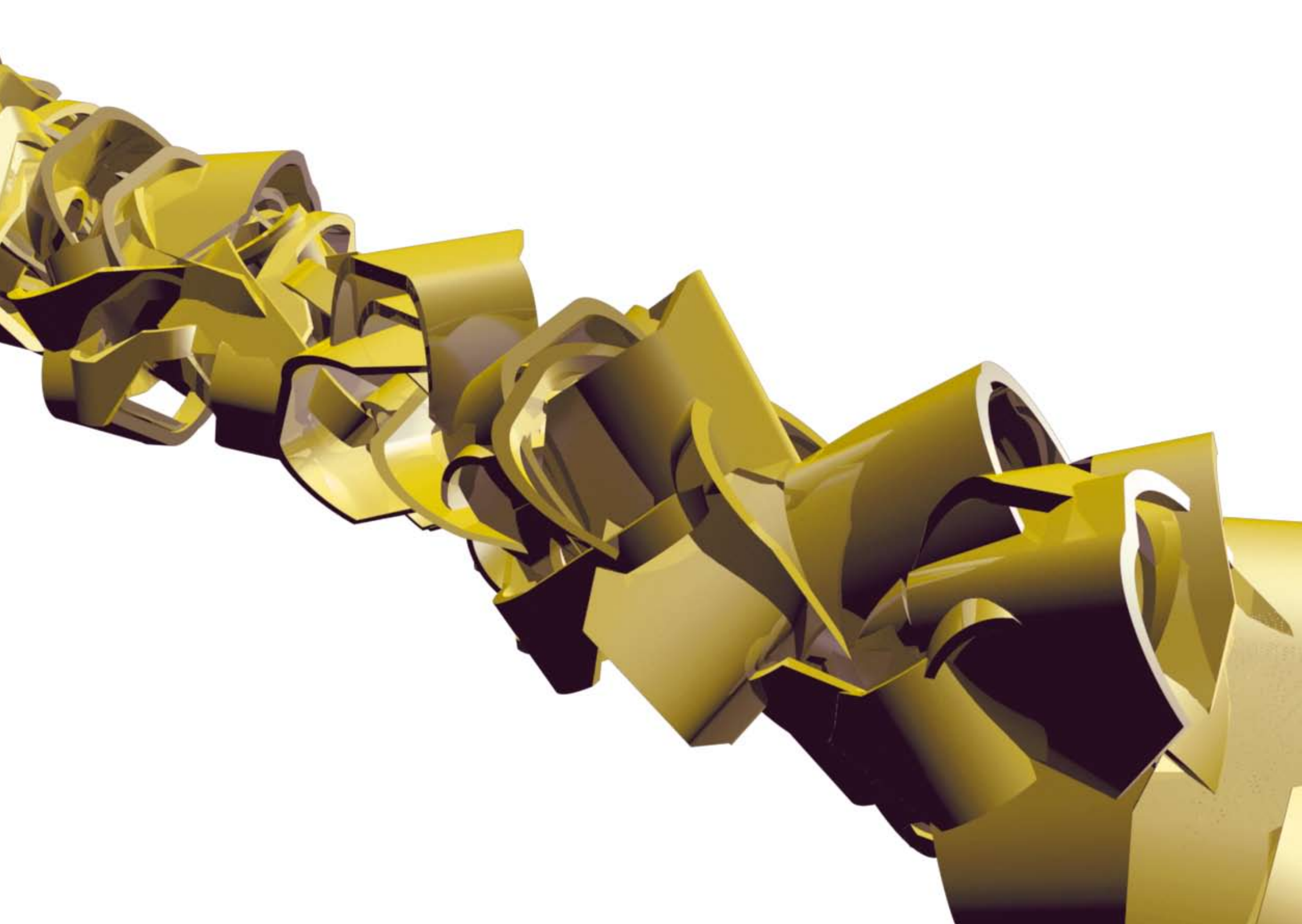


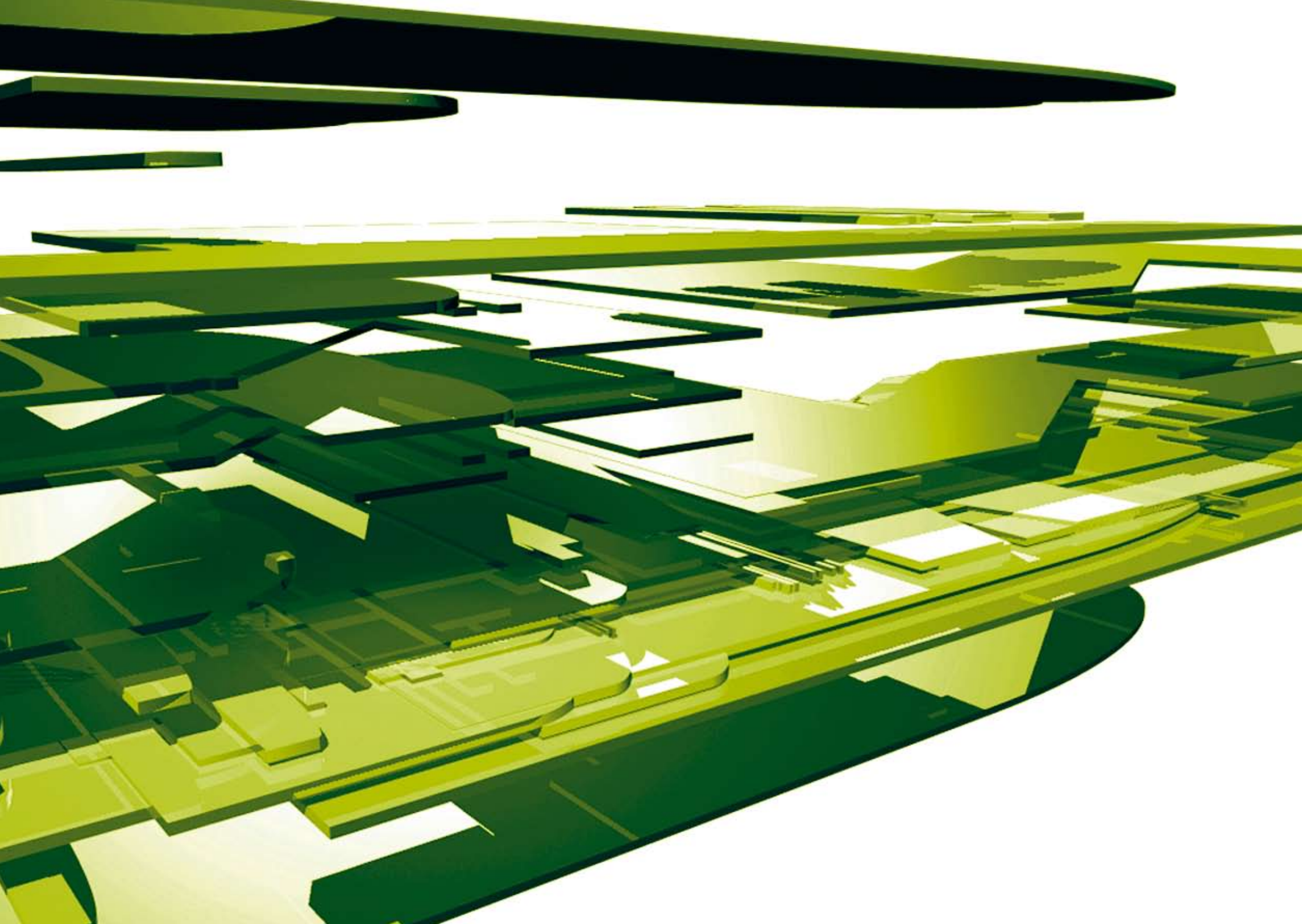
Kraftwerk „Autobahn“

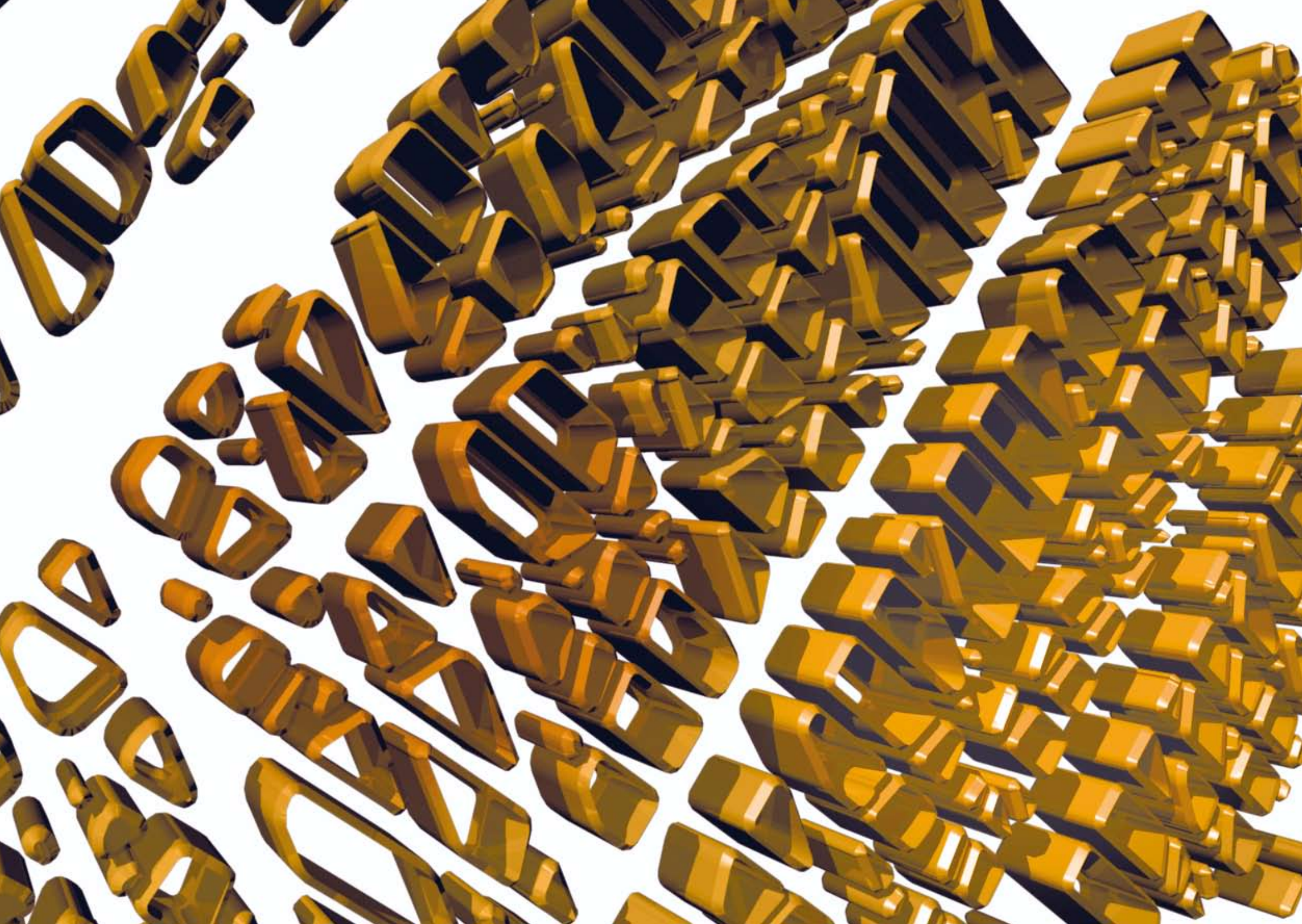
Translated with this 3D-geometry for every note - result next page

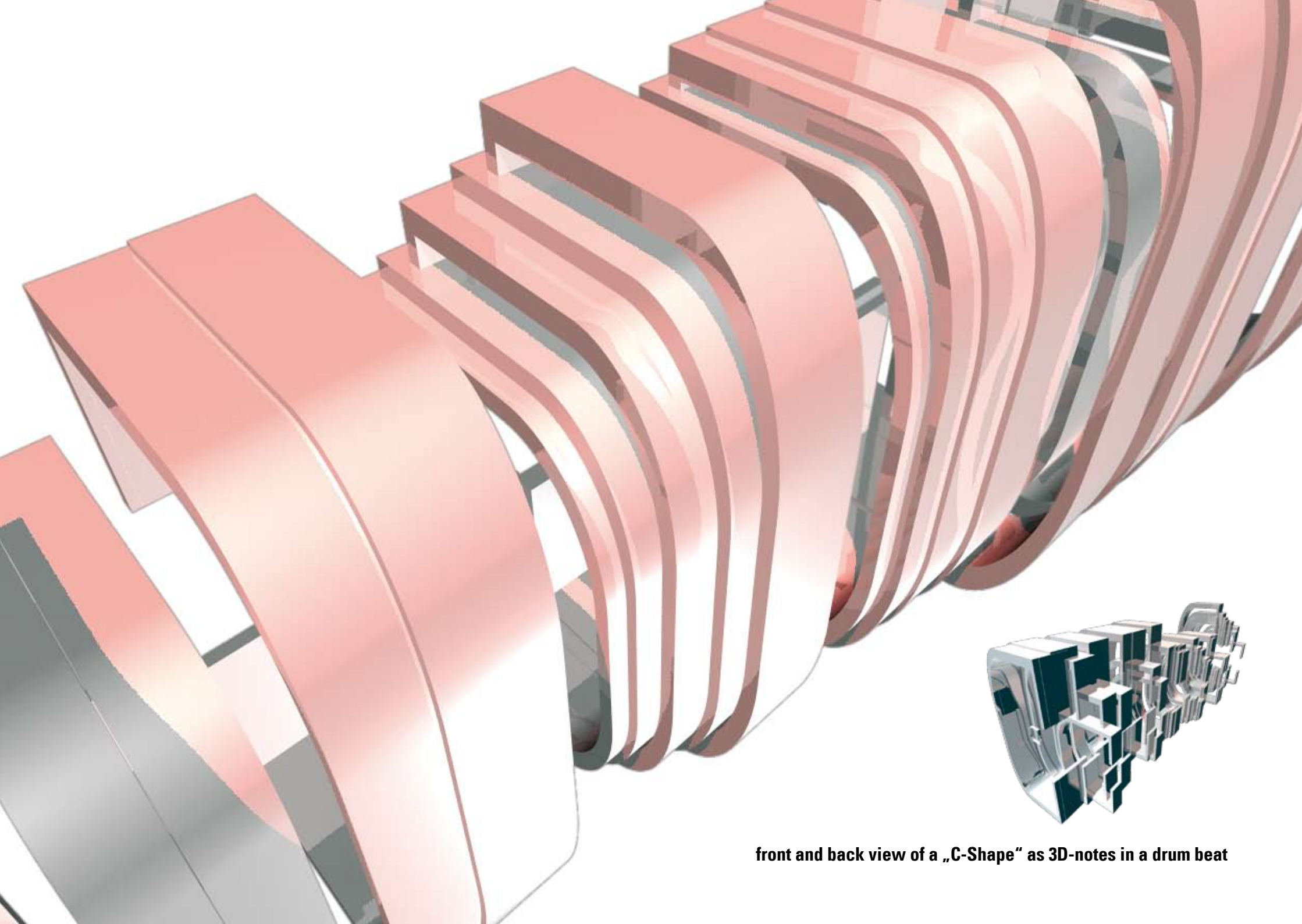


Snoop Dogg
„Gz and Hustlaz“



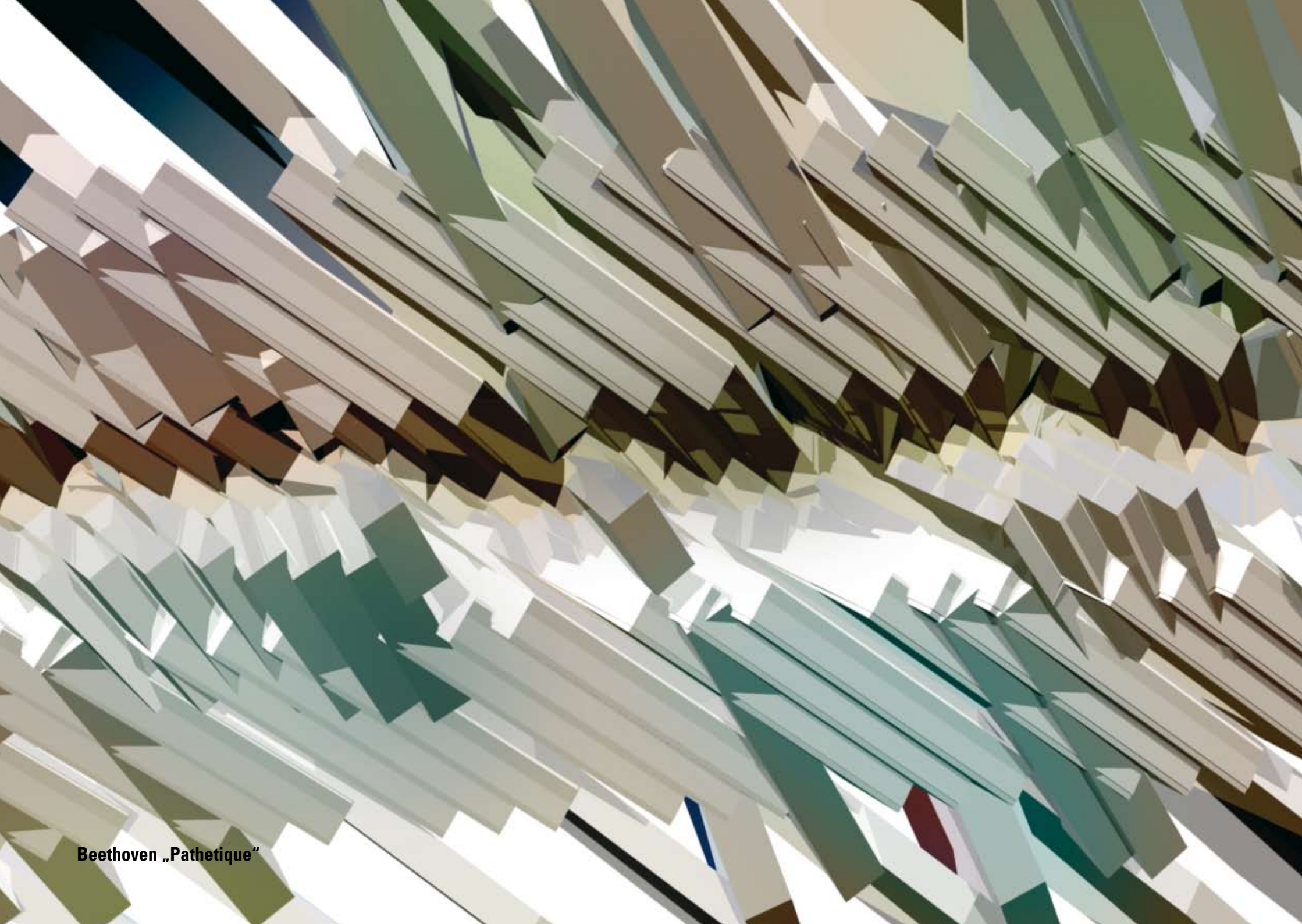


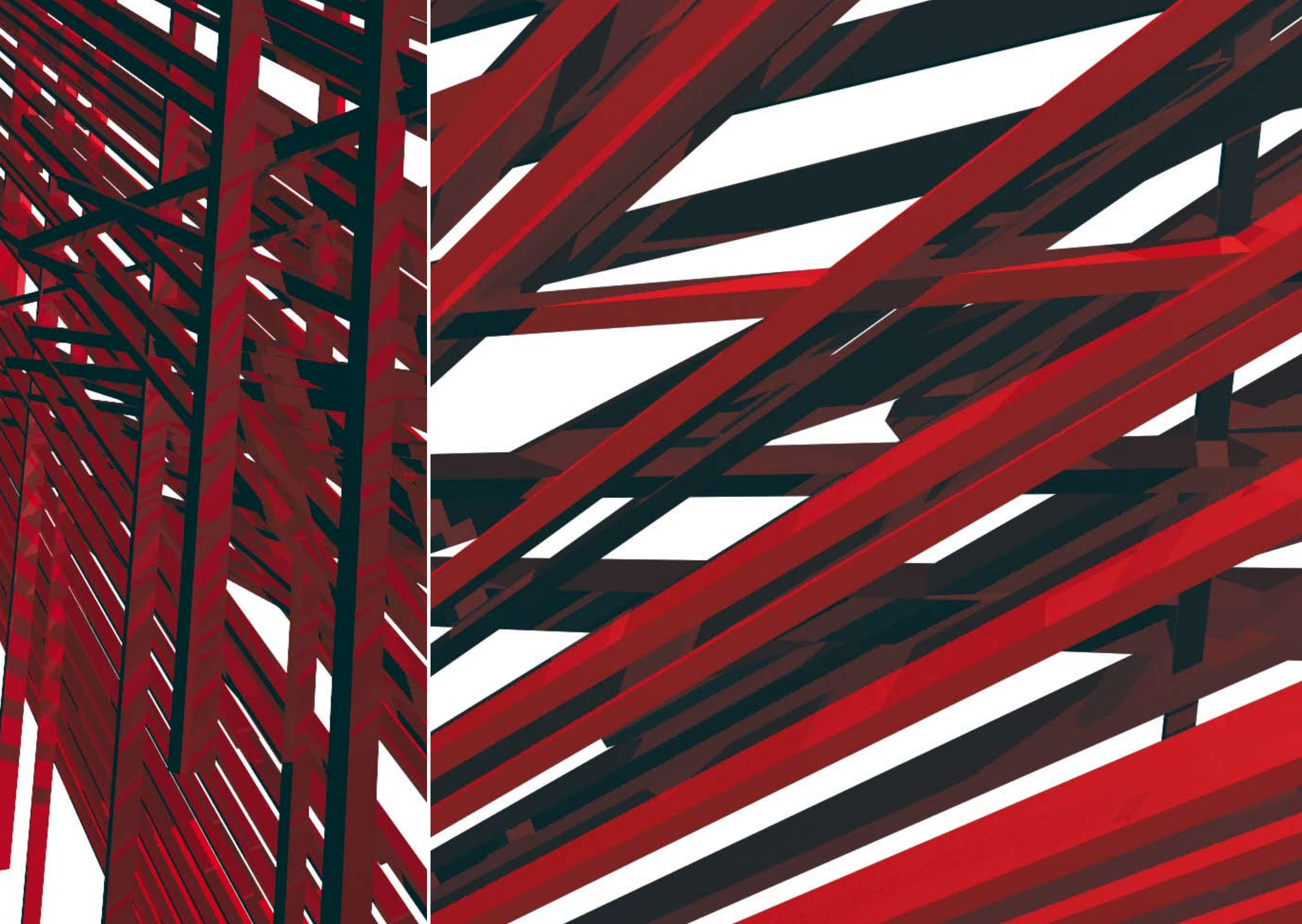




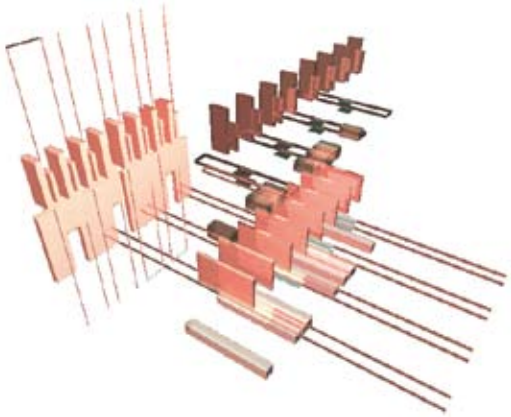
front and back view of a „C-Shape“ as 3D-notes in a drum beat

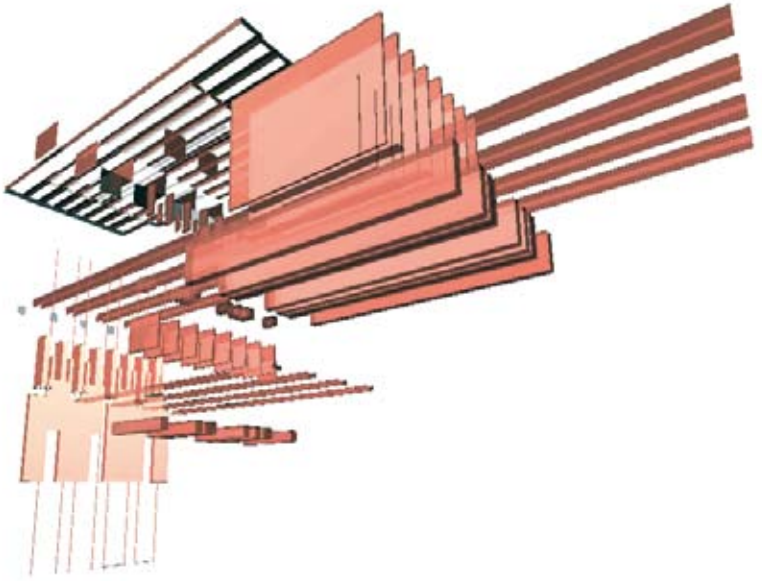
a bassline


Beethoven „Pathetique“

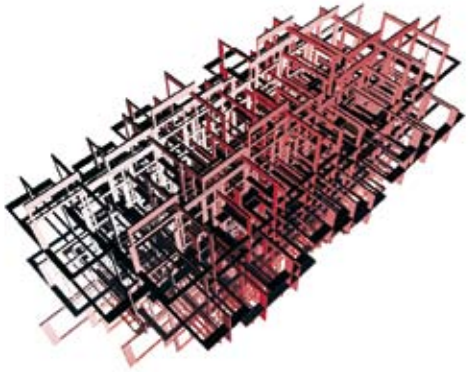


EARLY STUDIES 1999 – 2003

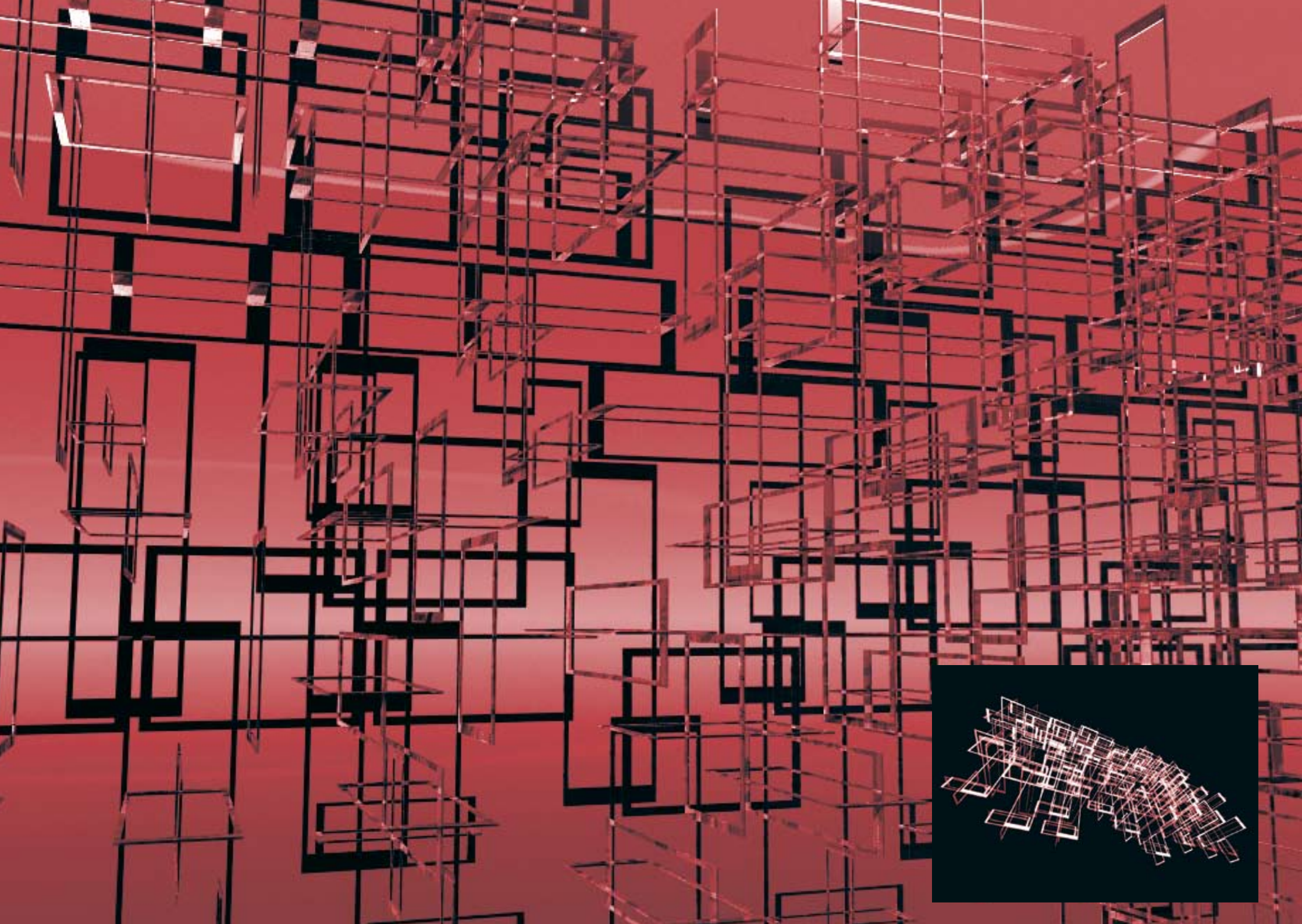


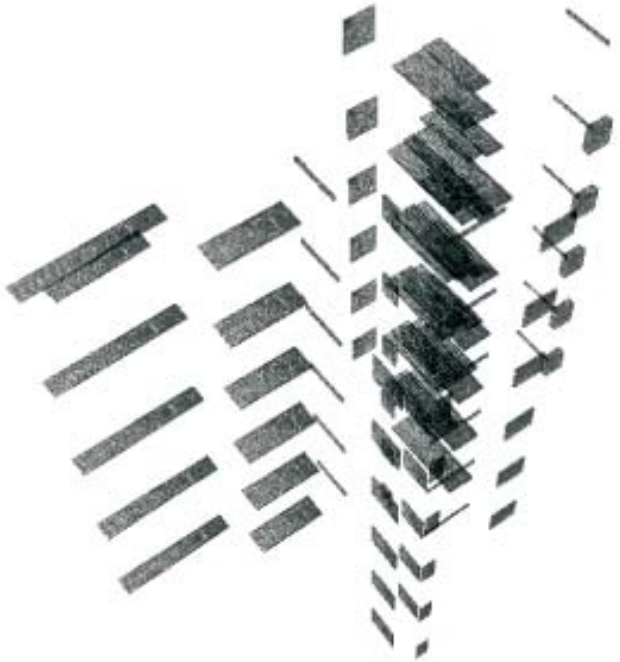


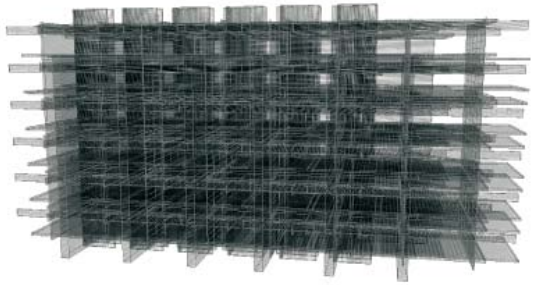
composing and editing a drum beat in 3d



Views of a rythmic structure from a drum be

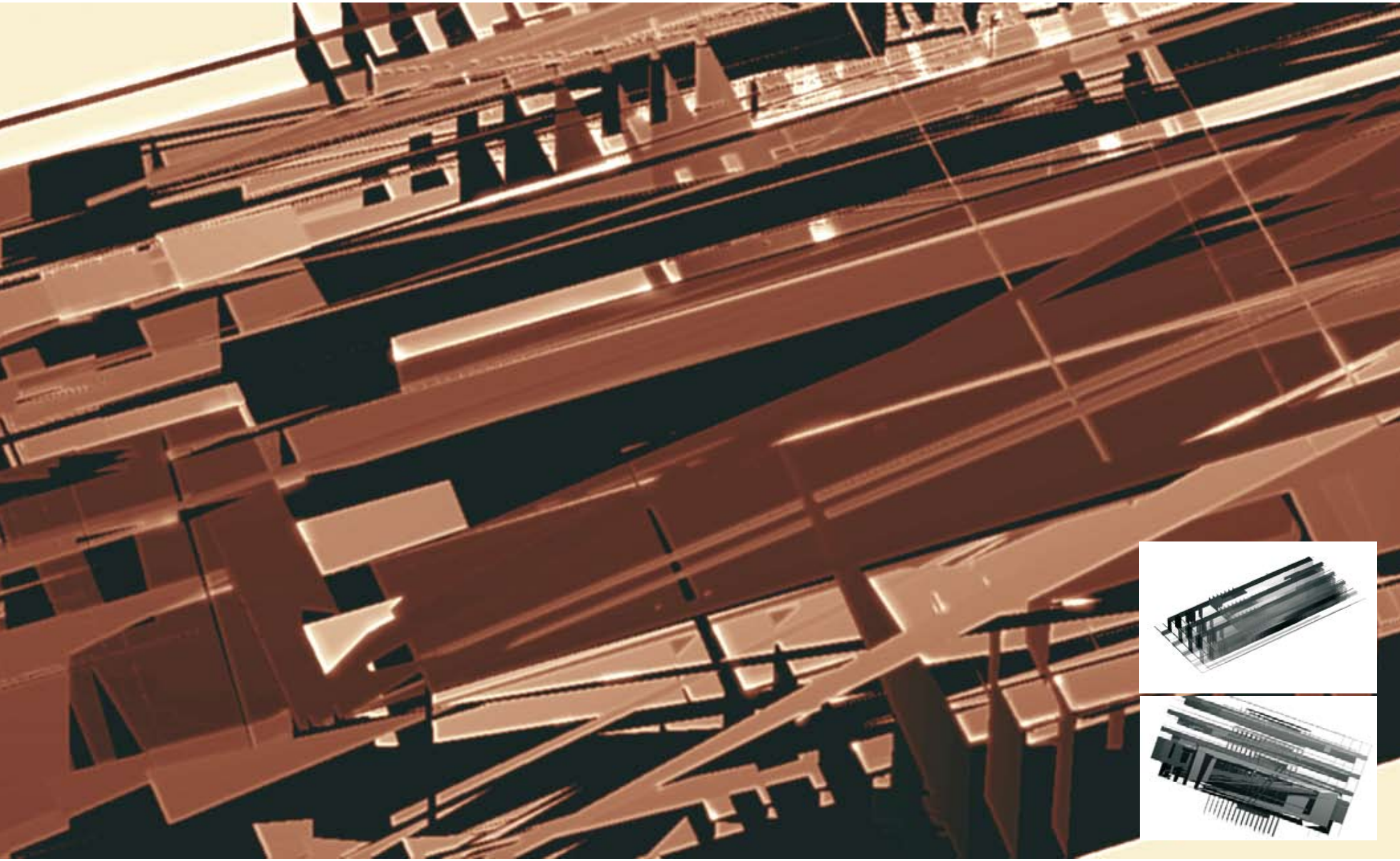


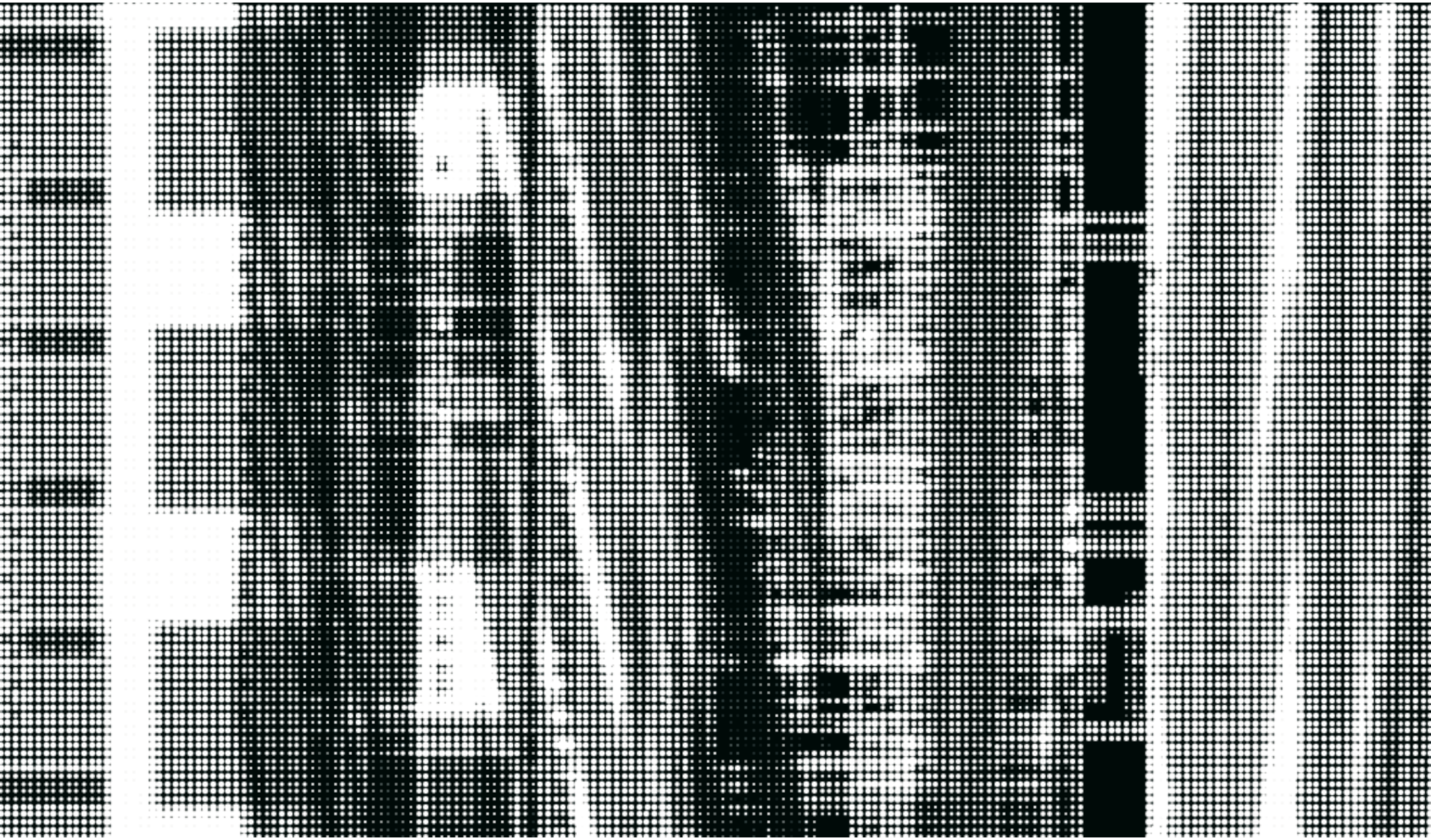




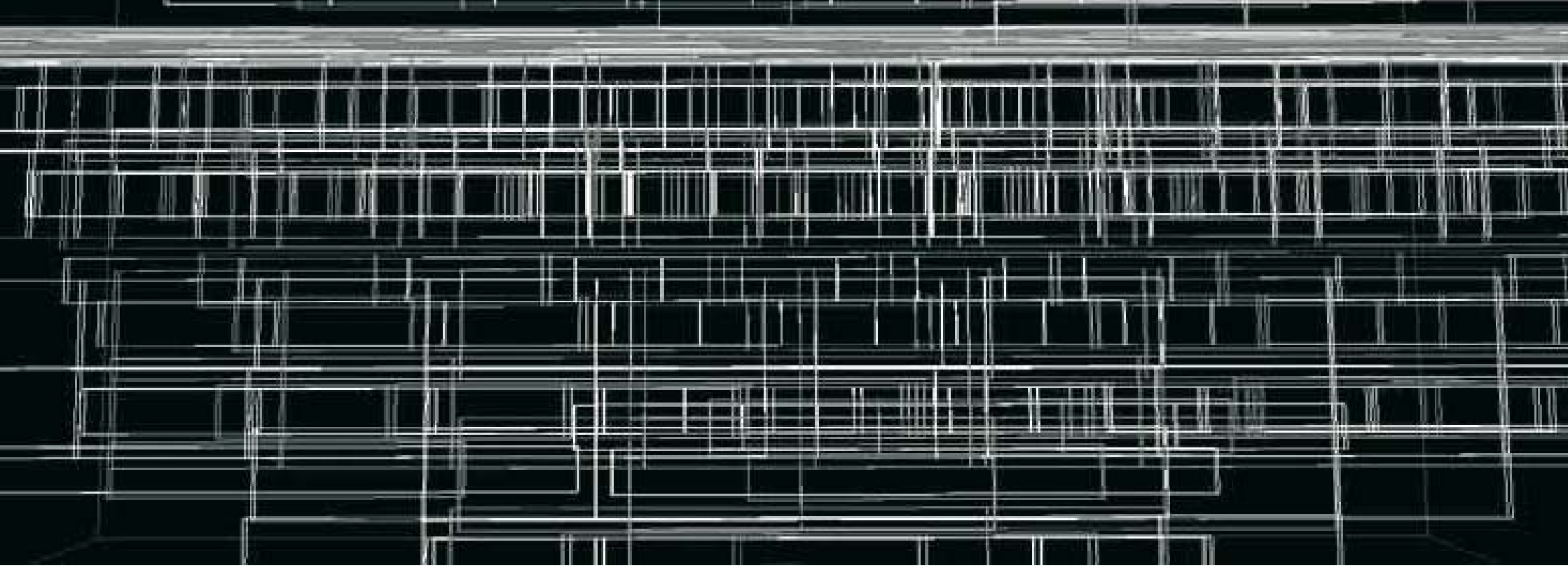
musical tower

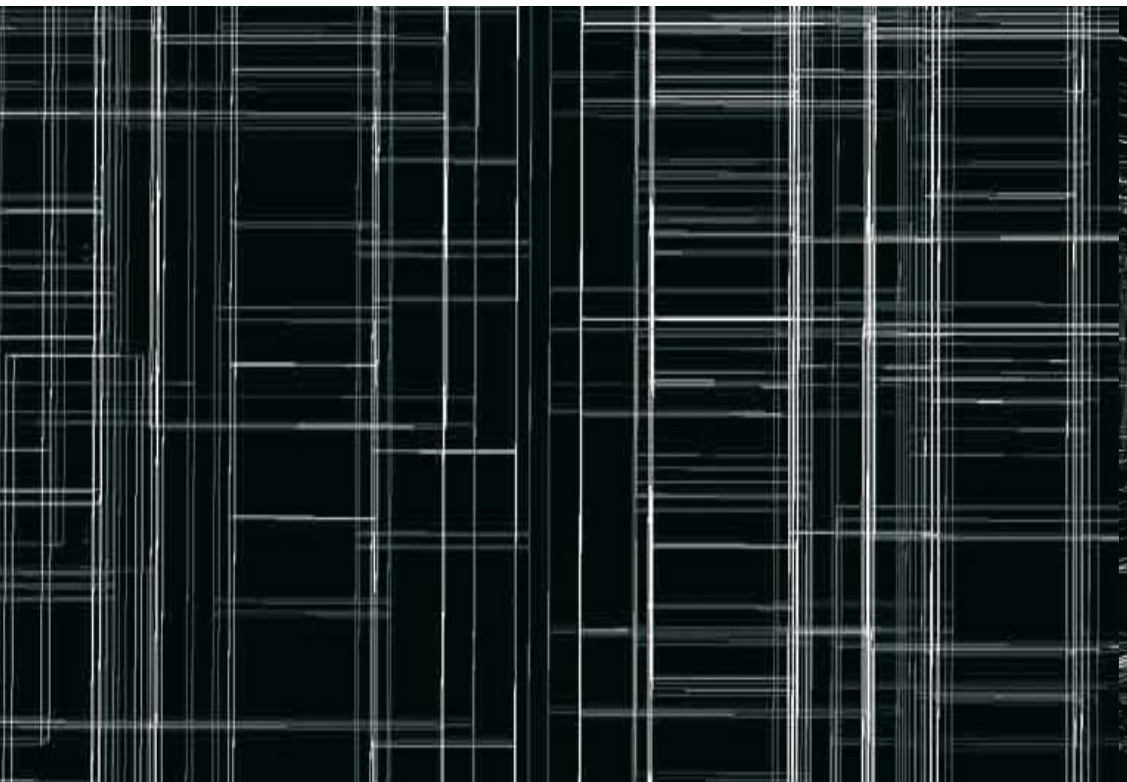
grooves

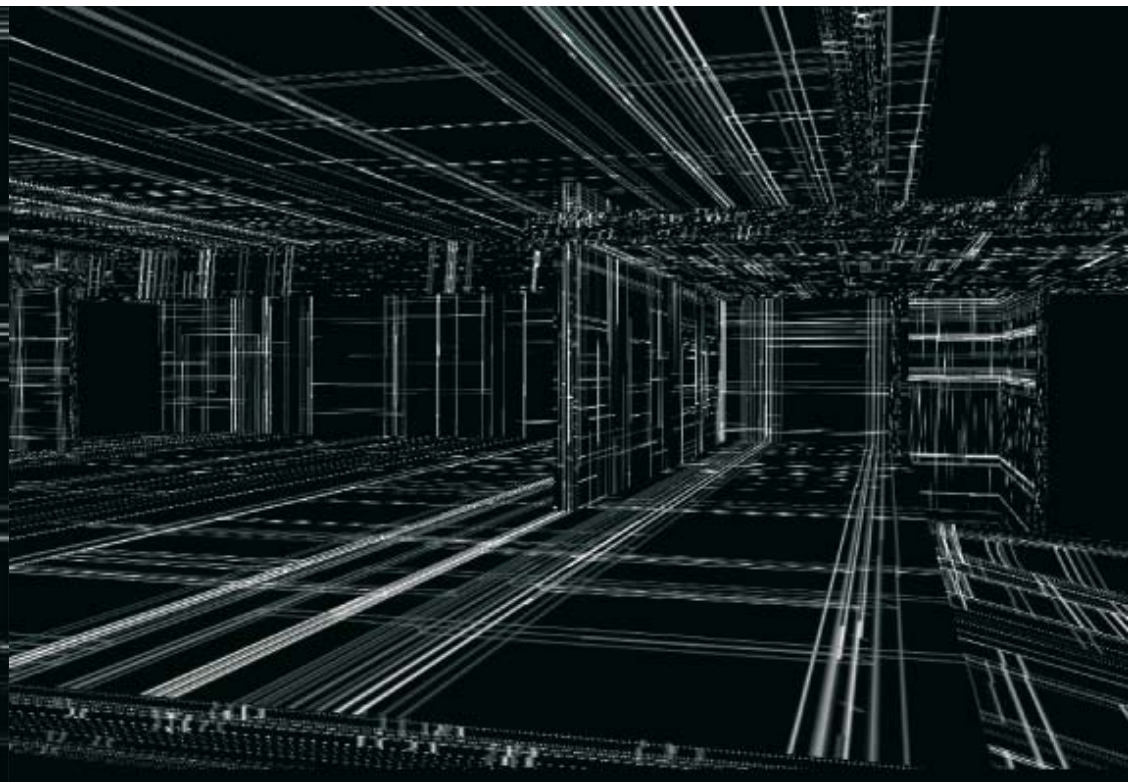


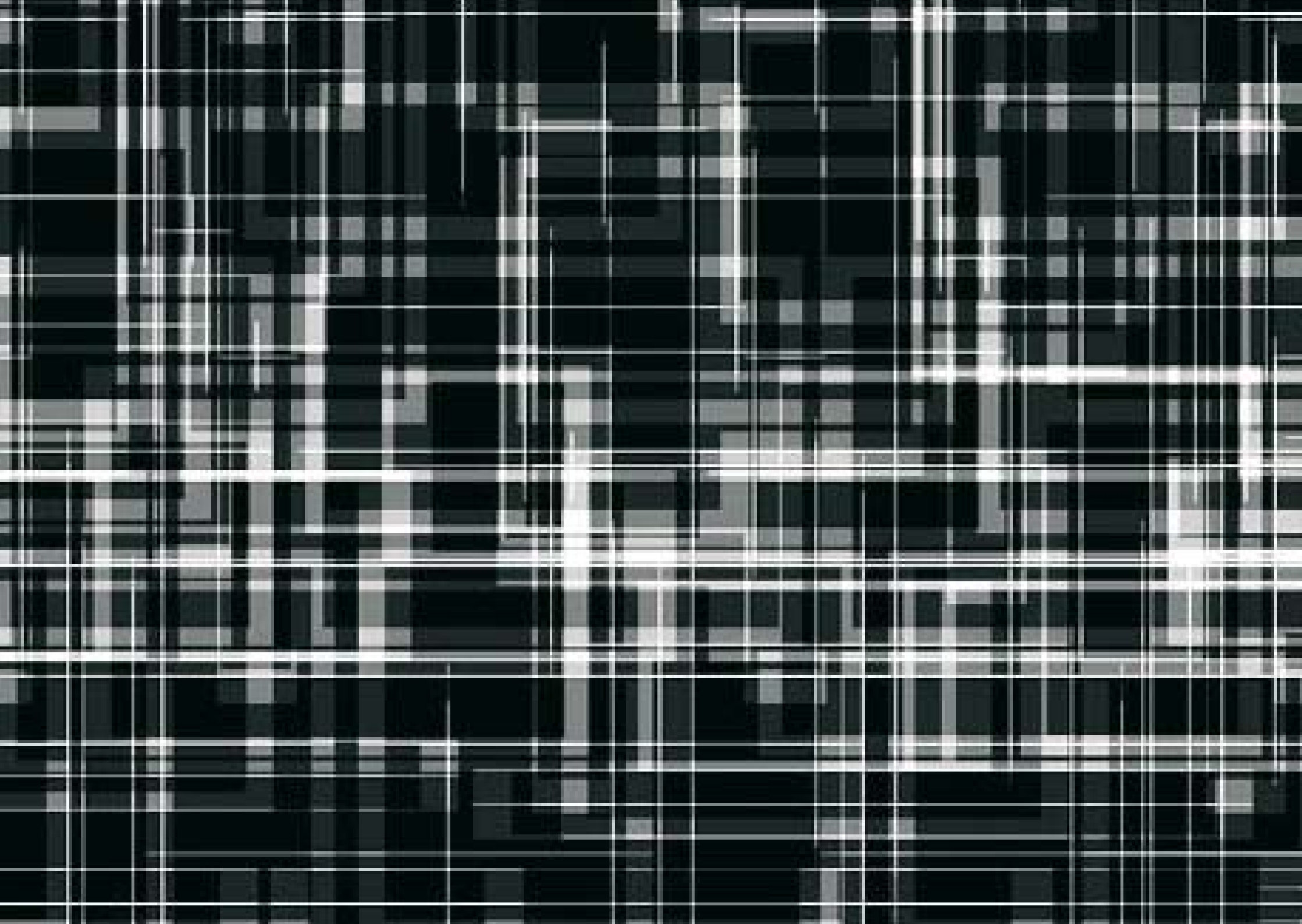


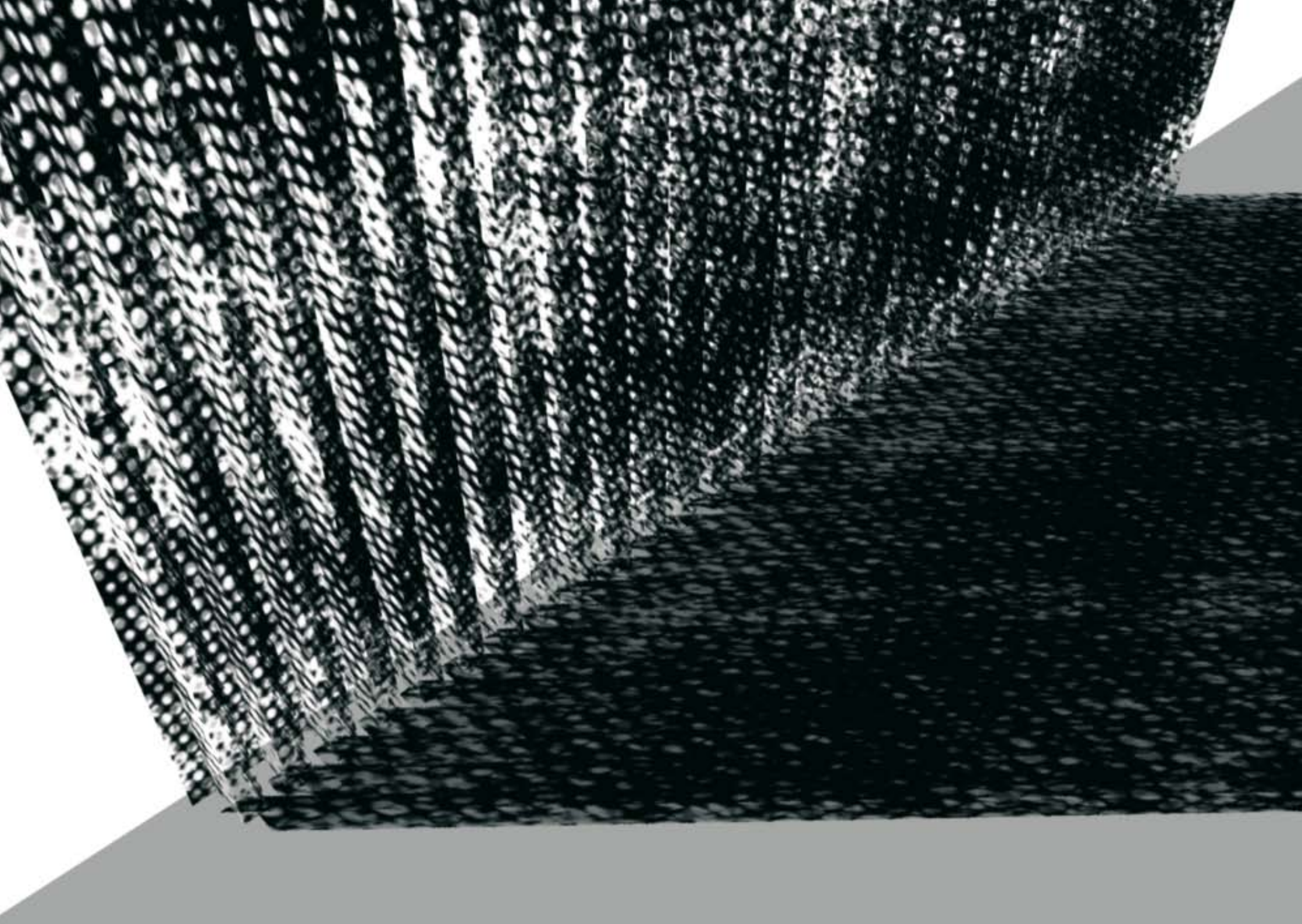
MUSICAL GRIDS AND FACADES

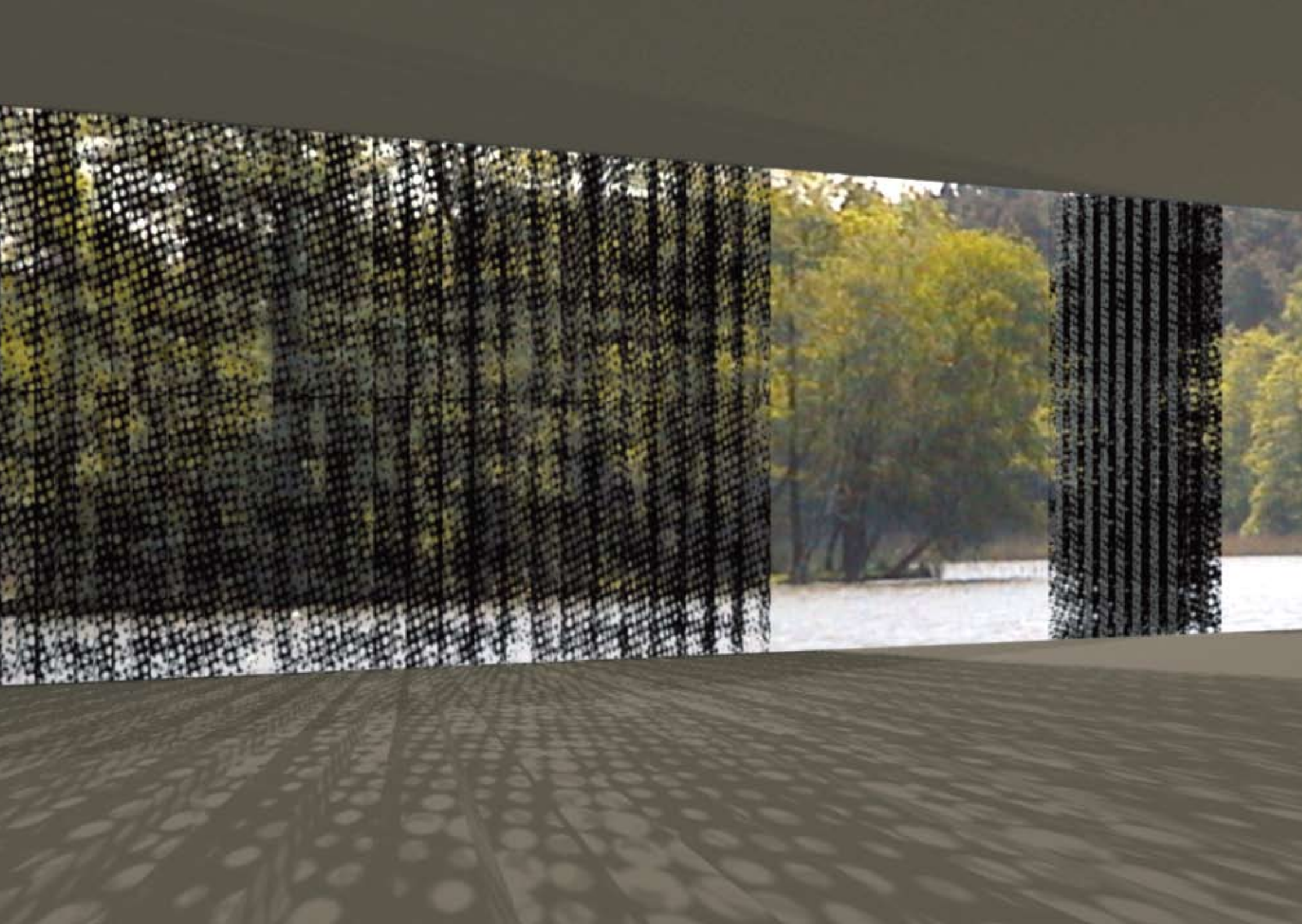


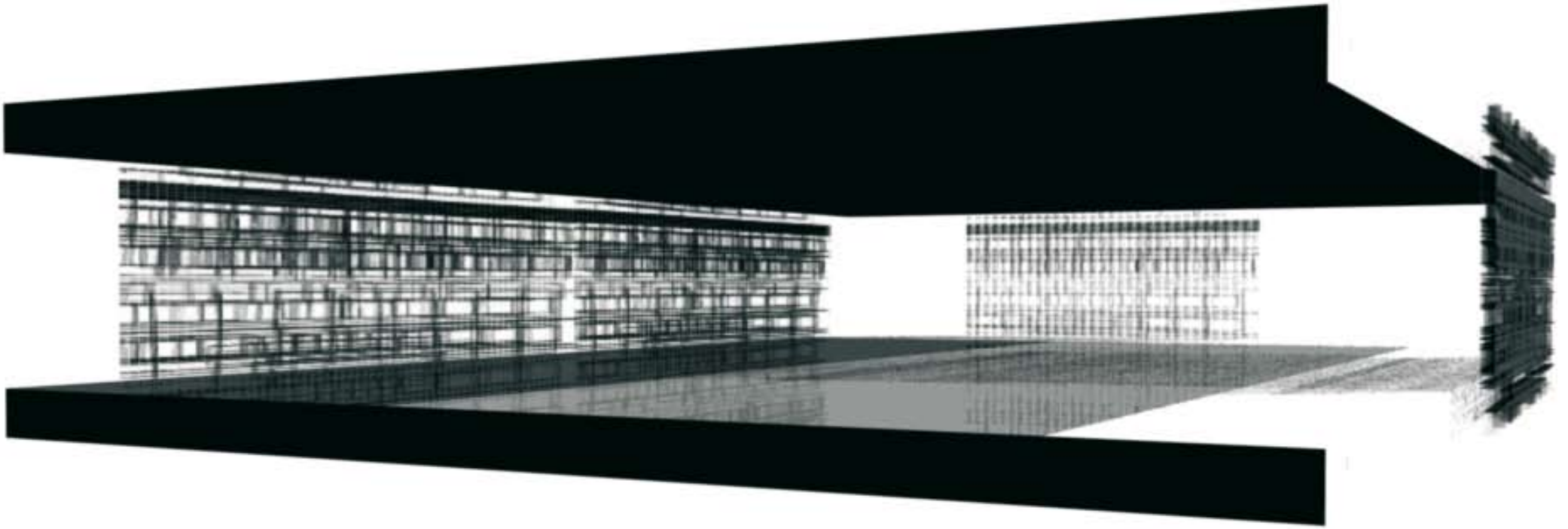


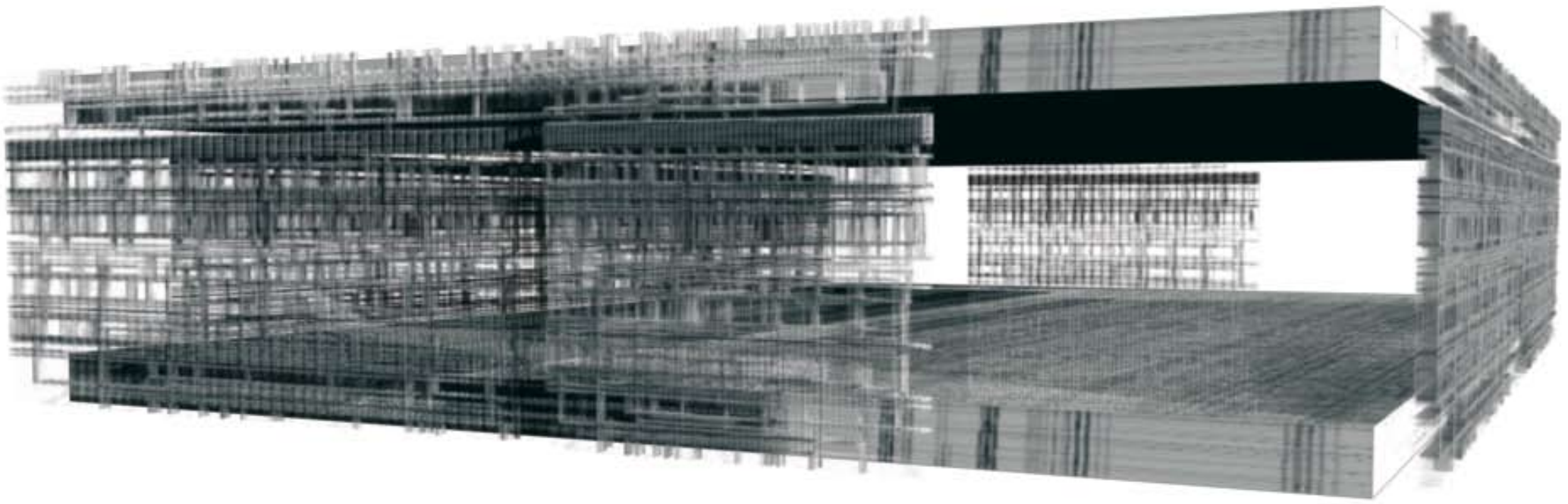












musically inspired interior elements
cnc-milled Nutwood Wall and watercut convector cover
Bar Lounge FORUM, Zurich


ZÄHLER
00:00:30
BAND
E120
ZÄHLER
00:03:58
BAND
E120
ZÄHLER
00:05:37
BAND
E120
ZÄHLER
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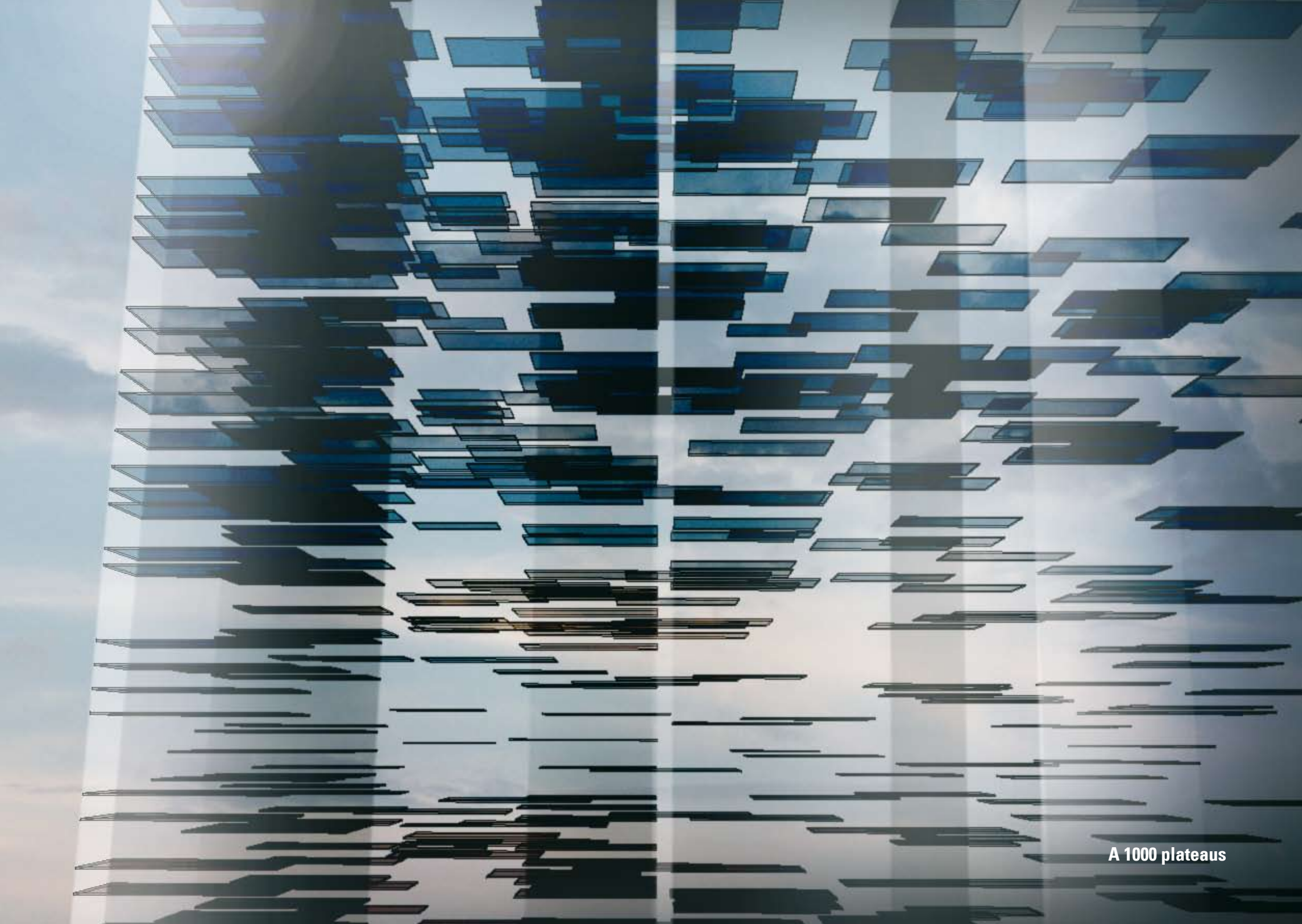
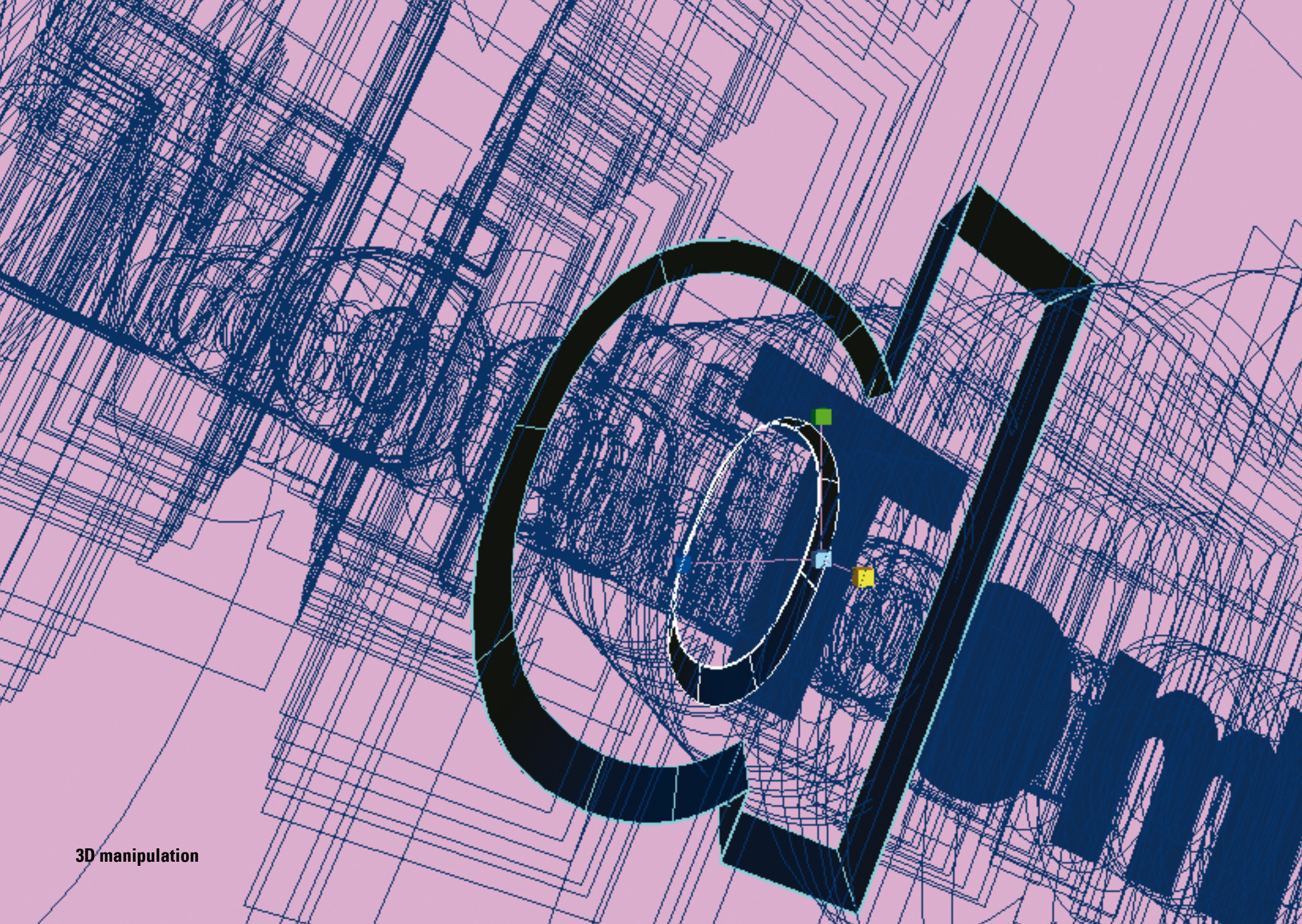
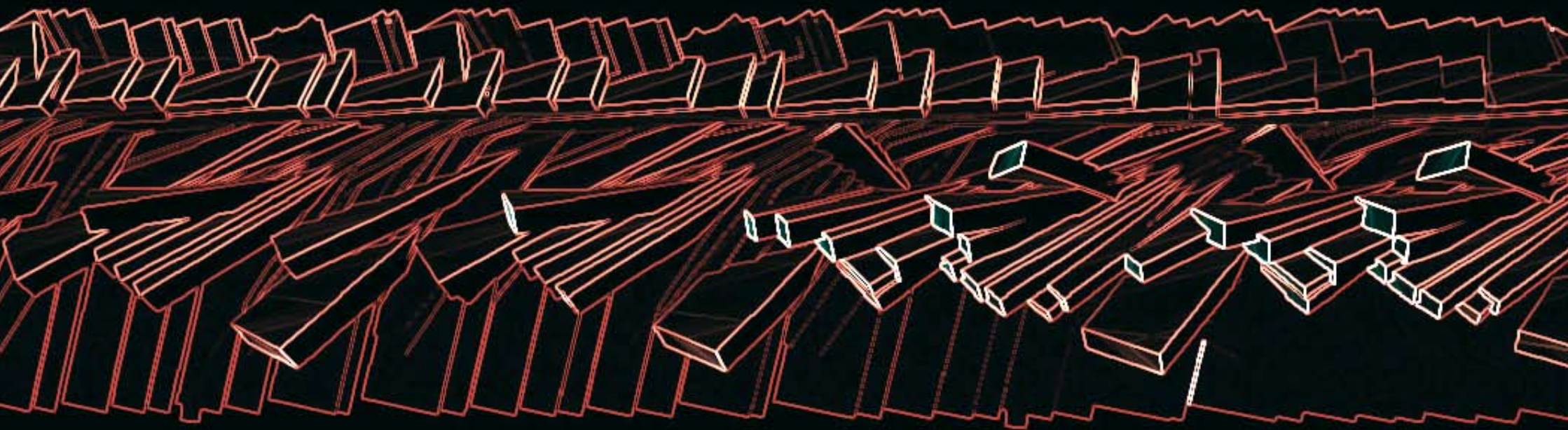
Snapshots



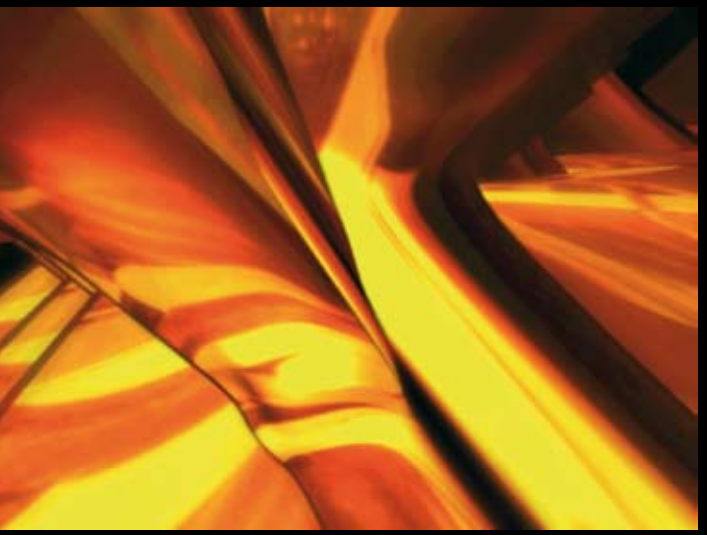
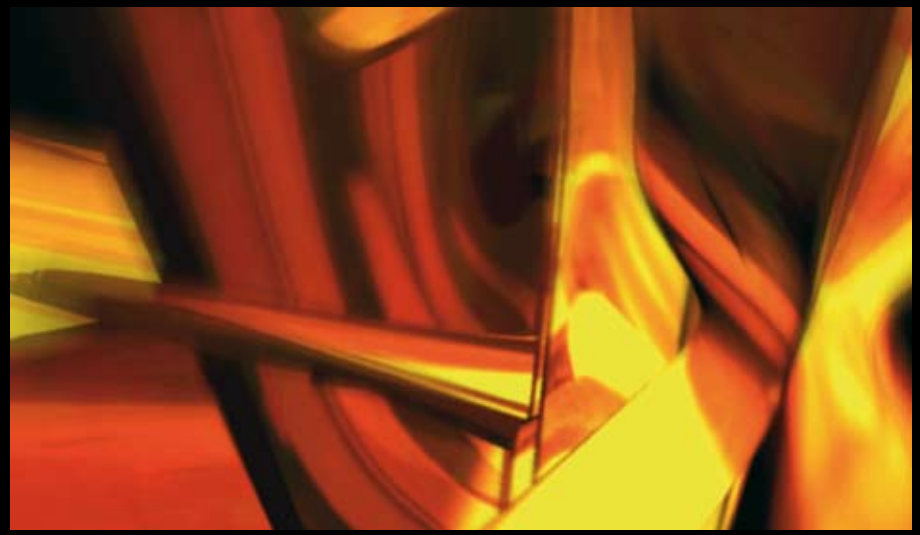
A 1000 plateaus



3D manipulation



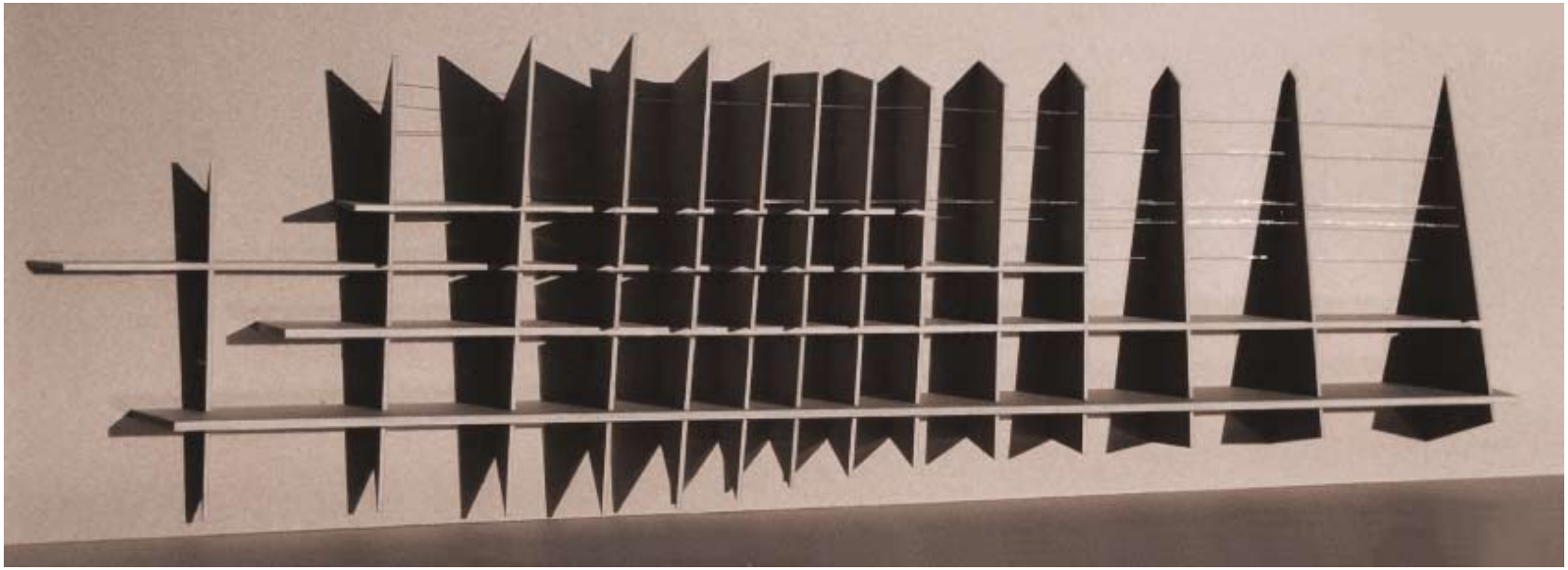
sequence of cubes

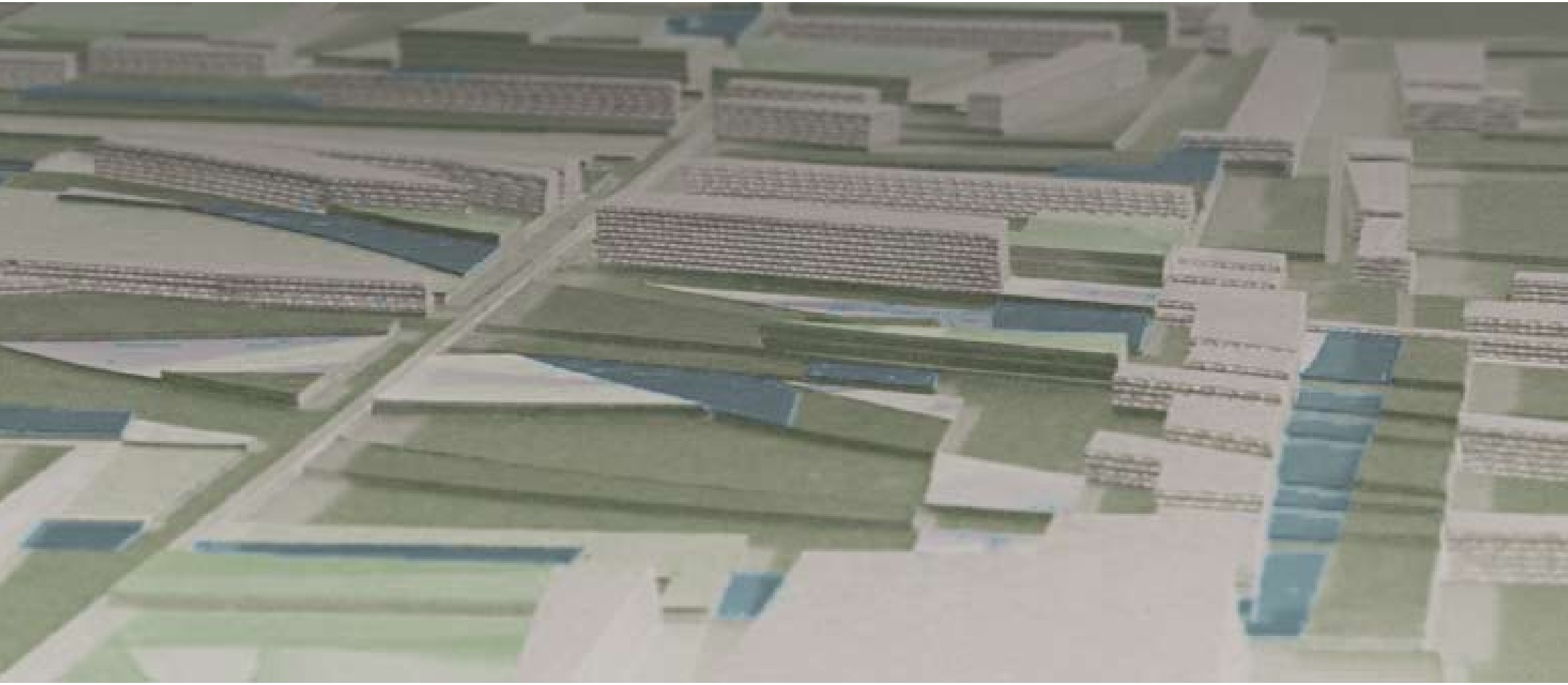

harmonic surfaces

ASSOCIATIONS

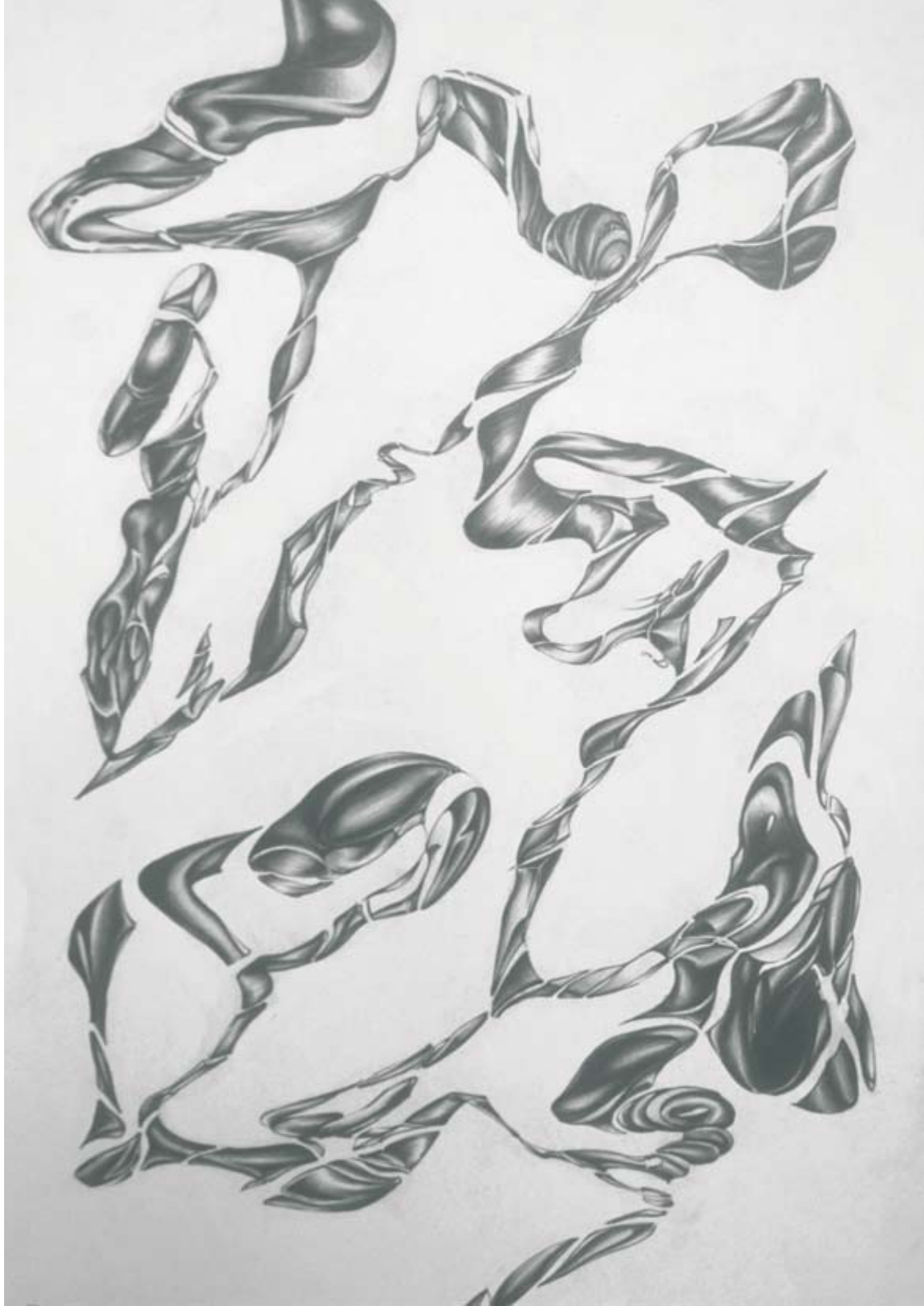
Earlier work already including musical rythm and harmony - produced before our cad-tools were available.



hanging shelves, New York City 1997



melodic landscape, Zurich 1998



melodic flows,
drawings, NYC 1997

Further Reading

„...and we‘re working on downtown switzerland“