How can architecture intervene in challenging situations? How can it influence social dynamics and give rise to new forms of activity? What are the methods, tools, and media that it uses and what roles do they play in generating new knowledge?

Taking these questions as its starting point, *Recalls, Reconstructions, Projections* explores the potential of architectural design to disrupt and transform existing systems and contexts by employing technical, aesthetic, and symbolic practices and visualization techniques. The development of new time-based media of investigation, imagination, and cooperation renders design eminently suitable for initiating actions of transgression, resistance, and collective participation.

Based on these considerations, the volume sheds light on design viewed as a critical spatial practice, knowledge creation, and form finding. The theoretical and practical contributions gathered here open up a variety of content-led and methodological approaches to the burgeoning field of media-cultural and architectural design research.

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Time-Based Design Processes in Architecure
Edited by Carolin Höfler and Matthias Karch
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PROJECTIONS

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Time-Based Design Processes in Architecure

RECALLS RECONSTRUCTIONS PROJECTIONS

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RECALLS
RECONSTRUCTIONS
PROJECTIONS

Edited by Carolin Höfler and Matthias Karch

IMD _Institute of Media and Design

Department of Architecture
Technische Universität Braunschweig
Teaching and Research Projects

Macheath, *The Threepenny Opera*

»Things can happen differently, but they happen this way too.«

INTRODUCTION

It Could Be Different: The Space of Possibilities in Architectural Design

Matthias Karch

Architectural design, especially while pursuing a degree, constitutes being constantly overwhelmed: Too many parameters that influence the design must first be recognized, considered, and processed without hierarchy or evaluation. Many of these depend on or even contradict each other. The creative design process is thus initially an almost infinite space of possibilities, and it feels very difficult to make the *right* decisions. On top of this, the more designers experience in the course of their studies, the more complexity becomes apparent. The problems are constantly increasing instead of decreasing.

It's Biographical

Teaching and research at the IMD _Institute of Media and Design at the Department of Architecture at the Technische Universität Braunschweig therefore focuses on providing students with powerful media, methods, and strategies to help them learn to cope with this phenomenon of the »equation with too many unknowns« and to gradually improve their ability to control the design process. One crucial insight is that there can never be one *correct* design. This clearly sets architecture apart from other specialist disciplines, in which a purely logical sequence of decisions based on the available facts may lead to correct conclusions and reliable results.

In architecture, it is the designer's personality that comes into play first and foremost. From the outset, it is their biographical constitution, their previous experiences and adventures, their projections, dreams, and nightmares that mark the starting point of every creative activity. This means that knowledge of the underlying complexity may still be incomplete at the beginning of the design process. However, a concrete and very precise hunch is indispensable. And it is this biographically connoted hunch that already significantly limits the scope for future design decisions. Usually happening unconsciously, it is the essential prerequisite for pointed, surprising, unexpected, and—in the best case—breathtaking designs. After all, it is only when the unique, unrepeatable personality of the designer emerges in the final design that the space of what we previously thought was obvious or even just possible is expanded into a wider realm. This is what makes a very good design. It also differentiates it from a design that is merely logically derived from the available facts and requirements.

Contingency

Contingency is the creative concept of unpredictability, uncertainty, or dependence on certain conditions or situations. It also encompasses the idea that events or states are not inevitable or predetermined, but can depend on various factors and conditions, even chance. This concept of contingency (»it could be different«) stands in contrast to logical determinism, in which events or decisions are seen as necessary, correct, inevitable, or predetermined. Applied to architecture, contingency implies that there are no recurrently correct or even universal solutions, but only a situation-dependent reaction and adaptation to the respective present time in which the design is made and to the locally prevailing conditions.

Performance, or Finding What You Were Not Looking For

What's more, if the designer is consistent enough to abandon the illusion that all it takes to create a good design is to take note of the immediately visible, quantifiable facts and organize them sensibly according to traditional procedures with regard to a determined and expected use of the building, the design will gain a key quality feature of well-functioning urban environments and efficient architecture: that of performance. When we make space for the concept of a contingent design process, the biographical intuition potential of the designer merges with the contingent aspects of chance, the unplanned, and the not necessary in a self-reinforcing way. The results are urban environments, buildings, settings, and spatial collages that are full of surprises waiting to be discovered, in which heterogeneous moods and disparate atmospheres lead you to lose yourself within them, perhaps to find something you were not even looking for, or to encounter people you might otherwise never have met.

A critical review of merely logical, coherent design decisions and allowing chance into the design process leads us, as visitors and users of such buildings, right into the heart of experiences and moods that we can always describe in retrospect as extraordinarily stimulating: Something happens to us—we are surprised, challenged, stimulated. After all, even a partial loss of control facilitates a highly positive state; wandering, letting ourselves be carried away, and even allowing ourselves to be in a controlled state of danger is often described in retrospect as an intense and enriching experience. It is precisely these phenomena of contingency that account for the allure of large or chaotic cities in

particular (Tokyo, Bangkok, Hong Kong, etc.) and which—with regard to individual buildings—can allow us to escape the banality of the all too expected and all too familiar.

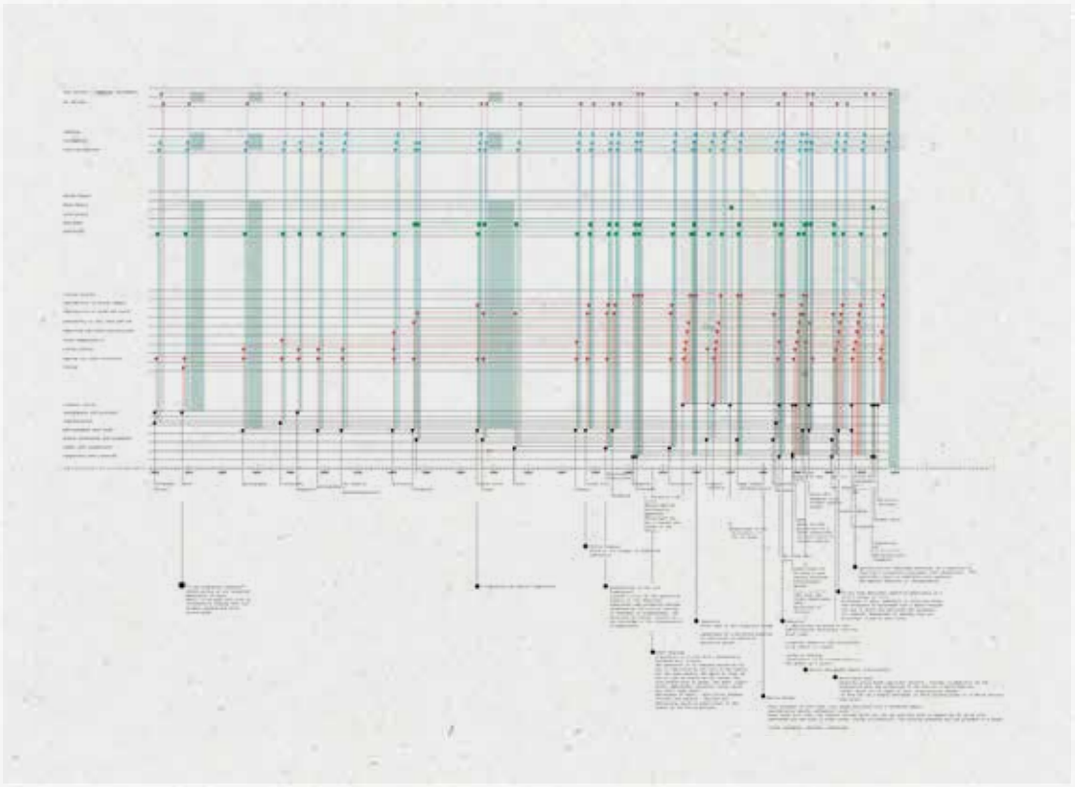
Diagramming, or the Design Events

The first and most obvious way for our team to approach this architectural quality of performance is through time-based recording systems, i.e., diagrams. These are important research tools for us at the beginning of every design process, especially when it comes to graphically recording actions that can be observed on-site and over a certain period of time. The main observational phenomena are the actions and interactions of often very heterogeneous people, both among themselves and in and with urban settings and spaces. In this design phase, the definition of specifically spatial solutions, i.e., what we would normally expect in architecture, does not yet play a role. Instead, we first analyze situations over time and then evaluate them, break them down into their individual components, and—in the sense of a dramaturgical or staged condensation—reassemble them.

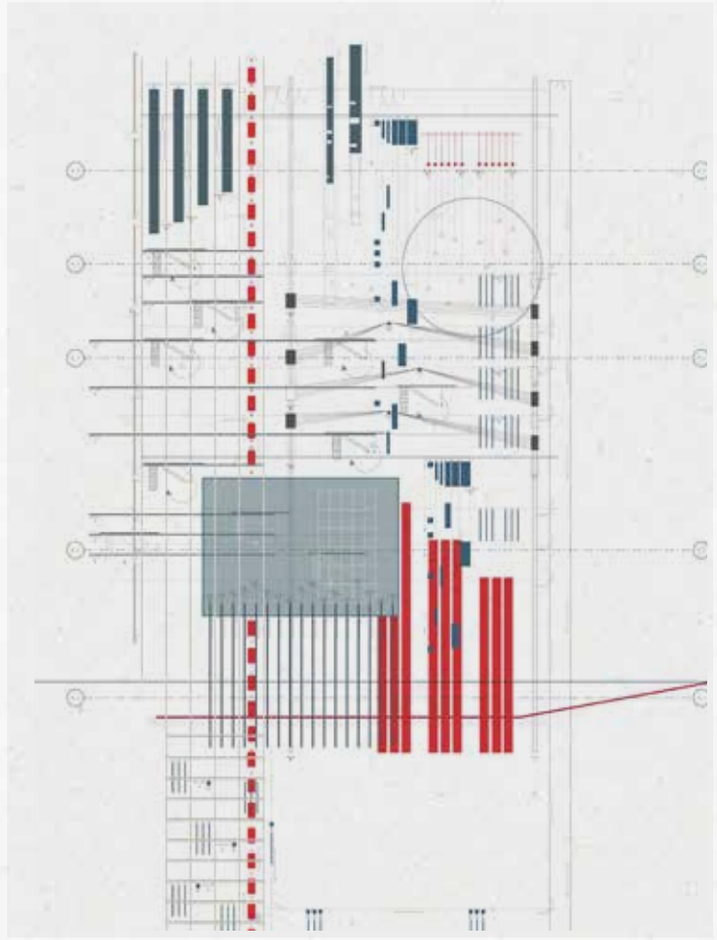
The architectural, space-creating design can then, in part, mean an almost literal adoption of these time-based research diagrams and their subsequent, abstracting spatialization. The designer—seemingly—recedes into the background as an author and the design arises from the diagrammatic approximation of heterogeneous actions that have to be organized within it. The designer does not first discover/invent and reenact spaces, but events. This strategy aims to reinforce the latent potential of the location as well as the function and programming of the building with regard to the intentional or unintentional/accidental interaction and communication of its users.

A Mechanical Ballet

One example of such a method is Darja Möhlmann's design for *The Third Space: A Center for Art and Media in Berlin.* The project is described on pages 168–175 of this book. The author examines the history of recording media and early algorithmic machines since 1800 *(Fig. 1).* Among other things, she explores the functioning of looms and church organs. What in the case of the organ uses superb craftsmanship to produce the sound of polyphonic and complex church music is translated by the author into a vertical building that can be read as a whole like a towering organ stop *(Fig. 2)*. It is a place of space-time: Floors and ceilings can rise and fall; wall elements pulled by ropes can enlarge or condense rooms. Even the vertical access via a clearly visible group of elevators is part of a constantly changing atmosphere. Similar to an organ, the designer proposes a sound collage that can be felt throughout the building, albeit subtly staged. The result is a building that is capable of constantly changing its shape and atmosphere, thus giving the purpose of this Center for Art and Media a pointed, coherent, and convincing setting; it is a mechanical ballet.



1 Darja Möhlmann, *The Third Space: A Center for Art and Media in Berlin,* IMD, 2019, led by Matthias Karch and Folke Köbberling. Research diagram.



2 Darja Möhlmann, *The Third Space: A Center for Art and Media in Berlin,* IMD, 2019, led by Matthias Karch and Folke Köbberling. Section.

A Look at »What Is the Case«

In the context of the insight that these diagrammatic recording methods are very well suited to collecting and evaluating a variety of partly contradictory information and then sharpening it in a dramaturgical sense, another factor comes into play: By looking at »what is the case« in a concentrated and unprejudiced way, designers casually dispense with their private preferences or predispositions and forget their stylistic role models. Questions of the successful composition or beauty of the design do not even arise. The paradox of this design method lies in the fact that even in the seemingly objective attempt to take a close and concentrated look and record as precisely as possible, the designer always becomes visible as an independent and unrepeatable personality.

No One Can Escape Their Biography

In this dialectical tension between conscious, laconic observation and recording, between the attempt to successively and at times literally translate these insights and spatiotemporal notations into architecture on the one hand, and the fact that the person and biography of the designer always plays a central role—albeit an unconscious one—on the other, designs are created that are both surprising and coherent. They are surprising because they allow the unique personality of the designer to shine through; they are coherent because they are based on a pointed staging of the previously latent potential of the location and the programming of the building.

Shared Authorship, or Control versus Loss of Control

A »shared authorship« becomes particularly visible when students deal with dynamic form-finding processes that integrate advanced digital tools and programs. These are particularly capable of processing and organizing a constantly growing amount of information. The previously rather static analysis of urban environments and buildings owes its privileged position solely to the fact that dynamic aspects such as movement, climate, light, acoustics, different uses, and similar factors could only be planned to a limited extent. Current computer programs not only bring these aspects together, but can also continually optimize interactive design and form-finding processes via feedback loops: During the design process, information changes the output, and this in turn changes the input.

Designers find themselves in a position in which they communicate with the programs based on intentions that are purposefully vague or ambiguous at the outset. The designer is not yet committed

to a concrete result, which is, after all, meant to be optimized by the digital media in the course of the process. Like an attentive observer, the designer needs to pay particular attention to the emergent moments. The term »emergence« refers to the concept that properties, patterns, or phenomena can occur in complex systems that cannot be derived directly or predictably from the properties of the individual parts of that system. This means that emergent properties or phenomena occur at a higher level of organization or complexity and cannot be explained simply by analyzing the components of the system. This is where designers need presence of mind, and this is where their authorship is again brought to bear: Ultimately, they decide which branch (bifurcation) should be preferred in this interactive process and which should be neglected. In such a creative process, it is obvious that the traditional concept of a »congenial designer,« who has all the inspiration necessary for a successful design in mind from the outset, has become obsolete. The architectural design process has long since become a productive dialogue between man and machine. The current technologies and tools of artificial intelligence will only intensify and accelerate this creative dialogue.

The Imperfect Form

One example of the design method of shared authorship is the project *The Imperfect Form* on pages 126–127 of this book *(Fig. 3)*. It explores the creation of time-based, fluid, and metamorphic forms with the support of the 3D animation and modeling software Autodesk Maya. The starting point of the project is the development of a scenography for William Shakespeare's drama *Twelfth Night, or What You Will.* These form-finding processes are primarily early forms. That is to say, they are created without an author, solely through the organization of physical forces such as gravity, turbulence, and non-linear deformations. In each subsequent act of the drama, the original form evolves into a complex spatial system through a continuous process of transformation. The concept behind it is that this process is never complete. Thematically, this mirrors the drama of the protagonists in Shakespeare's comedy—basically, they are all shape-shifters; no one agrees with their own identity and gender attribution. They all want to »get out of their skin.« This is why Shakespeare's text is particularly well suited to addressing the constantly changing forms of possibility or metaforms in architecture thematically and in a poetic context.

The Present Comes to Us from the Future

The processes of analytical diagrammatics and the shared authorship brought about by the digital tools described thus far are all the more powerful and relevant for architecture the more concretely they deal with sociopolitical issues and urban hotspots. This is why the IMD uses these hybrid methods above all to explicitly enter the realm of the political. Mohammad Reza Abdollahi Bidhendi's project *In Limbus: An Architectural Investigation of the Mória Migrant Camp on Lesbos* presented on pages 102–113 of this book, is an example of this research and design process, which is supported (indeed, made possible) by digital tools *(Fig. 4)*. In this project, the author examines the dramatic situation in the Mória migrant camp on the Greek island of Lesbos. His starting point was an example of a residential house in one of the countries from which people have fled to Mória. The project was created during the three-year COVID-19 crisis, so it was almost impossible to travel to the island of Lesbos to get a first-hand impression. Nonetheless, with the help of weeks of chats with those affected, local supporters, and hundreds of photographs and videos collected from all available social media, the author succeeds in accurately reconstructing not only one of the homes from which the refugees had to flee, but also the camp itself.

To create the geometry of the house *(Fig. 5)*, he used what is known as LiDAR (Light Detection and Ranging) technology, which is employed to create precise 3D maps or models of objects and environments. LiDAR systems emit laser beams and measure the time it takes for the beams to reflect off an object and return to their source. This information is then used to generate accurate distance and position information. The technology was used to precisely scan the example 67-square-meter house. In this way, it was possible to create a precise geometry with 1.3 million triangulated surfaces, the lighting of which was implemented directly in the texture file. The house and its furnishings are a typical example of a home—and a homeland—that the refugees were forced to leave due to unbearable external circumstances. How the Mória migrant camp eventually found its end is well known: It burned down almost completely on September 9, 2020, after which its residents were transferred to other reception camps. This example shows how current digital technologies and social networks can now support architectural research into political hotspots or complex urban scenarios, enabling all available data to be taken into account in the planning process almost in real time.

Participation and Exclusion

As *In Limbus* shows, our research is increasingly supporting the development of a transdisciplinary methodology concerning the relationship between participation and exclusion. We are exploring cultural and media practices, digital public spheres, hybrid spaces, and social transformation processes, not least to address the pressing issue of resources beyond global networks and their predominantly capitalist interests. Some of the questions we ask include:

- In what way are creative practices embedded in the structure of prevailing power relations?
- How can approaches for shaping future living environments be developed without running the risk of confirming pejorative constructions of race, class, gender, and ability?
- What effects do global digital platforms have on urban spaces and spatial action, and what processes of mediation and displacement do they set in motion?
- To what extent does networked communication create new possibilities for the emergence of political public spheres?

3 Fahim Mohammadi, *The Imperfect Form*, IMD, 2008, led by Matthias Karch. Model.

4 Mohammad Reza Abdollahi Bidhendi, *In Limbus: An Architectural Investigation of the Mória Migrant Camp on Lesbos*, IMD, 2022, led by Matthias Karch and Corinna Schnitt. 3D model.

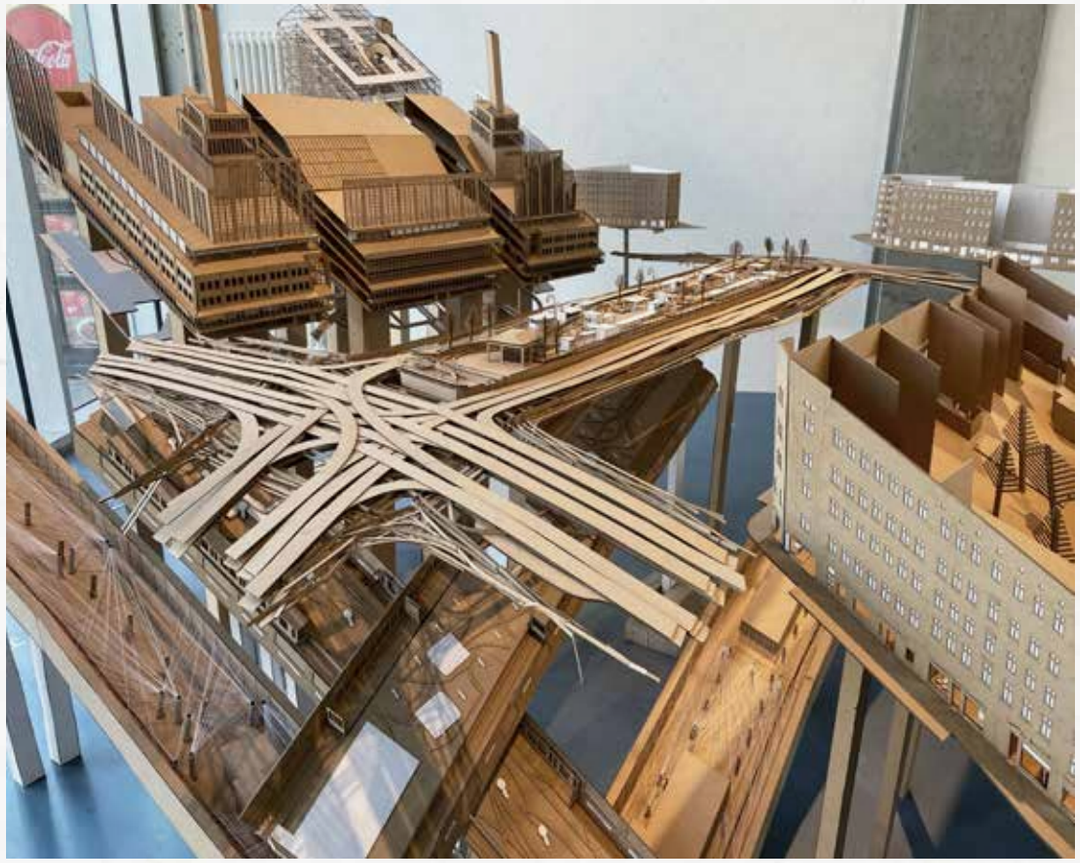
Discursive Modelings of Political Participation

Today, nearly all gatherings in public spaces are coordinated by social networks and simultaneously accompanied by digital discourses. For us architects, real-physical model constructions continue to play a central role in communication. Just as we have found that almost completely virtualized communication forced by the COVID-19 pandemic is not sufficient for successful social interaction, architectural concepts and visions are ultimately much more tangible and understandable—especially for laypersons—if they are realized three-dimensionally and physically in the model. On the one hand, the factual three-dimensionality of the model constructions, most of which are based on a concrete thesis, is immediately clear to the layperson—it is far more than abstract plan representations are capable of achieving. On the other hand, viewers have the opportunity to create a multi-perspective image for themselves by physically moving the models around.

Beyond Representation

What particularly interests us at the IMD are the unfinished conditions of these models *(Fig. 6)*. In a much more complex way than the early forms described above, which were at the center of the design process for William Shakespeare's drama *Twelfth Night, or What You Will,* they reflect a very similar phenomenon: a paradox. After all, architectural models are commonly perceived as representational models. They depict a fully designed building or a thoroughly planned urban space. Their task in communication is essentially limited to representing and making the planned building as suggestive and convincing as possible. By contrast, the *incomplete* models that we strive for and create in teaching and research display an ambivalence. They are prepared as precisely as possible with regard to the problems and issues being discussed; at the same time, they point to their own indeterminacy through a deliberately staged excess of thematic and theoretical energy that they physically embody—something that can hardly be implemented directly in the way the model presents itself in reality. This should, incidentally, not be the main concern of architectural designs, especially during the course of study. Yet, a certain intuition is visible and preserved in them, as well as a multifaceted and urgent searching that can be immediately linked to all conceivable forms of participation and social decision making. This is the paradox of these special models: Their function is not that of representation, but that of a searching motion—still fluid in thought, still uncertain—aimed at conferring a three-dimensional and yet ephemeral presence to the concrete questions and problems posed by the place.

5 Mohammad Reza Abdollahi Bidhendi, *In Limbus: An Architectural Investigation of the Mória Migrant Camp on Lesbos,* IMD, 2022, led by Matthias Karch and Corinna Schnitt. 3D model of a typical house in the Middle East.



The intense debates and protests surrounding issues such as migration, resources, and the climate crisis are examples of the interplay between activities in digital networks and the occupation of public spaces. In these discussions, those practices that make conflicts and exclusions visible (and at the same time enable alternative forms of publicity and participation) move to the center of sometimes fierce and irreconcilable debates. The fact that the collectivist, participatory, and inclusive approach outlined here is often endangered by polemical overreactions should not lead us to believe that it is not worth pursuing seriously.

6 IMD students, *NEUXKÖLLN: Reverse Modeling Berlin,* IMD, 2020, led by Nicolai Schlapps. Exhibition at CLB Berlin in cooperation with ANICOWORKING.

PROLOGUE

DRAWINGS WITHOUT MEMORY

Year	2012
Participants	IMD students
Led by	Eske Rex

Drawing Machines

A Workshop by the Artist Eske Rex

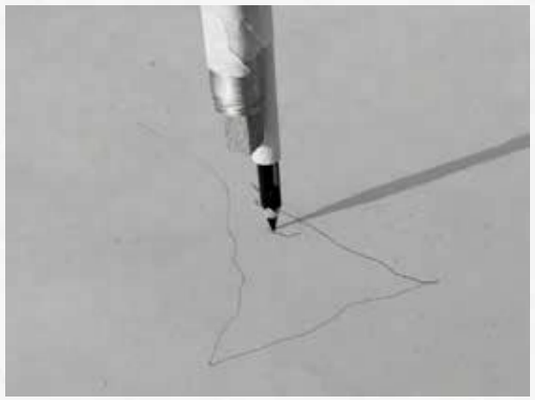
On a grand scale, expansive spirals and a myriad of intricate patterns in different colors and prints appear on oversized paper or metal plates. Once a manual endeavor in the childhoods of many, albeit on a smaller scale, Danish artist Eske Rex now uses a homemade drawing apparatus to create similarly mesmerizing effects, only on a larger canvas: Two independent pendulums are set in motion, to which a variety of drawing or cutting tools, such as pencils, pens, circular saws, and more, can be attached. The harmonious oscillations of different frequencies create captivating drawings. The device weaves intricate webs or fills vast spaces, leading the lines outward or concentrating them in the center.

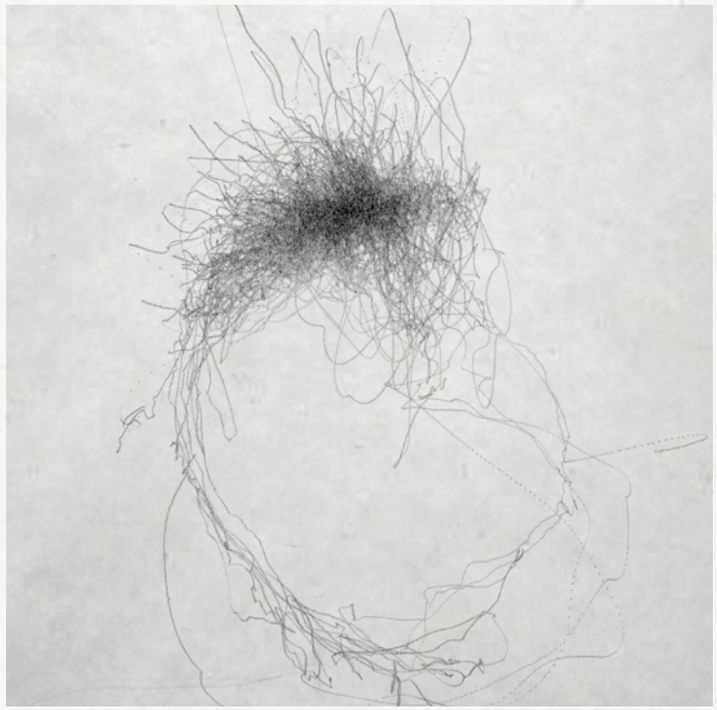
Eske Rex's patterns always exude a strong sense of momentum; the drawings emerge from the interplay of time, movement, and gravity. Nevertheless, a certain artistic freedom remains within the instrumental system, as the two pendulums never dance in perfect unison, making each image both unique and unpredictable. Furthermore, Eske Rex sees his devices as moving sculptures, proclaiming, »*Drawing Machine* is built as a moving sculpture and is a tool with which to make a series of studies about time, force, and movement.«

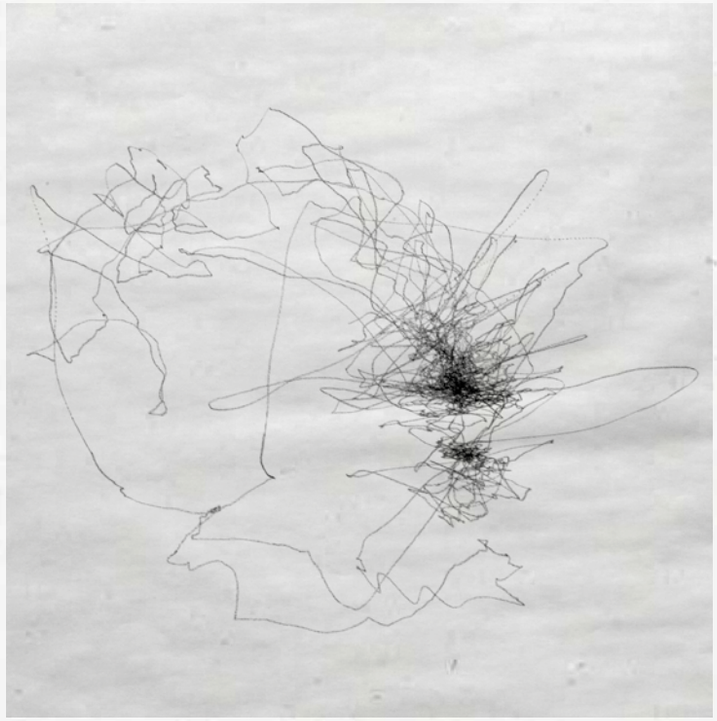
In the description of his workshop, he ponders, »What defines a drawing? What makes a drawing machine?« Throughout the workshop, participants explore the Renaissance invention known as the harmonograph, as well as Eske Rex's work and that of other artists in the field. Working in groups, students embark on a journey of research, design, and construction of their own mechanical drawing machines, using natural forces as their sole source of power. The themes of time, motion, and gravity are explored as the analog machines take shape, leading to the development of new forms of graphic expression through the beauty of natural motion.

The artist Eske Rex.

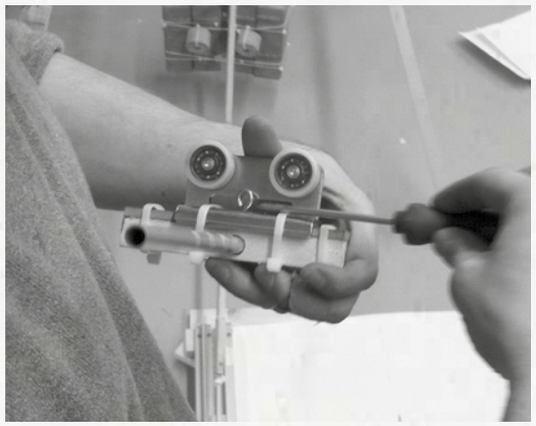
Katharina Specht
Wind-Driven Drawings

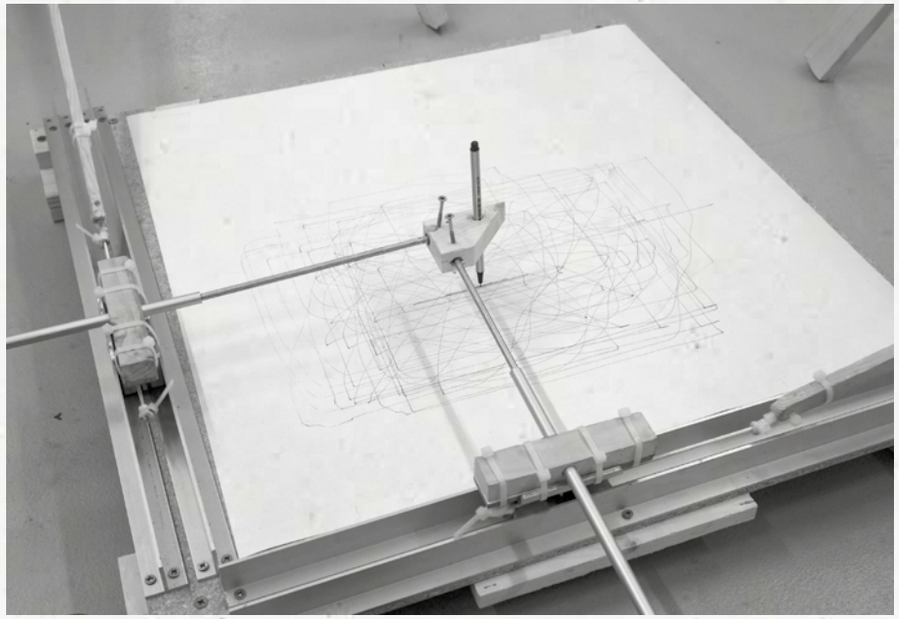






Amir Touhidi and Dave Tkaczyk
Delayed Drawings





DIAGRAMMING & DIVING

The Virtual Annulment of Distance: Drawing Arguments in Space

Philipp Reinfeld

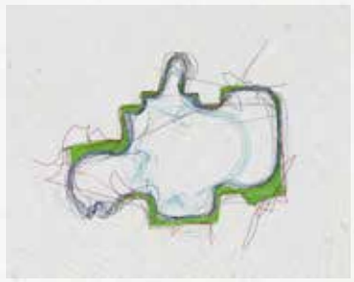
1–3 VR glasses images from the project *VR Spatial Drawing*, IMD, 2019, led by Philipp Reinfeld and Max Justus Hoven. Participants: Maximilian Goetze and Kirsten Melles.

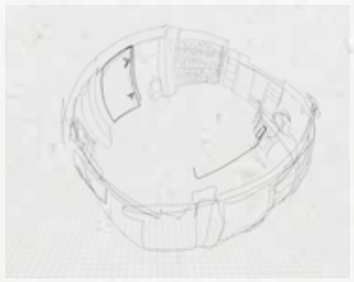
In 2016, the research focus »Architectural Design in Virtual Reality—Spatial Drawing with VR« was launched at the IMD _Institute of Media and Design at the Technische Universität Braunschweig under my direction. It aims to research and develop design practices in architecture using virtual reality (VR) technologies. With the close involvement of students, the practical and theoretical possibilities and challenges of designing virtual spaces and within virtual spaces have been under investigation ever since. The student projects presented in the following originate from courses that were created as part of this research focus. They examine the potential of real-time drawing and modeling using VR technology.

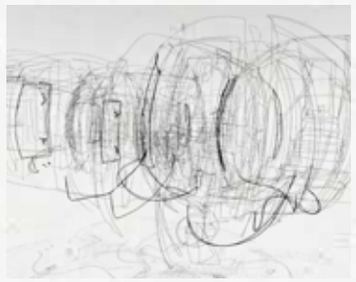
One of the key insights gained as part of this teaching/research work is the unique physicality of working with VR systems. In contrast to designing with virtual images in front of monitors, where we mainly move only our hands and work in a seated position, the entire body is involved when working with VR content. By integrating physical movement, the concrete physical environment of the design work takes on a new role. The environment is no longer the insignificant, indifferent background of scaled-down and dimensionally reduced screen work. On the contrary, the designing bodies and their surrounding space are situated in the same temporal, dimensional, scaled, and local category. A strict separation between design work and the design environment therefore seems counterproductive. Understanding the area of contact and transition between the design theme and a specific spatial context as a significant and productive arrangement offers great opportunities. This can help to shorten the distance that normally exists between abstract creative design work and the design theme.

Four Experimental VR Design Projects

The teaching and research projects were deliberately not carried out in empty laboratory environments that were as undedicated as possible, but consciously incorporated the surrounding architectural space and object context of the design work. It is important to mention that the HTC Vive VR systems used at the time did not yet have a camera-based pass-through function. In contrast to today's systems, high-quality visual interfacing with the surrounding space was not possible when wearing these VR headsets. As a result, other forms of interaction between the wearer of the headset and the spatial context had to be developed. The visually effective two dimensions of a drawing or the three dimensions of a static scale model were replaced by the characteristic four dimensions of architecture as experienced through physical use. The integrative connection of design work and the design situation formed the starting point for an explorative design work in which the architectural space is only fully defined in interaction with the human bodies acting in it. These interdependencies can be investigated and visualized through the sensorially traceable head, body, and hand movements of persons acting within a VR system.

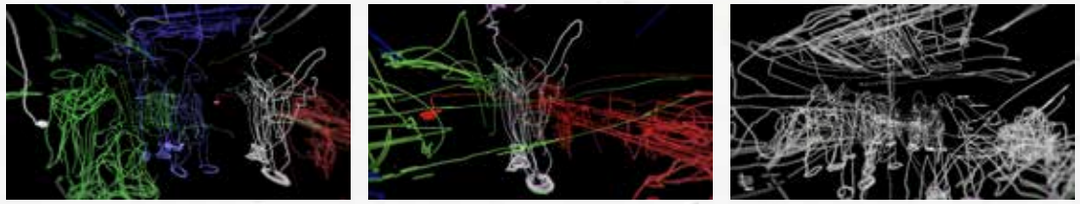






Haptic-Explorative Spatial Drawings

The inclusion of the space-forming environment in the virtual design space was achieved in different ways in the various works. One experimental spatial drawing project, for example, investigated the difference between a visual and a haptic graphic exploration of space in the VR tracking area of an HTC Vive setup. Using a VR headset in the windowless basement of the institute, the aim was to draw spatial lines with the help of the real-time VR modeling software Gravity Sketch. With their handheld trackers acting as drawing pens, students Maximilian Goetze and Kirsten Melles first traced the space-defining elements by touch and without a view of the physical space *(Fig. 1)*. Later, the VR glasses were removed so that parts of the room outside the tracking area accessible with the virtual drawing pen could also be included in the workspace. In contrast to a perspective drawing on a planar and limited image plane, the surrounding space—visually assessable in a complete body rotation from a single point of view—became visible as a kind of panoramic 360-degree spherical drawing *(Fig. 2)*. The resulting multi-perspective spheres were spatially extended based on the



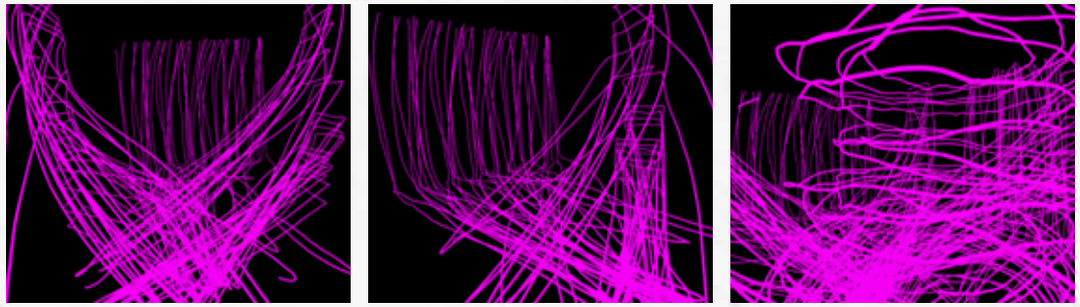
reach of the drawing arm as it rotated around its own body axis. Because the rooms in the institute's basement consist of several interconnected sub-areas that are visible in different ways (depending on the point of view in the tracking area), several panoramic drawings could be created from different positions in the room. This resulted in a system of interlocking, multi-perspective line representations of the surrounding interior space. The surrounding spaces—in actuality only visually accessible and observable from different viewpoints—were included in the accessible effective range of the VR tracking zone while simultaneously reflecting the dimensionality of the action space of a person's arms, which are oriented 360 degrees in space. By superimposing the physically accessible close-up drawings (previously created by tentative graphical means), a multi-layered spatial representation was created, the overlapping parts of which brought together different forms of experience of people physically acting on-site *(Fig. 3)*.

Other VR projects in this teaching unit focused on the dynamic interactions between several people and the surrounding architecture. *Figures 4–6* show still images of a collective drawing project in which five people trace themselves and the surrounding space with virtual drawing pens. In the course of this process, which lasted several hours, schematic representations were created in which the boundaries between physically occurring spatial elements and the moving bodies of the participating authors become blurred. Space and human bodies become entities that can no longer be clearly separated in the graphic work. The result is a different view of the space, in which the delimiting structural reality, the physical objects within it, and the people who use the space and the objects graphically coexist. This »space in use« loses its neutral character and appears as a concrete action space, which is only specifically characterized and thus defined by the people acting in it.

In the project *Collective VR Drawing,* the real-time and interactive dynamics of a physical appropriation of space were examined as a collective performative event. In this experimental VR work, additional tracking units attached to wooden sticks of different lengths functioned as pens with which different people could simultaneously draw lines in a virtual space. At the beginning of the experiment, a test person wearing a VR headset initially sees themselves surrounded by an empty black non-space. Without the test person noticing, four people holding the VR pens described above enter the VR space simultaneously. In response to a signal, the artists begin, collectively and choreographed in a coordinated way, to measure the space around the wearer of the head-mounted display (HMD) with lines (see page 46 of this book). This marks the constantly changing relationship between static elements such as walls and supports and the body of the wearer of the VR headset moving in space. Through the diagrammatic drawing that gradually develops between the person and the space, the test person realizes that their movements can help determine the development of the lineage that encloses them ever more intimately. In addition, the participant steadily gains confidence in their own movements because the boundaries of the surrounding space become more and more recognizable to them in the course of the action. The resulting drawings not only develop differently depending on the respective location, but they also differ for each round at the same location. This happens because the recorded subject-object relationship is constantly recharacterized by the test person's individual movements. Here, too, the otherwise hidden interrelationships that take place between physical action and space become visible *(Fig. 7–9)*.

All three projects emphasize, albeit with different objectives, the close connection between the surrounding space and the physical actions taking place in it, which favors creative work with VR technology on a real scale. In these project approaches, the actual drawing work largely frees itself from established methods of abstraction by dispensing with symbolically charged representations of architectural elements. They reflect spontaneous appropriations of space through drawing. Even if they have little to do with standardized construction and installation drawings in floor plans, sections, and views, the diagrammatic drawings are by no means created haphazardly, but rather within the framework of a designed set of rules. The movements may be spontaneous and formally open in their implementation, but they are not arbitrary

4–6 VR glasses images from the project *Collective VR Drawing,* IMD, 2019, led by Philipp Reinfeld with Max Justus Hoven. Participants: Haotian Chen, Alena Deiters, Valerie Dittrich, Annika Michael, and Tobias Thiel.



7–9 VR glasses images from the project *Collective VR Drawing,* IMD, 2019, led by Philipp Reinfeld with Max Justus Hoven. Participants: Jannes Beyer, Can Ciftci, Léon Dräger, Carlos González, and Ioannis Kefalas.

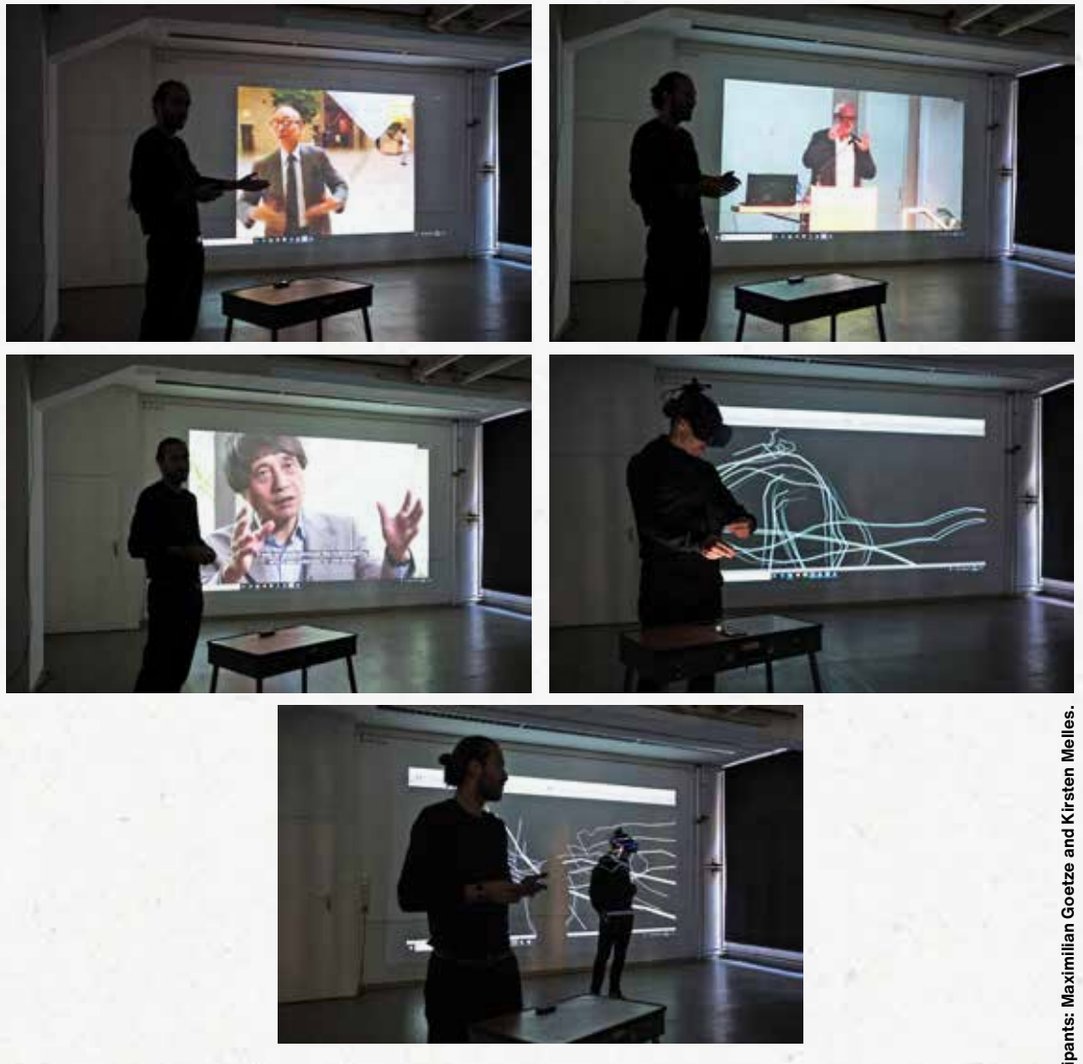
or disordered. Rather, they rely on the power of the direct participation of spontaneous physical expression in the reflection and appropriation of space. Architect and author Christian Gänshirt points out that similar methods of whole-body appropriation of space do indeed belong to an architect's repertoire:

»Especially at the beginning of a design process, where the aim is to develop a design approach from the specific conditions of a location, the physical experience of a situation is important. Only the senses and movements of the body make spatial experience possible in all its complexity. When we observe the body's movements, sensations, and reactions to a space or place, the body and its senses become an instrument of perception« (Gänshirt 2022: 12. Translation: author).

When such open-ended modes of perception become the starting point for graphic representations, these depictions convey a surplus of meaning that cannot be conclusively and satisfactorily explained in causal terms alone. The quotation from Christian Gänshirt is taken from a text dealing with Vilém Flusser's book *Gestures* (2014 [1991]), wherein Flusser examines such aesthetic surplus as one of the central moments of a variety of cultural technologies, which he summarizes under the term »gestures«: »For as the meaningful movement that it is, the gesture can in fact be explained exhaustively, but not satisfactorily, by a list of its causes: it is a ›free‹ movement, ›free‹ in just the sense that a satisfactory explanation can come only through its meaning, its future« (ibid., »The Gesture of Painting«: n.pag.). Of course, designing as a form of physical meaning creation is not a methodology that only emerged through working with VR systems. »The ability to express something with a few gestures, a few words or strokes, in which the as yet unrepresentable resonates, is fundamental to design—even without a computer« (Gänshirt 2022: 13. Translation: author). Such a spontaneous mode of expression that is not based on dimensionally abbreviated visualization, for example on sketch paper, can be a particularly effective accompaniment to linguistic expressions—especially when it comes to architecture, and thus spatial argumentation.

Communication, Gestures, and Space Creation

In one VR project, student Lukas Wichmann investigates the gestural argumentation of architects. To do so, he studied different videos in which architects gesticulate conspicuously with their hands in lectures and interviews to accompany verbal explanations of their buildings and designs *(Fig. 10–12)*. The traced hand movements sometimes resemble graphic movements in space that dynamically combine linguistic meaning and concrete spatial representation. Lukas Wichmann employed VR technology to make these fleeting and blurred patterns of argumentation visible. Specifically, he used Leap Motion, an additional sensor for VR glasses that is mounted on the front of the headset and uses infrared light to capture the movements of the user's hands and fingers. This allows hand gestures to be recognized in virtual environments and integrated into the VR experience in real time. With the help of a script extension he programmed for the Unity game engine, the movements of the hands could be transferred to the virtual space in real time. The fingertips of the hands, usually open when gesticulating, became pen tips and created continuous white lines against a neutral dark background *(Fig. 13)*. Different effects could be achieved by making small changes to the script. If the lines flowing from the fingertips remained visible in the room for a long time, the arguments created densely entangled spatial nodes, in which they continually overlapped. If the lines were set to dissolve automatically from the end after a few seconds, only the spatial traces of what had recently been said remained visible in the space. By adding a scaling factor, it was also possible to enlarge the lines, which are usually located in the radius of action of the hands in front of the person's head and body. This made them visible around the gesticulating person in an almost architectural and space-creating manner. It is an extremely striking experience, in which the spatial expression of the verbal utterances becomes



10–14 *Gestures in Space*, IMD, 2020, led by Philipp Reinfeld and Max Justus Hoven. Participants: Maximilian Goetze and Kirsten Melles.

almost physically effective. Passing the VR glasses to an outside person or integrating a second VR headset resulted in a different effect compared to this almost auto-suggestive visualization of one's own thoughts in real time. The visualization of arguments, for example about an architectural design idea, with affirmative hand gestures that surround the listener in real time, creates an exciting spatiotemporal connection between linguistic and graphic explanations *(Fig. 14)*. Interestingly, Vilém Flusser considers the fact that the keyboard and mouse are operated in front of a screen in a particularly disembodied way, with only the fingertips in motion (also referring back to the original meaning of the words »digitus« and »digit« as fingers), a key characteristic of dealing with digital artifacts (1993: 87). In the work described, on the other hand, the fingertips become the source of expansive gestures involving the motor skills of the entire body, which return the »total abstraction« of the »zero-dimensional« digital world to the physical (Flusser 1994: 21–22. Translation: author).

The gestural or pointing hand movements that can spontaneously accompany thought and speech are also at the heart of another VR project developed as part of this teaching/research focus. The project relates to the typical gestures that can often be observed between architects, specialist planners, clients, or even students when discussing a design model. The discussion of the design, its advantages and disadvantages, or alternative ideas and improvements is often accompanied by pointing hand movements on the model. The VR project makes the design available as a virtual model that can be viewed with VR glasses. The pointing hand movements of a design discussion are captured by the VR system, which in turn generates lines that transform the gestural argumentation into a sketch-like spatial drawing. What is special about the project is that the arguments of the discussants, converted into lines, are not only visible on a model scale but also appear simultaneously on a real scale around the assembled people. The typical »model gesture,« in which the audience looks down on the design in question from the outside and above, is supplemented by a schematic impression of the suggestions from the inside, from the user's perspective. The principle also works in the opposite direction: If the model of the design is not only scaled down but is also available in its original size, the viewers are simultaneously standing in front of and inside the design

model. Communication can now also take place on a real scale. The hand and body movements generate lines in real time, which appear correctly scaled down at the corresponding position in the scale model. Graphic extensions or changes within the scope of a design discussion are possible in two ways: either 1:1 in real space or within the scaled-down model of the design. Regardless of the scale at which the argument is drawn, the actions always appear in real time in both models. This makes it possible to simultaneously experience the spatial effect of a sketch in the model on a 1:1 scale, as well as to immediately check a change argued on a 1:1 scale in the model.

In the design project *Virtual Crafting—Handwerkerviertel Wolfsburg,* which was implemented in 2020 at the IMD in cooperation with the Forum Architecture and the Department of Urban Planning and Construction Consulting, Redevelopment, and Urban Design of the City of Wolfsburg in the Citizen Services Office in the middle of a designated redevelopment area, student Tilman Schumacher puts the previously developed method to the test on a real architectural issue. Residents had the opportunity to present their views on the problems in the courtyard area of the Carl Hahn School and to share their ideas and suggestions for improving the situation. For this purpose, a virtual 3D model of the schoolyard and the adjacent buildings was created, which could be viewed using VR technology. The test persons were provided with VR glasses in the Redevelopment Office, with which they could virtually position themselves in the middle of the schoolyard. In addition, a scaled-down replica of the same location hovered in front of them, the dimensions of which almost completely filled the VR area in the Redevelopment Office. To discuss the problems of the square and possible changes, Tilman Schumacher then engaged the residents, now situated in the virtual double model, in a conversation. He asked specific questions about the location, its shortcomings, and existing ideas for improving the situation. The participants were asked to illustrate their comments not only verbally but also graphically with their hand trackers in the large city model. The resulting schematic representation of their arguments on a model scale greatly supported and promoted communication and exchange. The opportunity to visualize points of view about their own living space in the debate reinforced the aim of serious citizen participation. The residents' realization that their arguments were not only visible in the scaled-down model but also in the realistic virtual environment model in which the VR users found themselves further reinforced this feeling. The fact that the spatial effects of their own analyses and suggestions could also be evaluated in terms of their urban impact significantly increased the dynamics of the debate.

Two key conclusions can be drawn from this VR project: First, it shows how arguments about architectural issues can be made spatially visible and recorded to give them more lasting weight in a discussion situation. Second, this approach drastically closes the technical distance between the architect, the client, and the residents involved. The abstractions of technical planning and its symbols and graphic abbreviations—incomprehensible to non-experts—recede into the background. Even non-experts can introduce their ideas into the professional argumentation arena of a digital 3D model without prior knowledge, thus entering into a dialogue with the experts on an equal footing. This helps to break down knowledge hierarchies and open up new communication channels, especially in processes of public participation.

»Reaching from the Present into the Future« [1]

These prototypical attempts at real-time, real-scale graphic argumentation in space using VR technology as a method of architectural design are also important in the context of the current expansion of text-, image-, and video-based digital communication platforms into virtual communication spaces. Gestural argumentation will play a greater role in this. At the same time, the intersection of real physical interiors and overarching virtual communication spaces will take on a whole new relevance and become an architectural and design challenge. The experimental projects presented here represent attempts to develop a practice of spatial, full-body architectural graphic argumentation between the real environment and its virtual extension. The use of VR technology, particularly in the context of architectural design, offers unique potential given its novelty—it is not yet associated with any established, and therefore restrictive, design methods. Vilém Flusser describes the particular openness that a new, not yet fully established (cultural) technology offers in relation to the formerly new medium of video and its associated gestures as follows:

»With traditional, familiar tools, this ›problematic‹ aspect is obscured by familiarity. [...] The new tools are fascinating because

1 Flusser 2014 [1991], »The Gesture of Painting«: n.pag.

they, more than anything else, conceal unknown virtualities within themselves and because they permit acts of emancipation. [...] This is exactly the reason video, as a tool, fascinates us. It permits us to discover potentialities unknown either to those who invented it or to those who paid for its production. And it permits us to steer its development in another direction« (2014 [1991], »The Gesture of Video«: n.pag.).

This opportunity is currently particularly relevant to the use of virtual reality technology. Flusser characterizes the central moment of the gesture, within which he also incorporates photography or painting, as follows: »The gesture not only reaches from the present into the future but also brings an anticipated future back into the present and returns it to the future« (2014 [1991]: n.pag.). This description, which he specifically relates to the »gesture of painting,« could just as appropriately be applied to a full-body (architectural) design process, which, as a multi-layered gesture, is at least as meaningful as any future structure that emerges from it. Applied to designing virtual realities within virtual worlds, physical construction would no longer be a compulsory future; instead, the *gesture of designing* would already achieve perfection in its own action.

Bibliography

Flusser, Vilém (1991): *Gesten: Versuch einer Phänomenologie*. – English translation: *Gestures,* transl. by Nancy Ann Roth, 2014, Minneapolis/London: University of Minnesota Press (Kindle eBook).

Flusser, Vilém (1993): *Dinge und Undinge: Phänomenologische Skizzen,* Munich: Hanse.

Flusser, Vilém (1994): *Vom Subjekt zum Projekt: Menschwerdung,* Bensheim/Dusseldorf: Bollmann.

Gänshirt, Christian (2022): »Von Vilém Flusser's ›Gesten‹ ausgehend: Zur Phänomenologie des Entwerfens und seiner Werkzeuge,« in: *Flusser Studies: Multilingual Journal for Cultural and Media Theory* 33, 1–19, https://www.flusserstudies.net/sites/www.flusserstudies.net/files/media/attachments/ganshirt-von-gesten-ausgehend.pdf, accessed January 1, 2024.

Year	2018–2020
Project *VR Spatial Drawing*, 2019/20	*A Real-Scale Drawing Machine* Participants: Felix Altkemper, Mats Ellerbusch, Andreas Zimmerling, and Justus Erb
	Restricted Movement Participants: Svea Grasztat, Tim Lötters, Carlotta Boelke, Sandra Hinrichs, and Valentina Leifried
	Collective VR Drawing Participants: Jannes Beyer, Can Ciftci, Ioannis Kefalas, Carlos Zamora González, Leon Draeger, and Antonia von Arnim
	Communication and Space Formation Participant: Lukas Wichmann
Project *Being a Drone—Flying Architecture*, 2018	*ICAROS—Sinking* Participants: Ahmed Kria and Niklas Labuhn
Texts	Dr. Philipp Reinfeld and Max Justus Hoven
Led by	Dr. Philipp Reinfeld and Max Justus Hoven

Drawings In Space

Architectural Design in Virtual Reality

The teaching and research focus »Architectural Design in Virtual Reality,« which was launched at the IMD _Institute of Media and Design in 2016 with the close cooperation of students, investigates the potential of VR systems for design processes in architecture. The focus was included in the »Good Teaching Innovation Program« at the Technische Universität Braunschweig in 2019/20, funded by the Federal Ministry of Education and Research (BMBF), and combines two objectives: First, researching and further developing the great potential of real-time, interactive, and collective design of architecture using VR and extended reality (XR) technology in the context of instruction. Second, exploring the fundamental changes in the role and significance of architecture in an increasingly mediatized and partially virtualized environment.

The possibility of using virtual reality to test, vary, and transform spatial conditions and arrangements intuitively and freely makes these systems ideal working environments for experimental design. When designing with a VR headset, the field of action of the body is a key category of action. The designer's own physicality becomes an essential element in the production of space. The conventional function of the architectural design as a model, as an anticipation of a future structure, partially recedes into the background compared to the design process itself. Working with a VR headset thus not only changes the representational possibilities of the results of creative activity but also has the potential to expand the design process. Thus, virtual reality can be used as a technology for visualization and representation during the design process, but it is also itself an extension of what will be understood as architecture in the future.

Due to their interactive accessibility and their real-scale physical expressiveness, VR environments create a strong sense of presence—they possess reality-constituting power. The »primary reality« of structural architecture and the »secondary reality« of the imaging design process are converging with the physically active design in, with, and of virtual space. Physically active architectural design work in virtual design spaces makes a shift in perspective possible—a shift away from the question of the *what* of a (design) object toward the *how* of its physically conditioned genesis and the methodology of an active, immersive design process. The dictum of architectural design as a bet that »it will be like this« takes a back seat to the here and now of the virtual, physically effective spatial experience. The virtual architectural design is no longer just a promise for the future, but can be experienced as a (pictorial) space without even having to be physically constructed.

A Real-Scale Drawing Machine

In this experiment, the digital space around a seated person is gradually constructed on a 1:1 scale. The viewer takes their place at the center of the three-axis drawing machine, wearing a VR headset that projects the image onto the back wall of the scene. Initially surrounded by pure white, the physical space around them gradually takes shape as its digital counterpart and, as the process unfolds, the resulting line drawing allows for an increasingly detailed digitized view of the physical environment.

The acoustics are marked by the commands of the team controlling the setup, the rubbing of rails, and the squeaking of manually operated pulleys. The timing of the axes and controls significantly affects the precision of each iteration of a drawing in space.

Restricted Movement

This performative work is based on the movement of the protagonist. A surface unfolds between the diagonally attached trackers on the hands and feet, creating a spatial diagram through the superimposition of temporal progression and body movement. Initially free and unrestrained, the space for action gradually narrows as the performance progresses.

As hands and feet are tied to the corners of the space with flexible ropes, the group partners intervene toward the end by pulling on the ropes with increasing force, creating a highly oscillating and tense surface in a state of extreme restriction. It then transitions to a person in the audience, and the process begins anew. The resulting surfaces overlap, revealing nuanced differences in the iterations of the densely compressed realm of action, this time from the perspective of an observer.

Collective VR Drawing

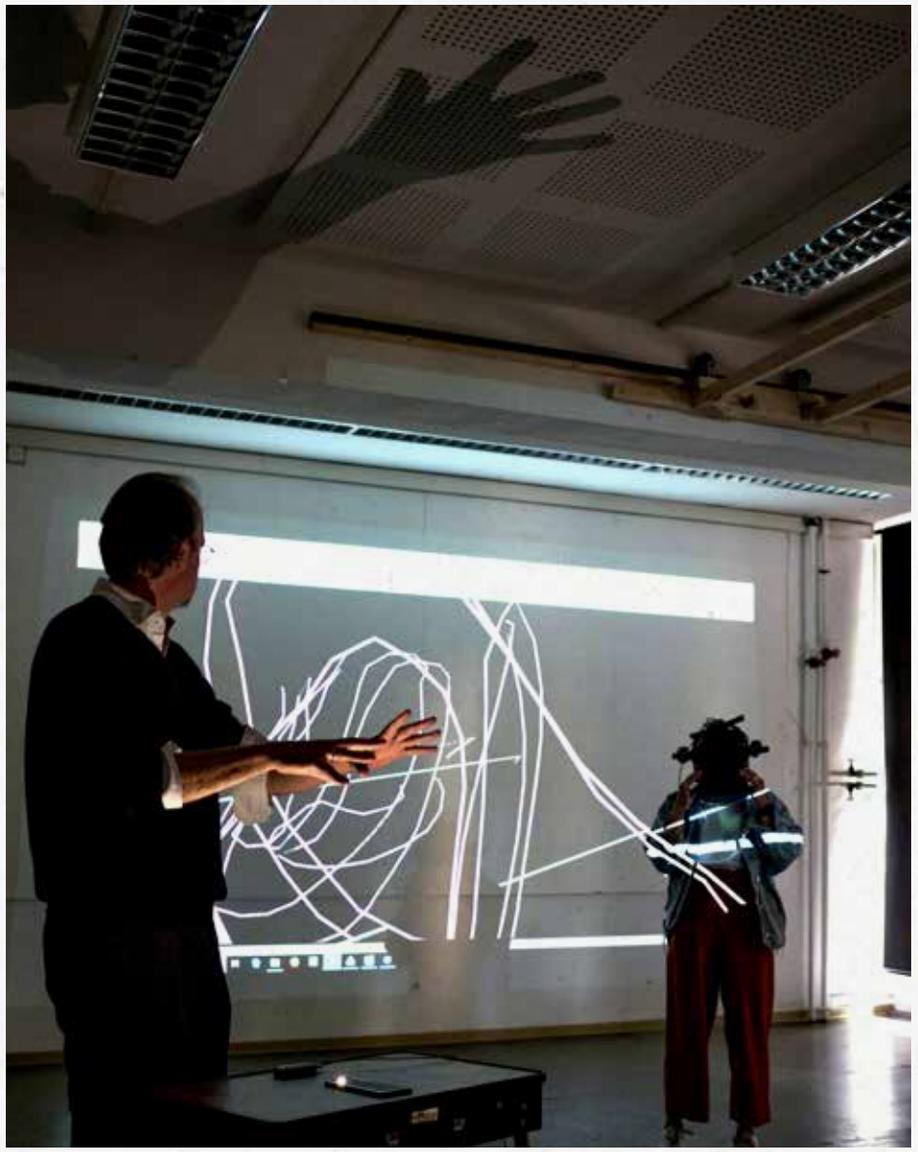
A performer puts on the VR headset and initially finds himself in complete darkness, both digitally and physically. A purple line appears in front of him, and others follow. Other participants begin to explore the volume of the physical space, rhythmically returning to the viewer. They oscillate between their respective positions and the architectural elements in the real space.

Once the basic cubature is outlined, the performance director issues commands through a sign. The lines then begin to trace the details of the environment. The performer in the VR space moves away from the initial center, unwittingly becoming a co-author of the increasingly intricate network of lines. Eventually, the lines break away from the architectural space and begin to encircle the viewer, gradually restricting his freedom of movement.

Communication and Space Formation

The work examines how people gesture with their hands when speaking—specifically in relation to architects. Lukas Wichmann watched videos of well-known architects and observed how they argued with their hands during lectures about their buildings and designs. He noticed that the gestures sometimes looked like drawing in space.

With the help of programming and using a Leap Motion Controller, he was able to transfer the gestures of his hands in real time into a VR space. His fingertips were tracked in the process, causing their movements to leave lines in space. The lines were also scaled up in real time so that a VR-glasses wearer, while listening, could step inside the space-gesturing arguments and explanations of the presenter.



ICAROS—Sinking

The ICAROS flight simulator was originally designed as a sports device. At *Futurium—A House of Futures* in Berlin, experimental VR projects are brought to life by the institute's students using this flight simulator to provide a physically novel approach to controlling VR works.

While it may seem intuitive to give the viewer complete freedom of movement during flight, the two authors decided to restrict this logic and simulate an eternal free fall: The control elements »pitch,« »yaw,« and »roll« were not assigned directional commands for navigation in the digital three-dimensional space. Instead, they are linked to various filters that distort perception. The falling person learns to maneuver through these controls in a playful manner, and the combination of whole-body input, visual perception of speed, and auditory signals creates a unique and sensorially stimulating experience.

Year	2008
Participants	IMD students
Led by	Dr. Carolin Höfler

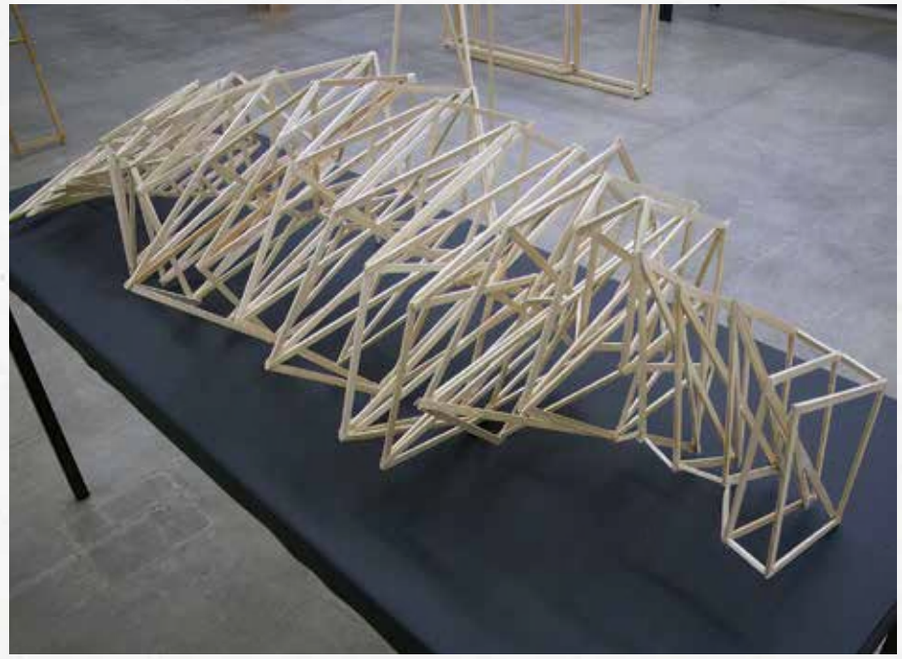
3D Timing Diagrams

Interpretations of Performative Space

The *3D Timing Diagrams* workshop explored concepts and forms of the performative space. According to the theater scholar Erika Fischer-Lichte, a performative space is one in which an event takes place (2004: 187–189). Always created in and through the event, the performative space does not exist before, after, or beyond it, and can be changed by any movement of people, objects, light, and sound. It is unstable, always in motion. The performative space opens up possibilities without determining how they will be realized. It can be used in ways that are neither planned nor foreseen. Through sketches, photographs, and video, the students observed and recorded performative processes, audiovisual events, and social interactions in urban spaces and transformed them into diagrammatic movement systems in which the movements were not dependent on the one that preceded them in time but were rather interdependent and concurrent. The resulting linear 3D structures stimulated new dynamic interpretations of the urban space and provoked designs of the city as a movement notation.

Fischer-Lichte, Erika (2004): *Ästhetik des Performativen,* Frankfurt am Main: Suhrkamp.

Presentation *3D Timing Diagrams*



Year	2012
Participants	IMD students
Led by	Prof. Matthias Karch, Christophe Barlieb, Manfred Fischer, Dr. Carolin Höfler, Katharina Puhle, and Dr. Philipp Reinfeld
With the support of	Steffen Busse, Malte Dirwehlis, Christoph Kruse, Hendrik Lindemann, and Aida Nejad

An Exhibition on Designing as Processing

The public exhibition *inForm* at the art space raumLabor in Braunschweig provides an insight into the conceptual and methodical work of the IMD _Institute for Media and Design at the Technische Universität Braunschweig. The exhibited projects show media and material experiments by students at the beginning of their architectural studies. These are based on the physical or virtual found objects of the students, in which structures, systems, and processes play an elementary role. The found materials range from graphic code structures and geo-referenced photographs from the Internet to everyday orders of things, architectural rhythms, and urban mobility systems. The drawings and objects on display emerge from the collected found objects and the structures, systems, and processes solidified in them, creating their own rules-based worlds of form. They are »in-formations« in a double sense: They contain information and give form to things. From this perspective, architectural design is understood as an ongoing medial and material process that intervenes in and changes existing structures, systems, and processes.

Carolin Höfler and students: *Time-Based Towers and Meshes*

Carolin Höfler and students
From Photograms to 3D Structures

Katharina Puhle and students
From Drawings to Reliefs

Philipp Reinfeld and students
Concept Models of Le Corbusier's Monastery Sainte-Marie de La Tourette

Philipp Reinfeld and students
Concept Models of Le Corbusier's Unité d'Habitation

Photographic Design: Topological Image-Space Relationships

Philipp Reinfeld

The Post-Photographic Age and the Flood of Images

In the mid-1990s, as the digitalization of amateur photography began its triumphant advance, media theory discussions soon speculated about an impending »end of the photographic age« (Wolf 2002. Translation: author).[1] The indexical evidentiary power of photography seemed to be losing its validity because the algorithmic manipulation of image content had reached a new level of control, with each individual pixel now adjustable. However, a »post-photographic age« (Peters 2004) did not materialize; on the contrary, the digitization of photography led to an enormous increase in the production and consumption of photographic images. Much-discussed terms at the time, such as »image flood« or »iconic turn,« as used by Gottfried Boehm, became synonymous with the various postulated shifts in image perception during the 1990s, describing the increasing infiltration of synthetic images into everyday culture (cf. Burda/Maar 2004).

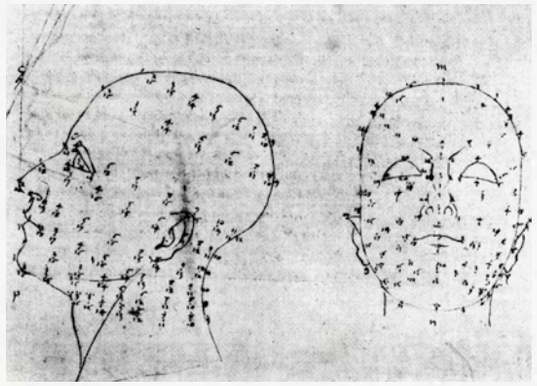
In particular, the widespread use of digital photographs on the World Wide Web has fundamentally changed the role and meaning of visual artifacts. Since the merging of cell phone and digital camera technology into smartphones, hardly anything escapes the photographic gaze. Many events are only perceived as significant when they are available in photographic form—an intensification of the phenomenon described by Susan Sontag in 1977 that experiences are only perceived as real when they are confirmed by a photograph (2005: 18). This classification of the importance of camera-based image production seems more relevant than ever in the history of photographic practices. The appropriation of the environment can hardly take place without visual and medial reassurance, without permanent multiplication on (camera) monitors. Since design work is closely linked to processes of perception and media appropriation of the environment, architectural production is not unaffected by the uniqueness of this visually mediated expanded access to the world through ubiquitous digital camera images.

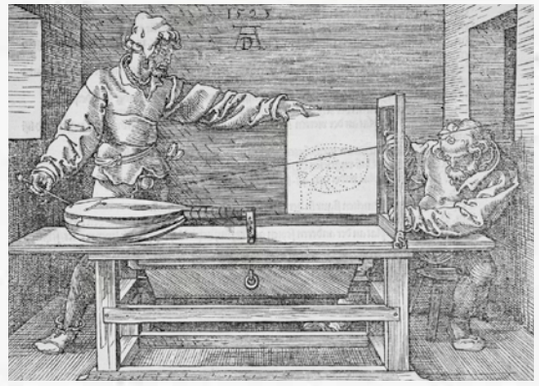
Control of Space in the Image

Connections between images and architecture are, of course, not phenomena that only emerged with the invention of digital photographic technology. An echo of pictorial logic in architectural realizations can be traced back to the Renaissance, when a systematic connection between spatial and surface orders was developed in the form of three-panel projection and perspective. The reduction of the perception of the environment to two dimensions has always been relevant for both the representation and the production of architecture. In his book *The Projective Cast* (2000), for example, American architectural theorist Robin Evans shows, on the basis of a large amount of historical evidence, how the development of perspective rules in particular has had a strong influence on the methods and results of architectural design. For example, the systematization of space in the image in central perspective, developed by Leon Battista Alberti, was particularly suitable for the realization of rectangular buildings. Geometrically more complex things that deviated from these simple architectural forms, such as vegetation and human bodies, had to be developed by drawing outside of this scheme because they could not be systematically represented within the framework of the rules of perspective: »Inside the rigid cage of central perspective they developed unbridled, graceful bodies, conceived without any recourse to geometry but directly dependent on it for the intuition of their liberated form« (Evans 2000: 135–136).

The exclusion of a large part of the natural phenomena of three-dimensional reality by Alberti's paradigmatic rules of perspective led to the development of other techniques of pictorial spatial contraction, in which this dichotomy of the graphic layout into simple (architectural) bodies and complex natural geometries could finally be overcome. By resorting to discrete image points instead of straight vanishing lines to determine the entire organization of space, it was possible, with the help of a so-called »Other Method« developed by Piero della Francesca (quoted in Evans 2000: 131), to capture in principle all conceivable forms in drawing—regardless of their geometric complexity and their orientation to the image plane (ibid.: 147–158). This type of perspective shows a striking kinship to the drawing methods developed some years later by Albrecht Dürer, which he presented in his treatise *Underweysung der Messung* (1525). In the approaches described here, a direct transfer of »values of the outside world« into values of pictorial representation takes place by transferring the spatial points of objects into the image plane with the help of apparatuses *(Fig. 1a–b)*.

1 The following article is a shortened and revised version of the German article »Fotografie und Entwerfen« (Reinfeld 2020: 120–144).





1a Piero della Francesca, *De Prospectiva Pingendi*, approx. 1472–1475. Views and aspects of the orthogonal projection of a tilted head, facsimile, Sansepolcro, Aboca Museum.

1b Albrecht Dürer, *Underweysung der Messung*, Nuremberg, 1525. Drawing machine Dürerscheibe (Dürer 1525: 181).

The concrete connection to physical reality through the »resolution of surfaces into constellations of dots« (Evans 2000: 151) can be understood as a precursor of optical methods such as the camera obscura, through which object points from the real world are geometrically transformed into points on an image plane. The fascination with photography stems from its beginnings in this »umbilical cord« (Barthes 1981 [1980]: 81) connection between image and reality.

New Camera Gestures

»What is perspective? – When a corpse only sees with one eye.«
Bruno Taut (1963 [1920–1922]: 16. Translation: author)

In his groundbreaking essay »Perspective as Symbolic Form,« art historian Erwin Panofsky distinguishes between a »perspectiva naturalis,« representing the systematics of physical vision, and a »perspectiva artificialis,« which systematizes this vision as a model in the perspective image (1991 [1927]: 35–36). According to Panofsky, the latter contrasts significantly with the constitution of the human perception of the environment during the act of seeing. Overcoming this difference between the mathematical-geometrical image construction of perspective and the individual, body-bound visual impression was not only a central motif in the development of drawing and painting strategies, but also a driving force in the genesis of camera systems. Whereas early cameras captured the world from fixed points of view due to the long exposure times required, thus confirming Panofsky's »perspectiva artificialis« with its systematic and objectifying control of space, today's camera systems no longer allow for the visual absoluteness of photographic capture to the same extent.

Taking photographs with a smartphone is far from being static or »immobile« (Crary 2002: 80) in terms of gestures and actions. Moreover, these cameras no longer use a viewfinder through the camera's optics to compose an image; instead, a display is held at a distance from the eyes. These are two completely different methods and gestures of photographic action. The one-eyed view through a camera's viewfinder requires the photographer to be able to abstract because the image is virtual and exists only in the photographer's consciousness. It becomes a real photographic image only later, after the moment of capture has passed.

In contrast, with monitor-controlled cameras, the photograph appears immediately as a visible external image. It no longer speaks of a past deferred to the future but appears as an image even before it becomes a photograph. A present moment of the act of capturing, it is as dynamic as the observed scene on the other side of the camera. While Roland Barthes characterizes the traditional functionality of a photographic image with the dictum »That-has-been« (1981 [1980]: 80), media theorist Kathrin Peters, on the other hand, refers to the handling of spontaneously captured camera images as the »processing of momentariness« (2004). Since the live monitor image of a digital camera is part of the photographer's action space, it can trigger a creative, playful, and even performative immediacy both in front of and behind the camera, reversing the originally distancing basic tendency of visual functionality. Instead of merely looking *through* the monitor image to the visible subject, if it is understood as an active element that influences the development of the scene, a mutual dynamization between photographer, image, and scene can occur. The monitor image then acts as a hinge between the scene and the future photograph. The art historian and media theorist Hans Belting first saw such a fusion of live image, camera, and motif in the display-controlled video camcorders of the 1990s (2001: 82–83).

The lasting effect that the integration of camera technology into the smartphone has had on the functionality of the photographic image can be seen by comparing photographs that appear for

2 The first 56 photos that appear in an Internet search for the term »Potsdamer Platz« on different platforms. From left to right: Google Image Search, Tumblr, Flickr, Facebook, Instagram. Laura Brüggemann and Janna Hinzpeter, IMD, 2014.

the same search term on different online photo platforms: In a student analysis from 2014, the photographs listed on the then widely used photo platforms for the search term »Potsdamer Platz« were sorted in a table from top to bottom in relation to the image width (the size of the photographed sections of space) visible in the photographs. It became clear that on communicative photo platforms such as Instagram (which went online in 2010 as a smartphone application), much narrower sections of the place are visible in the image, in which experiences with friends are staged to fill the format, while the space where the event took place and its architectural appearance are barely visible *(Fig. 2)*.

The photographs illustrate the profound transformation of their role from a rather passive documentary medium to an active, contemporary, and everyday means of communication. This evolution toward individualized photographic perspectives on the world is undoubtedly the culmination of a long process. The origins of private, non-professional photo production date back to 1890, when George Eastman introduced a series of easy-to-use, lightweight, compact, and affordable handheld cameras under the name »Kodak.« Prior to the advent of these camera systems, photographs were primarily consumed by individuals rather than taken by them. In the context of this individualization of photographic tools and the concurrent development of tourism, a »visual longing« emerged that focused on the acquisition and evaluation of the environment through visual aspects (cf. Oettermann 1980). As defined by historian and tourism scholar Cord Pagenstecher, this new way of seeing transformed a site into a sight. »Sightseeing« emerged as a convergence of »seeing the sights« and »visiting attractions,« giving rise to the concept of the »touristic gaze« (Pagenstecher 2006: 169–187. Translation: author). The parallel development of production and marketing strategies in the photography and tourism industries further strengthened the link between the leisure activities of travel and photography. Both sectors established standardized visual representations of tourist destinations, leading to a growing normalization of what and how to photograph. Architectural photography also played an important role in this context.

3 Ezra Stoller, *Fallingwater, Frank Lloyd Wright, Bear Run, PA*, 1971. Photo © Ezra Stoller/Courtesy of the Yossi Milo Gallery, New York.

In conventional photographic representations of architecture, the camera image functions as an open window into a seemingly present reality. A widely recognized image among architecture enthusiasts is Frank Lloyd Wright's *House Fallingwater,* particularly the iconic 1971 photograph by Ezra Stoller, which captures the house from a lowered perspective with the titular waterfall in the foreground *(Fig. 3)*. This photograph not only represents one possible view of the building, but has itself achieved the status of a universally accepted representation of the structure. If you type »House Fallingwater« into Google's image search function, you will see an overwhelming number of photographs reproducing this iconic shot of the site *(Fig. 4)*. It seems that the direction of photographic meaning has been reversed. Photography is no longer a second-order appearance or derivative of something existing in reality; instead, reality is measured against the normative truth of a repeatedly reproduced iconic photograph.

4 Google Image Search for the term »House Fallingwater,« accessed June 15, 2015.

Photographic Spatial Constructions

By looking through the surface of hundreds or thousands of such photographs to the underlying common subject, the three-dimensional structure of the place, captured from slightly different angles, can be computationally reconstructed. What is remarkable about the reconstruction of spatial data for a virtual 3D model is the computation of the photographer's shooting positions and perspectives, which become visible as a kind of compressed time-space of photographic action *(Fig. 5)*. The abrupt ends and gaps in the resulting three-dimensional visualizations forcefully reveal the limits of the visitor's »photographic interest« in a place. In addition, the three-dimensional reconstructions lack all the dynamic aspects of a place that change over time because they are filtered out during the computational process and disappear in the resulting 3D model. The computational approach thus produces an »average space« in which the »photographic surplus« present in each shot is lost:

»The whole paradox of popular photography is revealed in its temporal dimension. An instant incision into the visible world, photography provides the means of dissolving the solid and compact reality of everyday perception into an infinity of fleeting profiles, in order to capture absolutely unique moments of the reciprocal situation of things [...]« (Bourdieu 1990 [1965]: 76).

The individual temporality embedded in the photographs remains inaccessible through the algorithmic procedures of mere summation of monocular perspectives. The aim of the photogrammetric process is not to integrate conflicting statements about a scene into a realization of difference, but rather to reduce the heterogeneous visual approaches to a singular (architectural) truth. The unprocessed »iconic difference« (Boehm 2011: 170–176. Translation: author) of each individual image becomes apparent through the gaps and breaks in the resulting 3D models. These specific temporal deviations between the photographs remain hidden because they are not sufficiently confirmed in the »neighboring« shots.

Photo-Topological Image-Space Relationships

The research documented in the following pages aims to explore alternative methods of inferring the visually stored aspects of a place through photography. It is an approach in which individuality, ambiguity, blurriness, temporal variability, and performativity—all those characteristics that make the photographic image so distinctive and significant in the sense of Roland Barthes's »punctum« (1985 [1980]: 96)—are not lost, but become an integral part of a multi-photographic scenery.

The research project attempts to show ways in which architectural design can be initiated within a field of topological image-space entanglements that exceed the traditional genius loci in terms of (medial) complexity. Through diagrammatic investigations of visual features in a group of photographs and the incorporation of extrinsic photographic perspectives, places can be described beyond their static spatial and architectural attributes. In the resulting relational drawing systems, the absolute geometric or geographic fixations of subjects and objects and their temporal absolutes become less important than the vectorial determinations of the relationships that exist between them. The spatial and temporal rigidity of the subject-object relationships that dominate in a singular perspective can be overcome by an integrative consideration of a multitude of individual perspectives, as network-like connections between multiple *heres* and multiple *theres* become describable.

In the context of urban spatial issues, media theorist Stephan Günzel distinguishes between a topographical perspective oriented toward geographic absolutes and a topological perspective oriented toward relationships with the environment. The topological perspective is characterized by an »abstraction of materiality« (Günzel 2008: 9. Translation: author). If today's circulating online photographs are to be used as a methodological moment in architectural design, then the topological relationships that can be discovered or created between different levels of meaning in a group of photographs take center stage. The directedness of perspective and its inherent effective »objectification of subjectivity« (Panofsky 1991 [1927]: 66), already largely subverted by the performative gestures of modern smartphone photography, can be definitively transcended in topologically referenced image clusters in favor of more open subject-object constellations.

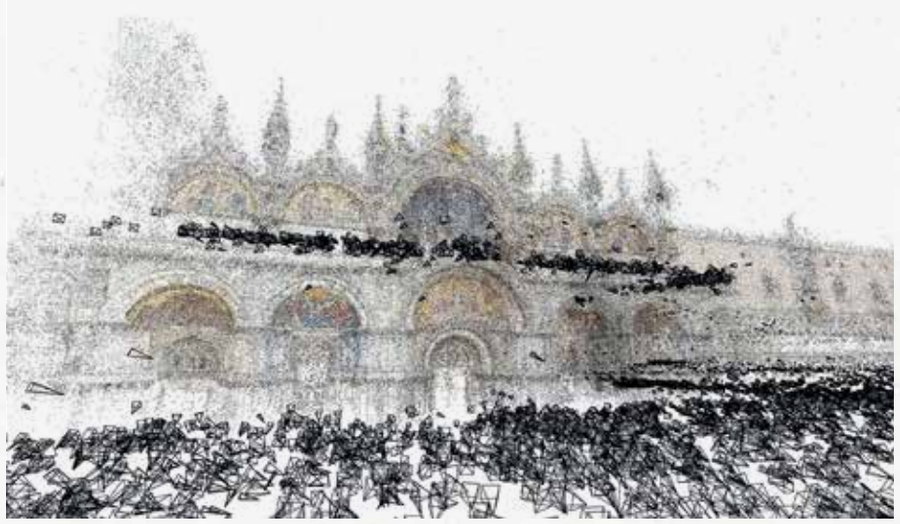
In topological-diagrammatic image graphs of a photo collection, the »virtual relationships« of the perceptual acts of those photographing at the site can be integratively visualized. The photographic multi-perspectivity of a place allows it to be described as a field of relationships. The latent intercrossing between a perceiving subject and the things brought into view through photography in each camera image can also be constructed as an »exchange of views« between multiple shots. The photographs mediate between seeing and being seen, between subject and object, between image and space. The architectural aspects of a place are no longer isolated external geometries, but become an inseparable part of a scenic description that would not exist without the photographing subjects who make them appear.

5 3D simulation of the Piazza San Marco in Venice consisting of 4,515,157 points calculated from 14,079 photos from Flickr. The black pyramids show the back-calculated shooting positions and viewing directions of the photographers. Sameer Agarwal/Keith Noah Snavely/Ian Simon et al. (2009–2011): »Building Rome in a Day,« in: *Grail,* http://grail.cs.washington.edu/rome/, accessed January 1, 2024

Scene Design Instead of Scene Reconstruction

The topological description of the manifold connections of a place on the basis of a multitude of photographic images does not have to remain on the two-dimensional, diagrammatic level. Even if the methodological approach of the projects does not aim at a geometrically exact reconstruction of architectural structures, the three-dimensional materialization of complex spatial relationships can lead to very intriguing proto-architectural models. The materialization of the diagrammatic photo analysis reveals a spatiality in which the mediality of the perception of the place is not hidden but rather visibly emphasized. In such models, the diverse spatial potential hidden in each photograph unfolds as architectural design potential. Through a photographic and media analysis that refers to reality, that is, to the architectural »inventory« and its users, a spatial transformation can be achieved that goes beyond the scope of analysis, which in turn can serve as a starting point for architectural concretization.

Just as the reception of parts of the environment has expanded to include traditional media such as television, resulting in a »media pressure« that affects real spatial effects—such as the TV (studio)-compatible reconstruction or construction of sports stadiums (Reinfeld 2018: 32–38)—the online image media that now thoroughly shape us will also inscribe themselves in the use and construction of future environments. To faciliate acting as architects in this process of a media »in-formation« of the environment, the projects of the research focus »Image-Based Architecture« were launched.



Bibliography

Barthes, Roland (1980): *La chambre claire: Note sur la photographie.* – English translation: *Camera Lucida: Reflections on Photography,* transl. by Richard Howard, New York: Hill and Wang, 1981.

Belting, Hans (2001): *Bild-Anthropologie: Entwürfe für eine Bildwissenschaft,* München: Wilhelm Fink.

Boehm, Gottfried (2011): »Glossar. Grundbegriffe des Bildes: Ikonische Differenz,« in: *Rheinsprung 11: Zeitschrift für Bildkritik* 1, 170–176.

Bourdieu, Pierre (1965): *Un art moyen: Essai sur les usages sociaux de la photographie.* – English translation: *Photography: A Middle-Brow Art,* transl. by Shaun Whiteside, Cambridge, UK: Polity Press, 1990.

Burda, Hubert/Maar, Christa (2004): *Iconic Turn: Die neue Macht der Bilder,* Cologne: DuMont.

Crary, Jonathan (2002): »Die Modernisierung des Sehens,« in: Herta Wolf (ed.), *Paradigma Fotografie: Fotokritik am Ende des fotografischen Zeitalters, Band 1,* Frankfurt a. M.: Suhrkamp, 67–81.

Dürer, Albrecht (1525): *Underweysung der Messung, mit dem Zirckel und Richtscheyt, in Linien, Ebenen und gantzen corporen,* in: *SLUB Dresden,* https://digital.slub-dresden.de/werkansicht/dlf/17139/1, accessed January 1, 2024.

Evans, Robin (2000): *The Projective Cast: Architecture and Its Three Geometries,* Cambridge, MA/London: MIT Press.

Günzel, Stephan (2008): »Topologie und städtischer Raum,« in: *der architekt* 3/8, 8–10.

Oettermann, Stephan (1980): *Das Panorama: Die Geschichte eines Massenmediums,* Frankfurt a. M.: Syndikat.

Pagenstecher, Cord (2006): »Reisekataloge und Urlaubsalben: Zur Visual History des touristischen Blicks,« in: Gerhard Paul (ed.), *Visual History: Ein Studienbuch,* Göttingen: Vandenhoeck und Ruprecht, 169–187.

Panofsky, Erwin (1927): »Die Perspektive als ›symbolische Form.‹« – English translation: *Perspective as Symbolic Form,* transl. by Christopher S. Wood, New York: Zone Books, 1991.

Peters, Kathrin (2004): »Instant Images: The Recording, Distribution and Consumption of Reality Predestined by Digital Photography,« in: Dieter Daniels/Rudolf Frieling (eds.), *Media Art Net,* http://www.medienkunstnetz.de/themes/photo_byte/instant_images/1/, accessed January 1, 2024.

Reinfeld, Philipp (2018): *Image-Based Architecture: Fotografie und Entwerfen,* Paderborn: Wilhelm Fink.

Reinfeld, Philipp (2020): »Fotografie und Entwerfen,« in: Christophe Barlieb/Lidia Gasperoni (eds.), *Media Agency: Neue Ansätze zur Medialität in der Architektur,* Bielefeld: Transcript, 120–144.

Sontag, Susan (2005 [1977]): *On Photography,* New York: RosettaBooks.

Taut, Bruno (1963 [1920–1922]): *Frühlicht 1920–1922: Eine Folge für die Verwirklichung des neuen Baugedankens,* Berlin/Frankfurt a. M./Vienna: Ullstein.

Wolf, Herta, ed. (2002): *Paradigma Fotografie: Fotokritik am Ende des fotografischen Zeitalters, Band 1,* Frankfurt a. M.: Suhrkamp.

Year	2017
Participants	IMD students
Texts	Dr. Philipp Reinfeld
Led by	Dr. Philipp Reinfeld

Photo-Based Architecture

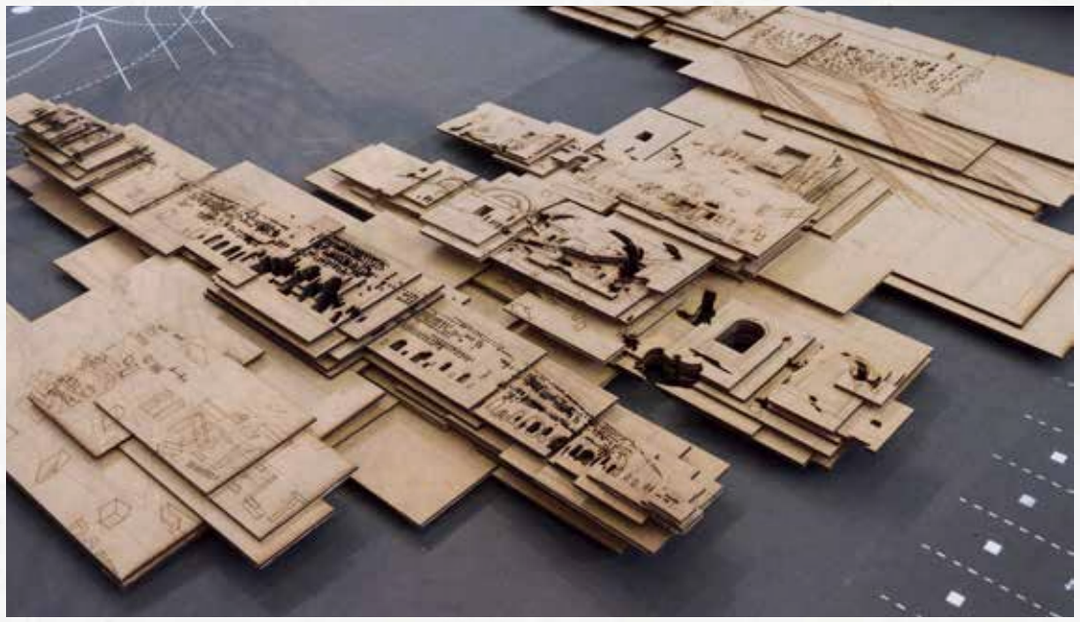
An Exhibition on Designing Virtual Realities

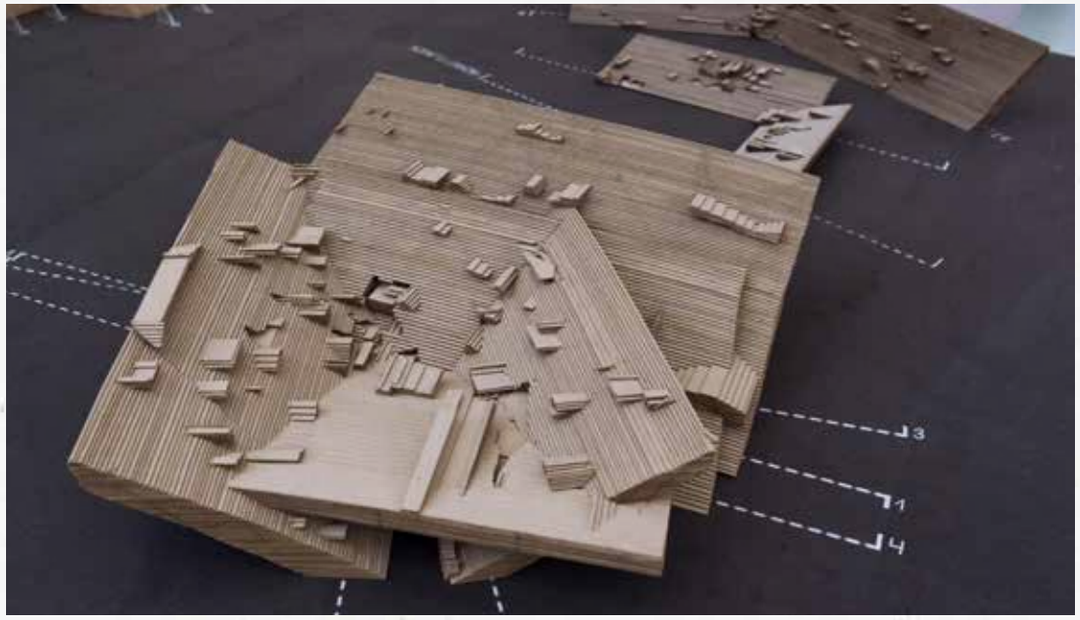
The public exhibition *Photo-Based Architecture—Designing Virtual Realities* at the Köln International School of Design of Technische Hochschule Köln presents selected projects of an experimental, photo-based design approach. In this context, camera images are not merely subordinate media that depict an existing reality, but are treated as media actors whose internal functions are creatively used for architectural design and spatial organization.

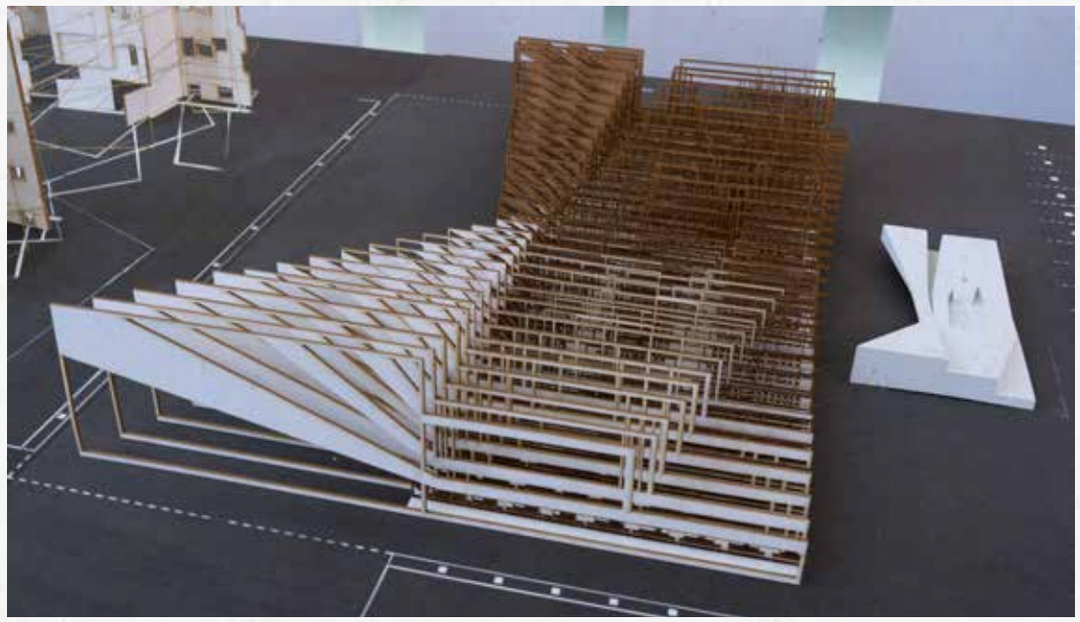
By gathering photo collections from the Internet or through capturing series of images at selected locations or events, the specific spatial potential hidden within the photographic observation of the environment is made accessible through diagrammatic classifications and topological referencing. The multi-faceted layers of condition and effect latent in each photograph, intricately embedded in the image, are tested for their spatial potential using design-based experiments. As media agents, the photographs serve as hinges between inside and outside, between viewing and being viewed, and between subject and object. Thus, the potential of photography as an architectural design tool can be unfolded—a process that refers to reality and the »existing conditions« while simultaneously transcending them through media analysis and transformation, serving as a starting point for subsequent proto-architectural concretization.

Exhibition *Photo-Based Architecture*

Exhibition *Photo-Based Architecture*
Concept models.



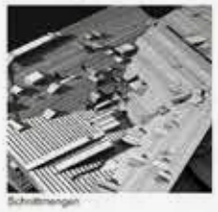




Landesversicherungsanstalt Braunschweig
BIT-MAPPING SPACE

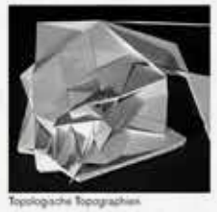
Omnodulationen

Oranienplatz Berlin Kreuzberg
FOTO FLÜCHTLINGS-PLENUM



Schnittmengen

Olympiapark München
MIT ANDEREN AUGEN SEHEN



Topologische Topographien

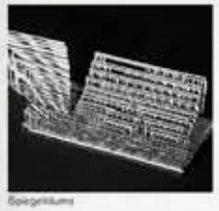
Times Square, New York
AMBIGUOUS COMPOSING

Dynamic billboard spaces

Wolfsburg Westhagen
FINESTRA APERTA

Blokkonstruktionen

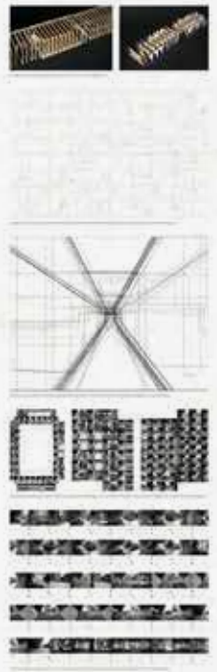
Forumsplatz TU Braunschweig
TIEFE – BILD – WEITE



Spiegelillusns

Audimax, TU Braunschweig
RÜCKSICHT NEHMEN

Sequentielle Raumabwicklung



Michigan Central Station
BIT-MAPPING TIME AND SPACE

Gleichzeitlichkeiten

Piccadilly Circus, London
PANORAMIC STREET VIEWING

Die Welt als Multipanorama

Gezi-Park, Istanbul
PROTESTSTADT

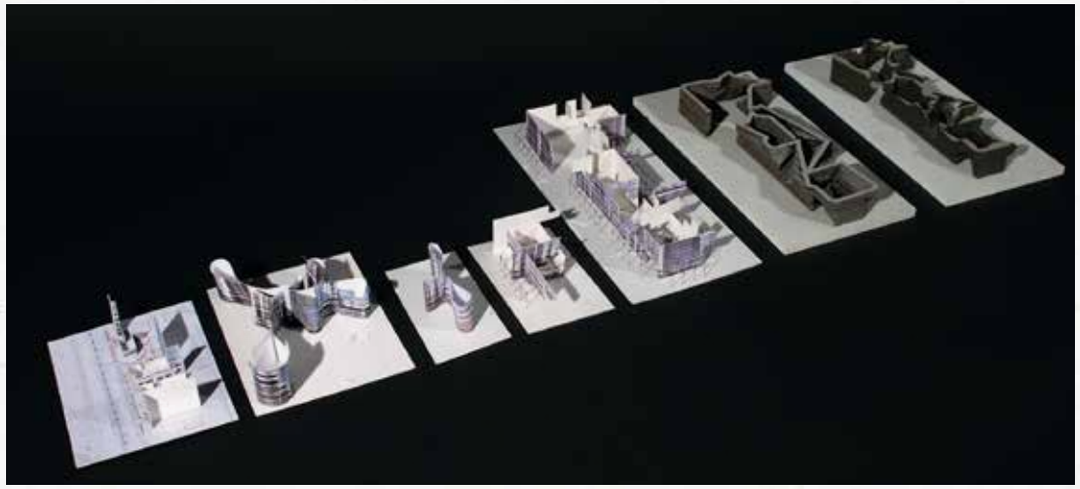
Bildlagenplan

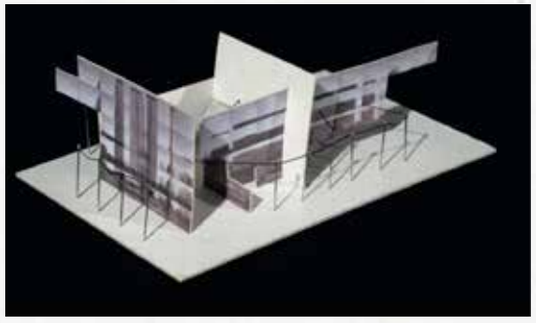
Christian Düvel
Bit-Mapping Space—
Landesversicherungsanstalt Braunschweig

An ensemble of post-war buildings in Braunschweig's Kurt-Schumacher-Straße is captured through photography. Photographs are taken at regular intervals perpendicular to the facade fronts. At each point, the camera is gradually tilted upward. The resulting images are then assembled side by side and on top of each other, following the logic of the shooting process. Elements of the site (buildings, vegetation) marked in color on the ground plan are artistically transferred to the content of the photographs.

Next, the image assembly is positioned vertically. Viewpoint and location information from the shooting process, as well as visual data from the individual images, serve as the basis for a spatial transformation: Where different objects of the location intersect in the images (indicated by color changes), the photos are cut and folded 90 degrees forward or backward. The arrangement of the buildings thus takes on a new disposition, following the logic of the photographic process and the visual appearance of the buildings. The percentage of overlap of the main element in each photograph is transformed into a horizontal extrusion. The tilt resulting from the specific tilt angle of the camera shifts the photographic elements perpendicular to the image plane, creating a new perspective on the vertical edges of the buildings.

By connecting the spatial points resulting from these operations, an inner and outer data envelope is formed, which is then condensed into a spatial network structure. Variations in the translation rules lead to different site modulations, each determined by the process of photographic documentation.



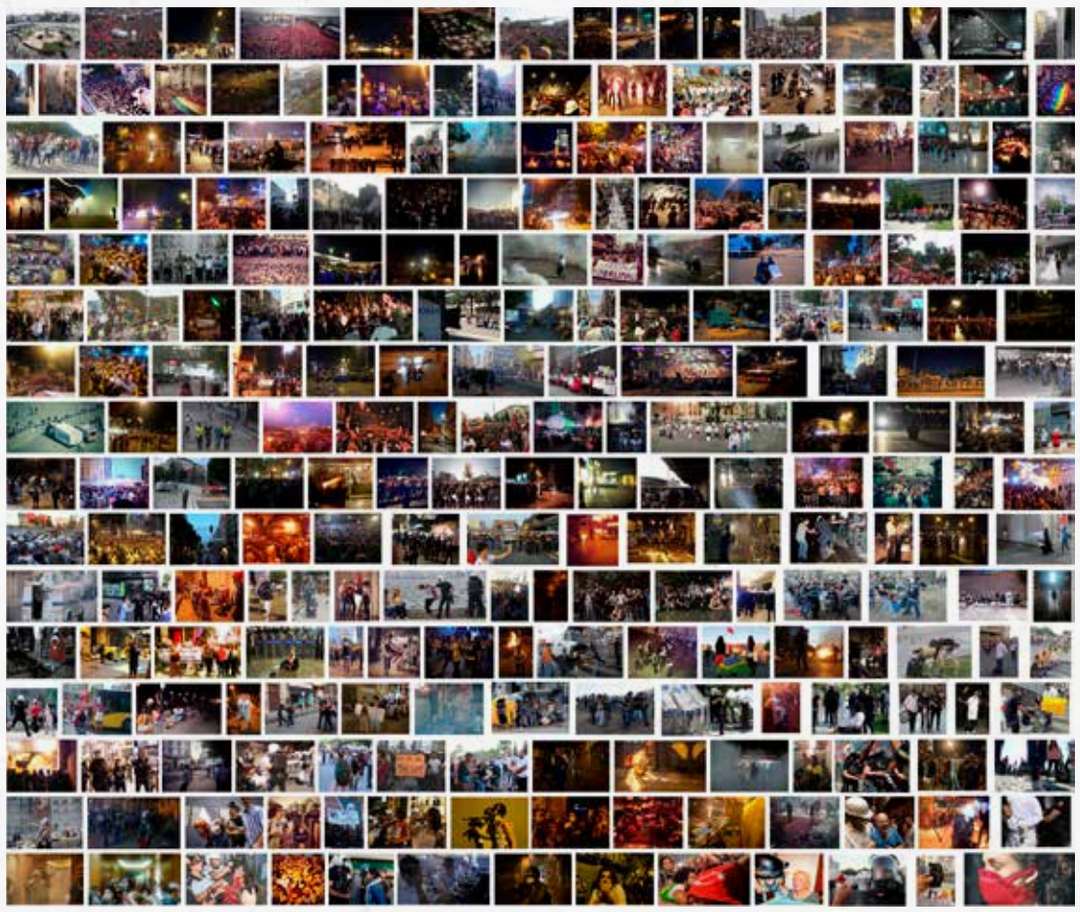


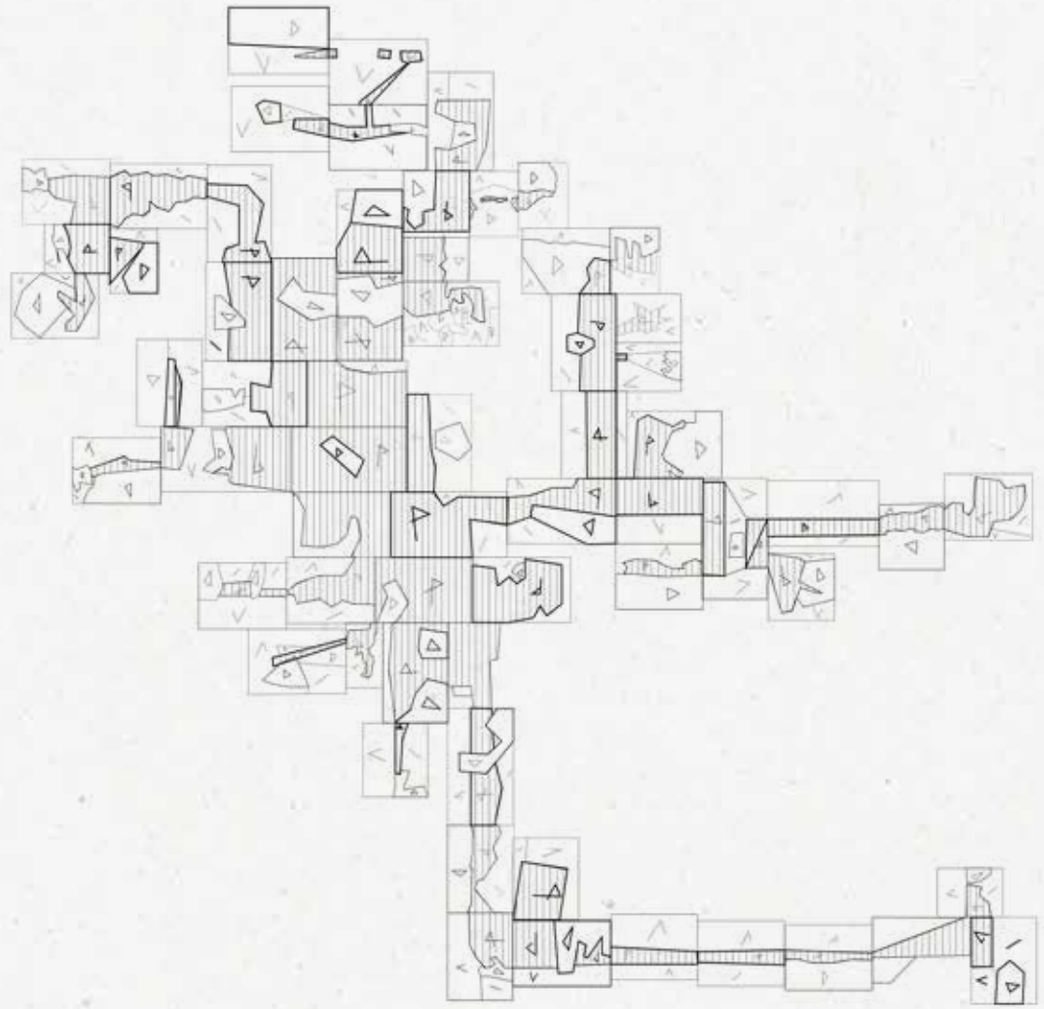
Baransu Azsari and Esma Sahin
Protest City—Gezi-Park Istanbul

A large collection of photos depicting the mass protests in and around Istanbul's Gezi Park in 2013 is gathered from the Internet, and all photos showing both protesters and police officers are extracted from this group.

First, the images are sorted or overlaid in various ways based on brightness levels to reveal possible visual structures within the photo collection. In the next step, the image elements of the two main subjects, protesters and police officers, are artistically marked. Each photo is divided into sections of demonstrators, police officers, and surroundings. Based on this image structuring, the photo collection is reconfigured: Beginning with a central image that predominantly shows police officers, photos are gradually added like pieces of a puzzle whose edges match the already inserted, artistically qualified photos. This process creates a cohesive pictorial layout of the protests based on the photographs taken here, where the urban space is constructed around the central demarcation line between the state power and the protesting citizens during the demonstration.

Finally, the photo layout of the event is rematerialized. The image categories are differentiated in their materiality and the percentage of image content is translated into heights. A model of the city is created based on the photographic documentation of the protests.





Victoria Hermesmann and Clemens Wiese
Refugee Plenary—Oranienplatz Berlin Kreuzberg

The protests of refugees at the Oranienplatz in Berlin Kreuzberg from 2012 to 2014 is spatially analyzed using photographs available on the Internet. Approximately 200 photographs related to the keyword combination »Oranienplatz« and »refugees« are collected via Google Image Search and sorted into thematic groups. Photographs showing mainly refugees are positioned centrally to create a kind of »photographic site plan« that is cut up like a floor plan to show the complex interactions between the various protagonists in the camp.

In the first step, the cuts are arranged in such a way as to separate the external interest groups affecting the camp, such as demonstrators, politicians, press, and police, from the refugees. In the second step, the clippings are shifted so that as many different groups as possible are visible alongside the photos of the refugees.

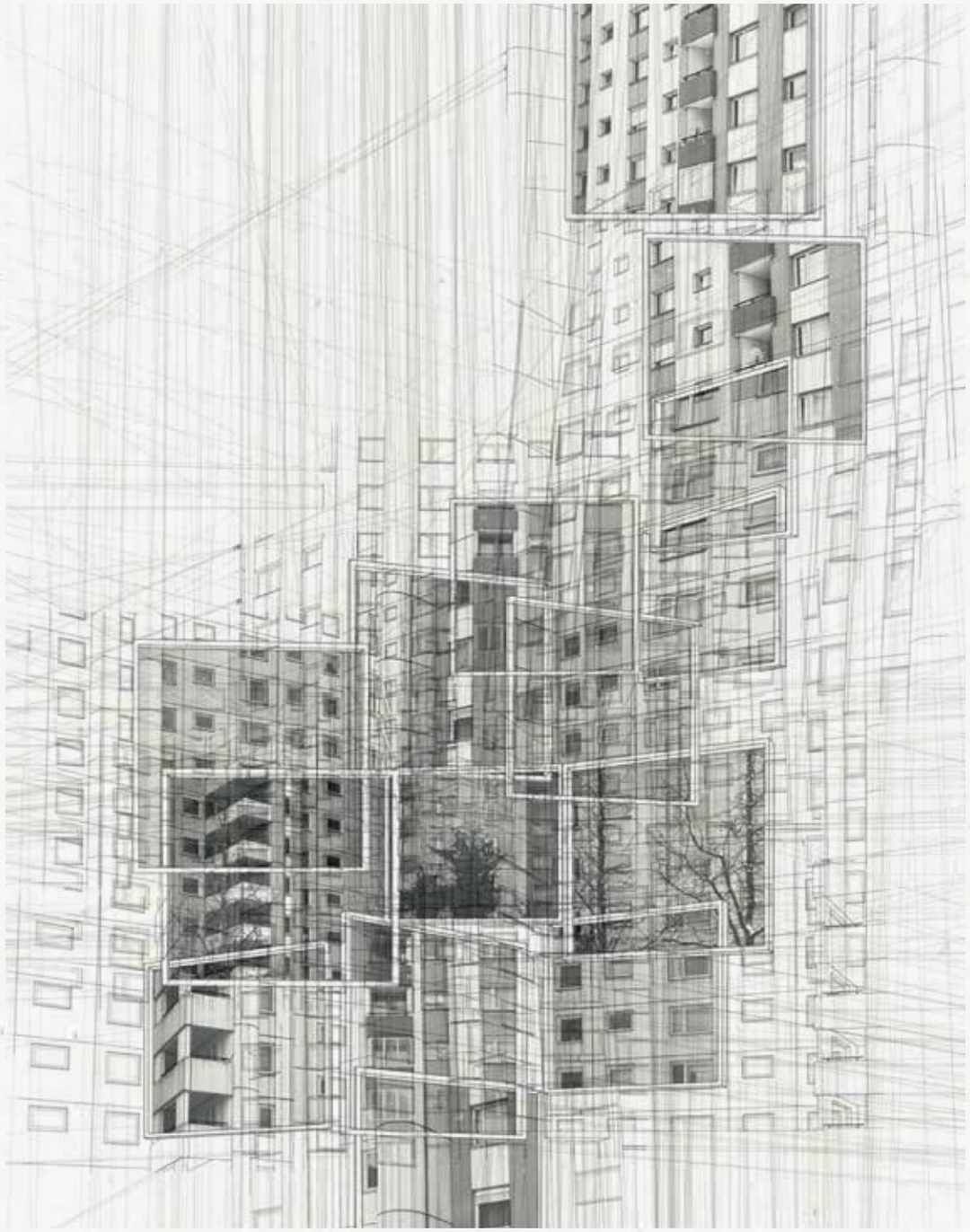
Similar to a sectional view of a building plan, the photos behind the cut planes are also displayed. To prevent the images from overlapping fully, they are moved up and made transparent. This creates clusters of images that visually connect the thematic groups of photos. Since no planimetric objects are cut, but rather perspective spaces, the visible ground plane between the shooting position and the main subject is color-coded in each photo. With the help of these planes and the positional information of the cuts on the floor plan, a spatial model can be derived that materializes the photographic analysis of the event as a communicative forum in which various interest groups can interact.

Julia Petersamer
Fenestra Aperta—Wolfsburg Westhagen

The Westhagen district of Wolfsburg is a typical example of late modern, large-scale residential planning from the 1970s. The similar appearance of the buildings visually merges the architectural units, making it difficult to clearly distinguish between individual houses, especially from the perspective of a pedestrian. This unique feature of the site is explored through a series of photographs specifically taken for this purpose.

The image plane of a camera is complemented by the virtual image plane of an empty wooden frame positioned between the camera and the subject. The frame is positioned in nine different ways, creating new possibilities for a consciously guided construction of the connections between viewpoint and perceived reality.

By considering the angles between the camera, the frame, and the structure of the building, various recombination possibilities are created that allow a relationship between the similar-looking facades of neighboring houses. This generates new, perspective-dependent appearances of the place. In order to go beyond pure analysis, the image arrangements are concretized through drawings and integrated into a design process. The resulting »plans« then serve as the basis for translation into three-dimensional proto-architectural objects. As materializations of the specific perception of the site, they reveal Westhagen as a multi-layered, intricately woven collection of staggered facade structures. The resulting models can be understood as transformations and as spatial development scenarios of a possible future for Westhagen.

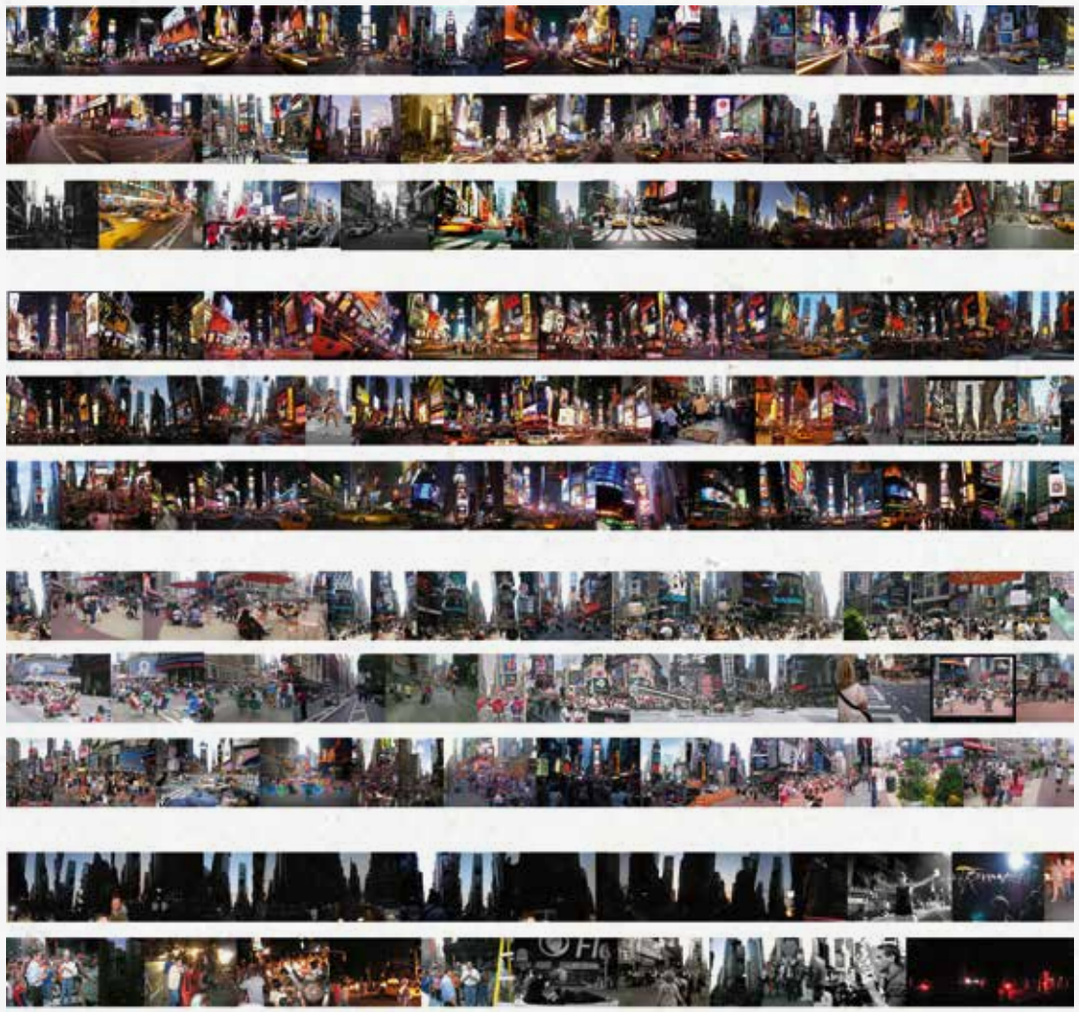


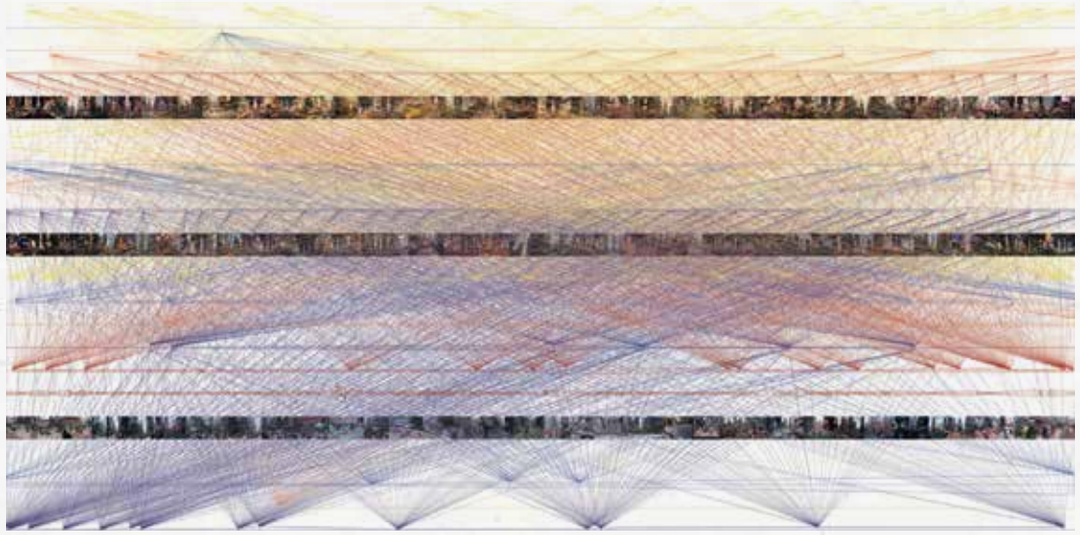
Jamie Queisser
Ambiguous Composing—Times Square New York

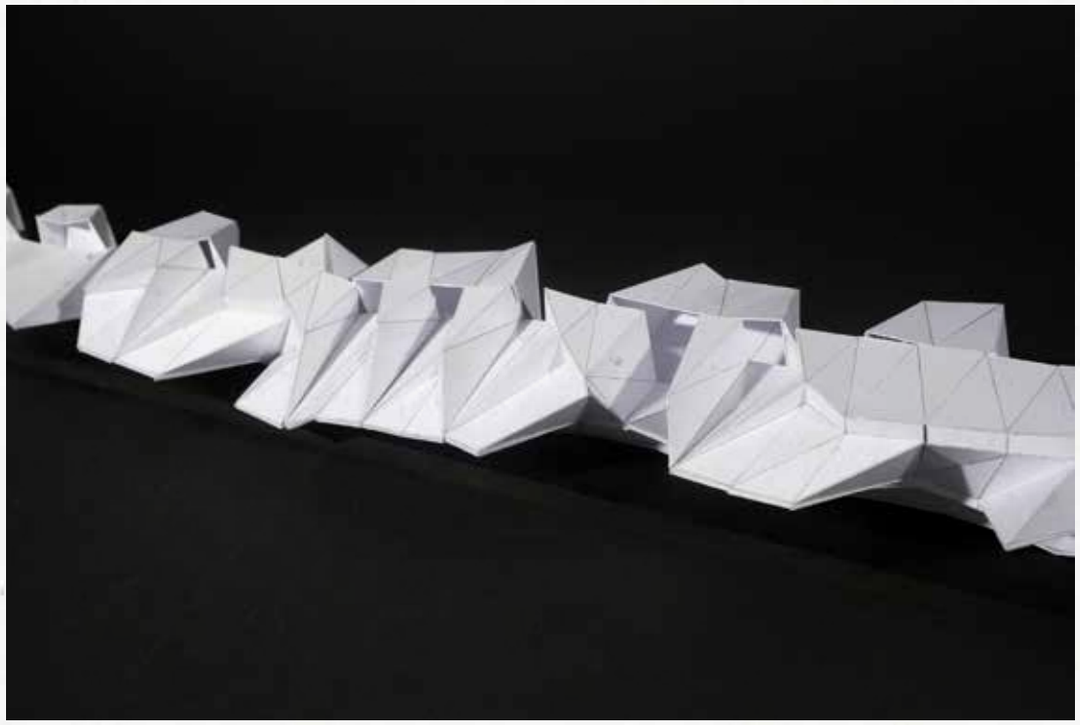
The photos found on the Internet under the search term »Times Square« can be divided into two groups based on the dominant billboards there. One group shows a Budweiser advertisement, while the other group shows a Coca-Cola advertisement. These are images presenting opposite perspectives of the street alignment of Seventh Avenue. In addition to the numerous photos of these iconic street views, others show completely different perspectives. Half of these images were taken after 2010, when part of Broadway became a pedestrian mall. The second set of divergent photos was taken during a power outage in New York in 2003.

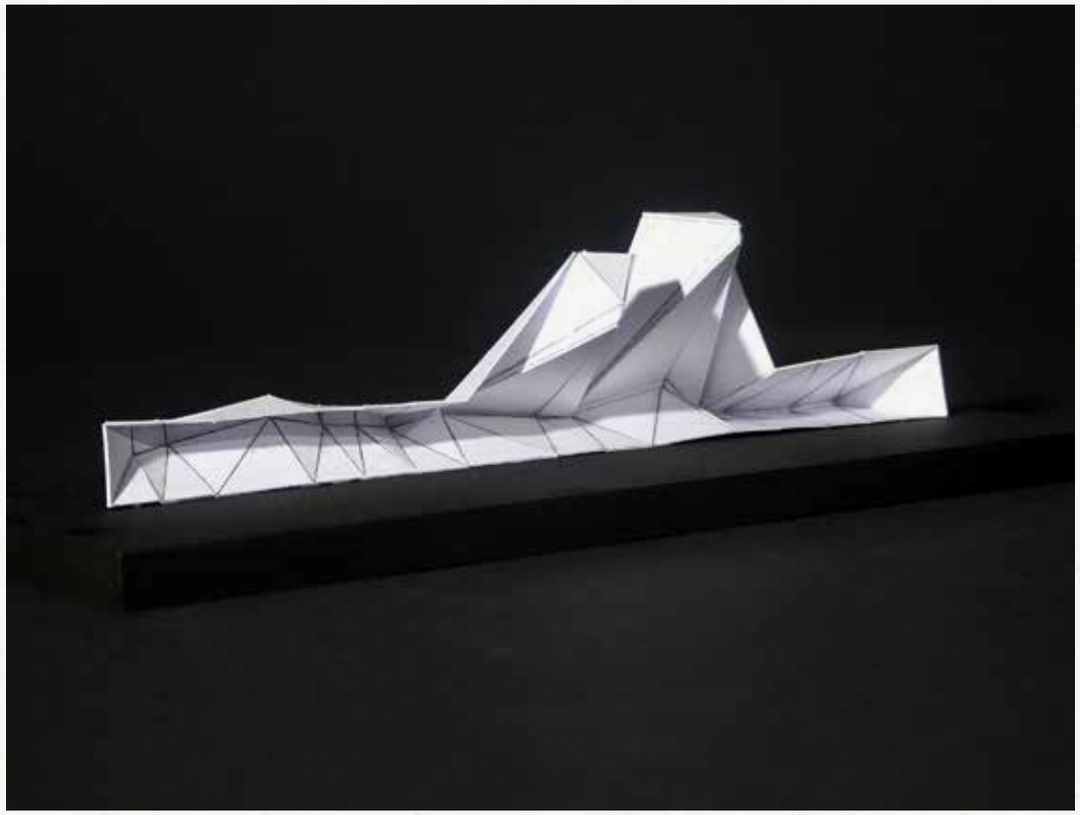
The billboards that characterize the cityscape serve as the basis for the following steps: First, the photos are sorted according to the apparent size of the billboards. Then, graphical connections are drawn between identical elements in the different image series. A hatched area indicates the size ratio of the billboards relative to the viewpoint for each photo. The result is a variable »image layout plan« for each billboard.

The image layouts of the opposing billboards are placed face to face. The smaller an advertising element appears, the farther it is moved vertically from its original position, because its small size in the photograph results from the photographer taking it from a greater distance. In this way, spatial representations of the different *conditions* of the location can be created: the classic street perspective, the pedestrian zone, and the power outage. The resulting materializations present the site as a fusion of architecture, use, and photographic representation









Year	2016
Participant	Jennifer Li Kamm
Text	Jennifer Li Kamm
Led by	Prof. Matthias Karch and Prof. Folke Köbberling
Guest review by	Dr. Philipp Reinfeld

Topographies of Memory

The Berlin Mountains of Debris

Artificial Mountains in Berlin

Seventy-five years ago, at the end of World War II, Berlin was left with 80 to 90 million cubic meters of debris. Clearance of the rubble quickly became a top priority, but only a few buildings were deemed suitable for immediate reconstruction. It was therefore necessary to relocate what could not or should not be used elsewhere. This was made possible in large part by the so-called »Trümmerfrauen« (»rubble women«). They not only cleared the streets of rubble, but also sorted and processed it so that it could be used as building material. Remnants that could not be used were to be given to the landscape architect Reinhold Lingner, who planned to pile them up and situate them in certain areas. In this way, the rubble heaps were either integrated into existing parks, gave rise to the development of new parks, or were used for demilitarization projects, all in an attempt to change the character of the city. The resulting 19 dumps became an integral part of the public realm and left a lasting mark on Berlin's rather flat topography.

Hidden Histories

Today, however, the mountains seem to have been left to their own devices. Places in the city that were once open to the public are now overgrown with greenery and, apart from an old information board, there is nothing to indicate why they exist. The attempt to bury all the evidence of this terrible chapter has led Berlin to sweep as much of the past as possible under the carpet, which has actually allowed it to grow and demand attention. Berlin's history, seemingly hidden, has never disappeared. Instead, the countless buildings, their stories, and their secrets have simply been stripped of their planned space, compressed, and moved to another part of the city. As it was not possible to fully cover up their contents, they are now represented in topographies of memory, highly concentrated and preserved. They are visible, but at the same time repressed, so that only a few people know what lies beneath the mountains of debris. But their history cannot and must not be forgotten.

The extensive research showed that a theoretical reconstruction of the debris was possible to a certain extent. Therefore, the project set the task of tapping into the existing knowledge to provide an insight into the inner workings of the mountains and make history accessible to the public once again through the means of virtual reality (VR). At the beginning of the analysis, all 19 debris mountains were examined to determine the origin of the debris. Since it is possible to determine which buildings were destroyed in each of Berlin's districts, as well as from which district the rubble of the 19 mounds originated, each mound can theoretically be assigned to a group of previously researched buildings and their past. It quickly became apparent that the specific use of each of these buildings could not be distributed evenly across all the mounds, as was initially assumed, but rather that certain uses (such as culture, transportation, or religion) were accumulated in each mound, which then became individual categories that were applied to the respective mounds. For the sake of clarity, the rubble piles were divided into four groups:

1. rubble of unknown origin,
2. bunker facilities buried under rubble,
3. rubble from one district, and
4. rubble from two or more districts.

From each of these groups, one exemplary mound was selected for further development of the design. The »Trümmerberg Lichterfelde« belongs to group 1 and is located on Berlin's border with Brandenburg. The »Großer Bunkerberg« represents group 2 and is fully integrated into the Volkspark Friedrichshain. The so-called »Insulaner« represents group 3 and is located in the south of the Berlin district of Schöneberg. The »Biesdorfer Höhe« rubble heap represents group 4 and is the third highest elevation in the Berlin district of Marzahn-Hellersdorf. These four mountains then had to be studied in terms of the individual intervention they experienced, which resulted from the particular use attributed to them. In this way, the individual nature of the intervention is related to what is buried underneath.

Seeing What Is Invisible

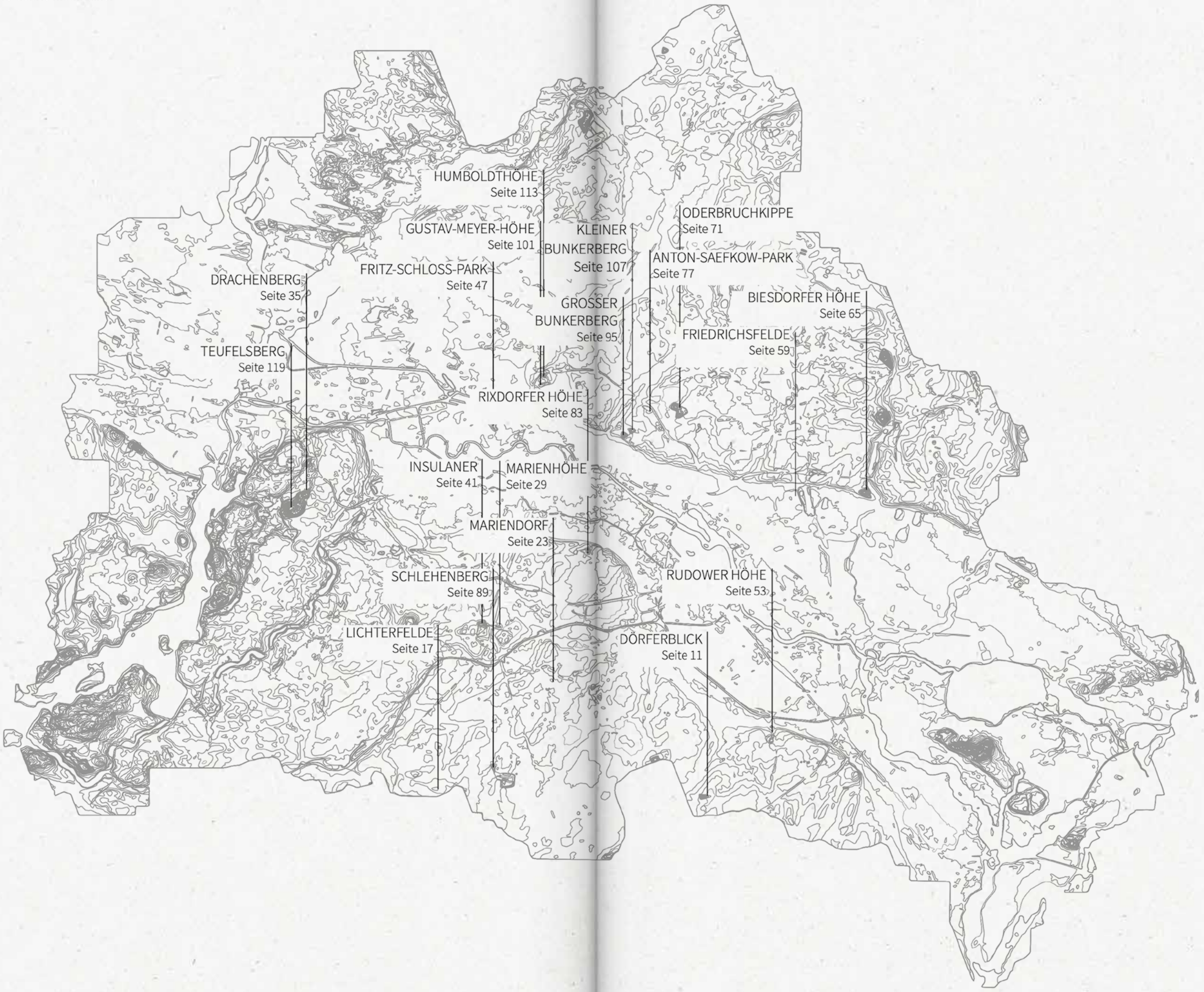
Having opened up the mountains, the next task is to make the space and history visible and tangible. VR allows visitors to experience and witness the process of examining, actively scanning, and assembling the rubble until the contextual space can be deduced and the buildings reconstructed. It also enables visitors to encounter stage-like representations of research images of the buried buildings. These images are sliced into individual layers within each mountain. On the surface, and as can be perceived in reality, all the rubble appears to have been irreversibly reduced to small pieces—compressed, mixed, and thus deliberately randomly placed within the mountain.

As one continues to move inside, one gradually gains more and more knowledge about the surrounding mass. From a certain point of view, the parts that have been cut apart suddenly reassemble and the previously buried architecture becomes a whole three-dimensional space again. In this brief moment, they reveal their history and background information, before returning to the state of rubble to which they ultimately belong.

One becomes aware that the dimensions of the reconstructed buildings now protrude far out of the mountain space, compared to their current compressed size. The relationship, as well as the contrast, between the reconstructed space and the compressed rubble is clear, revealing how much volume, space, and untouched parts of history are still buried under layer upon layer of rubble within the 19 mountains. There is simply more to them than meets the eye.

Jennifer Li Kamm
Topographies of Memory

Site plan of Berlin with the locations of its 19 debris mountains.



Jennifer Li Kamm
Trümmerberg Lichterfelde

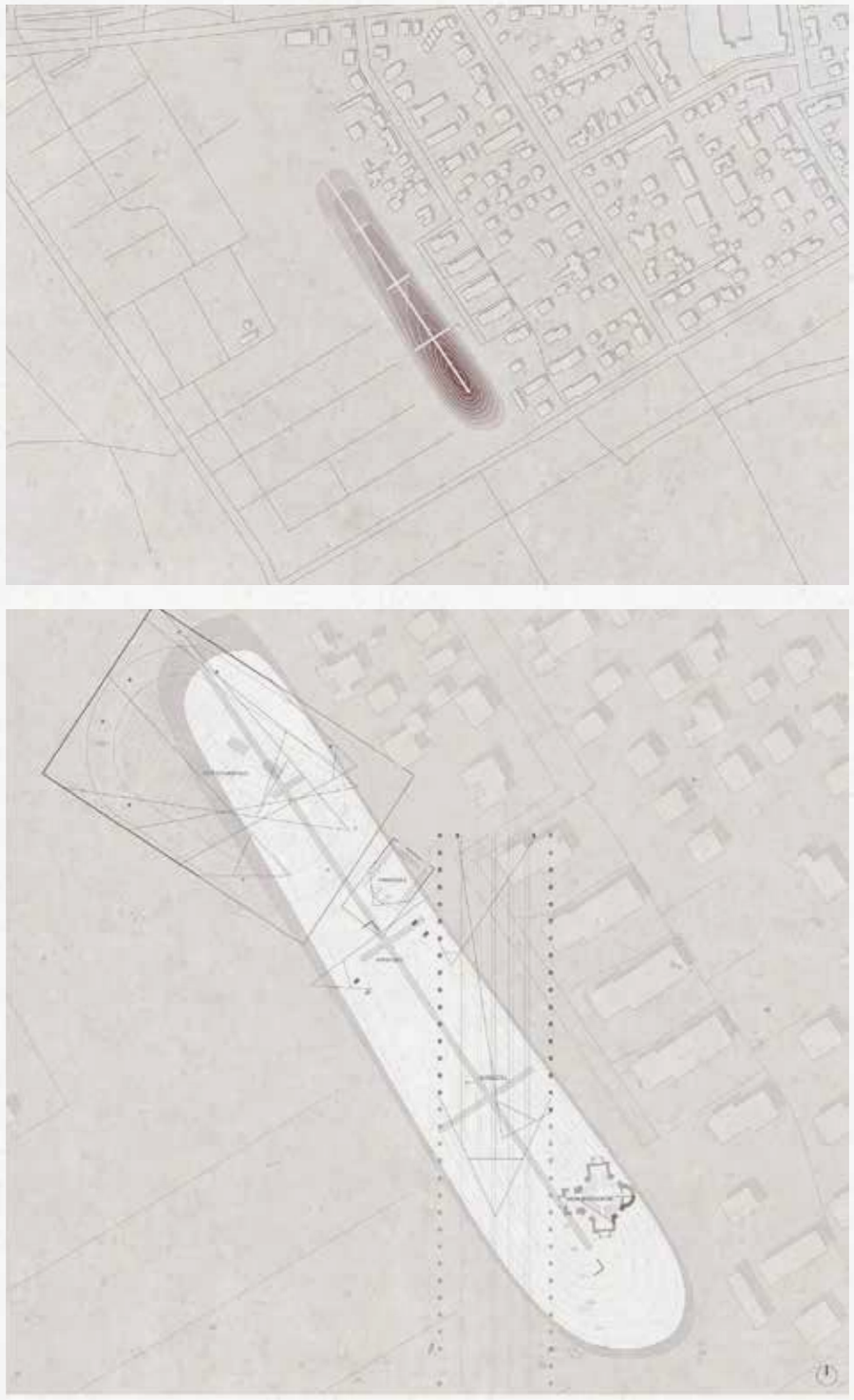
Site plan.

Floor plan with the buildings that lie buried under this mountain, aligned in their original direction.

52° 24’ 27” N | 13° 19’ 47” O
Trümmerberg Lichterfelde
Ht. = 16 meters
Year of creation: 1953–1956

Group 1: Rubble of unknown origin
Design strategy: Section

With a height of 16 meters, this debris mountain is relatively small in relation to the outskirts of Berlin. It is surrounded by a small park at the foot of the mountain, a viewing platform at the top, an allotment garden to the west, and residential buildings at the east. The »Trümmerberg Lichterfelde« represents all debris mountains for which debris origin has not been determined. In the field of archeology, a so-called test pit is used in such cases. To do this, a two-meter-wide section is dug out from the lowest to the highest point within the mountain. Following this, a consistent grid is drawn up gradually to retrieve information as constantly as possible.



Jennifer Li Kamm
Großer Bunkerberg

Site plan.

Floor plan with the buildings that lie buried under this mountain, aligned in their original direction.

Model of a broken bunker still lying under the large bunker mountain in Friedrichshain. A new elevator leads from the highest point down to the level of the mountain base.

52° 31’ 35” N | 13° 25’ 55” O
Großer Bunkerberg
Ht. = 78 meters
Year of creation: 1950

Group 2: Bunker facilities buried under rubble
Design strategy: Drilling

The so-called »Großer Bunkerberg,« together with the »Kleiner Bunkerberg,« is integrated in the Volkspark Friedrichshain. This mountain represents all debris mountains with bunker facilities buried under debris. It arose from blasting operations and was further fed during the demilitarization period when the bunker was filled in with even more debris, representing the category of hotels. An elevator illustrates the common feature of the bunker and the hotel, as the device had been a novelty for both at the time. In particular, bunker elevators were mainly used to transport heavy and large cargo. Consequently, drilling into the mountain seems to be the best way to explore it.

Jennifer Li Kamm
Insulaner

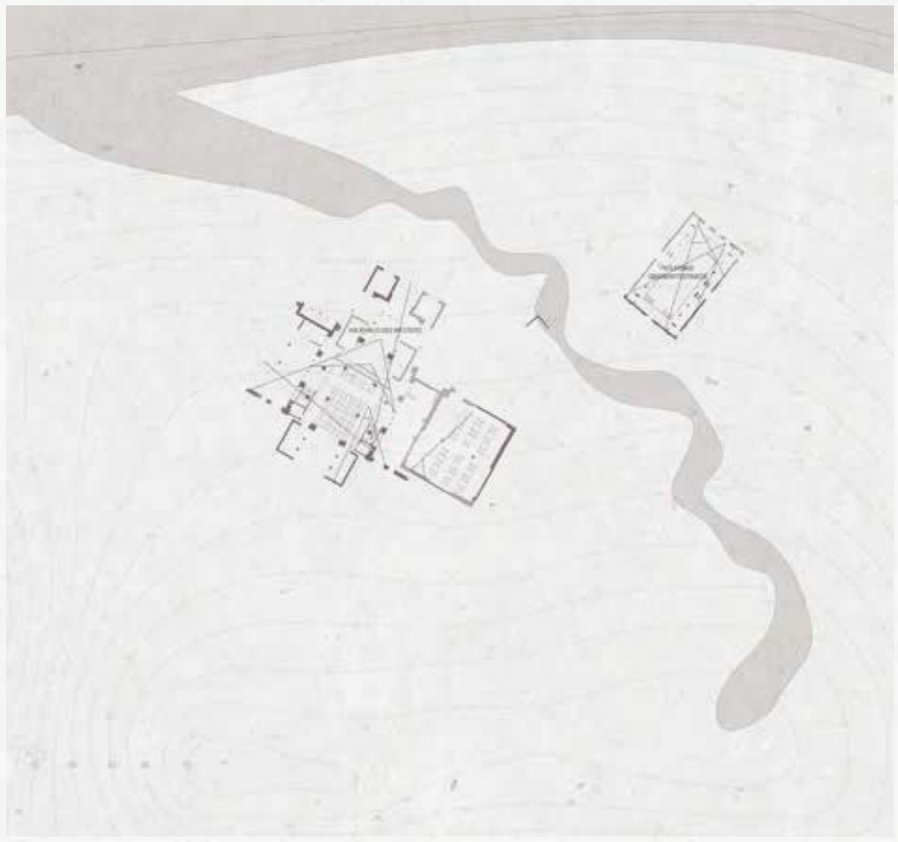
Site plan.

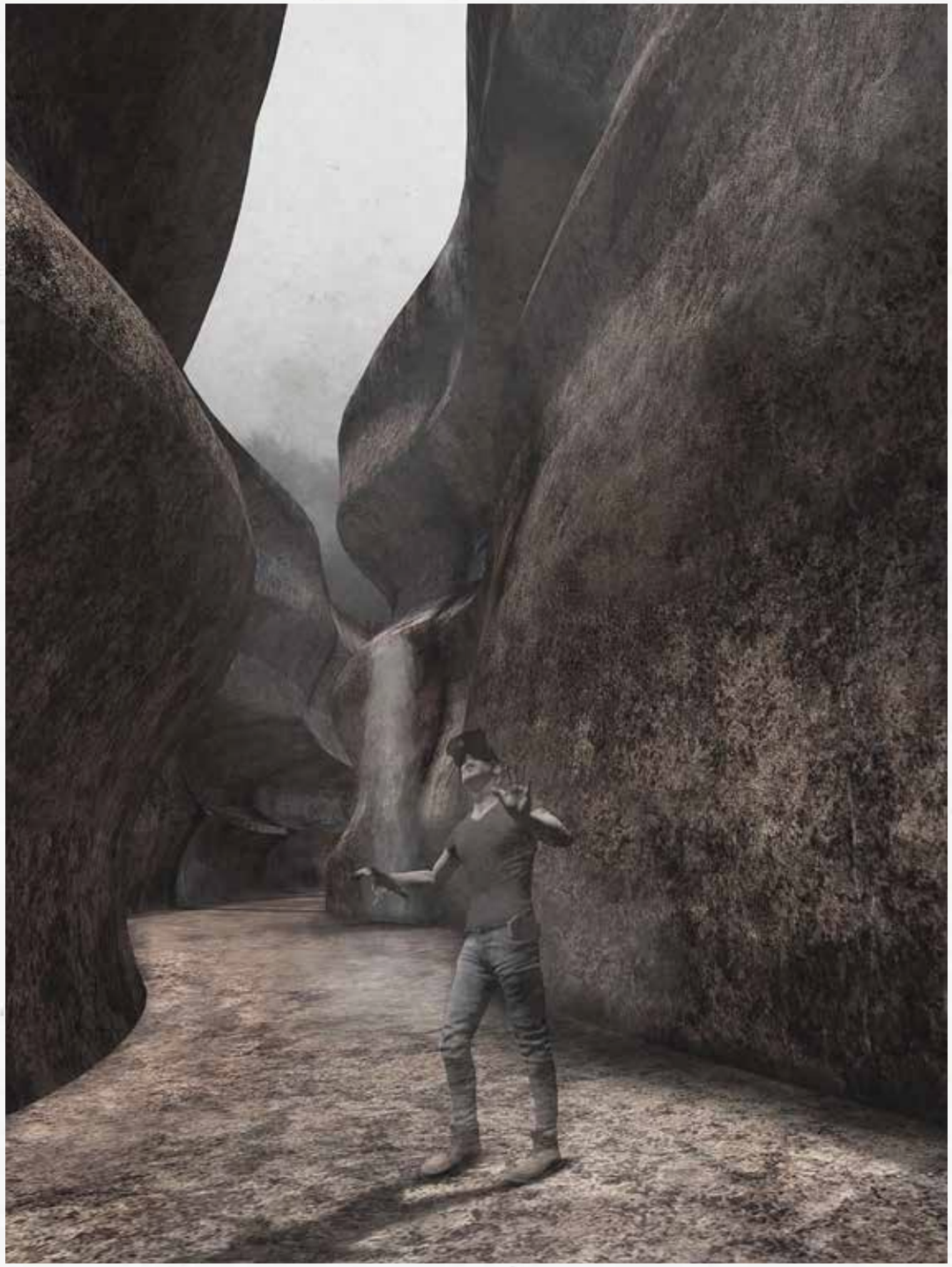
Floor plan with the buildings that lie buried under this mountain, aligned in their original direction.

52° 27’ 27.1” N | 13° 21’ 3.9” O
Insulaner
Ht. = 75 meters
Year of creation: 1946–1950

Group 3: Rubble from one district
Design strategy: Washing out

The so-called »Insulaner« represents all debris mountains with debris from one district and is located in the south of Berlin’s Schöneberg district. Within the Insulaner, only debris from Schöneberg is heaped up, and the individual pieces come equally from buildings that were used for sporting activities or that housed consumer goods. The mixture of both categories suggests similarities between the flow of money and the flow of water. The use of water as a means of opening up the mountain was therefore obvious. Starting from the top, the water streams choose their individual and quickest ways down the structure. By doing this, the surrounding earth is washed away, which in turn exposes the mountain as well as its history in a canyon-like way.





Jennifer Li Kamm
Biesdorfer Höhe

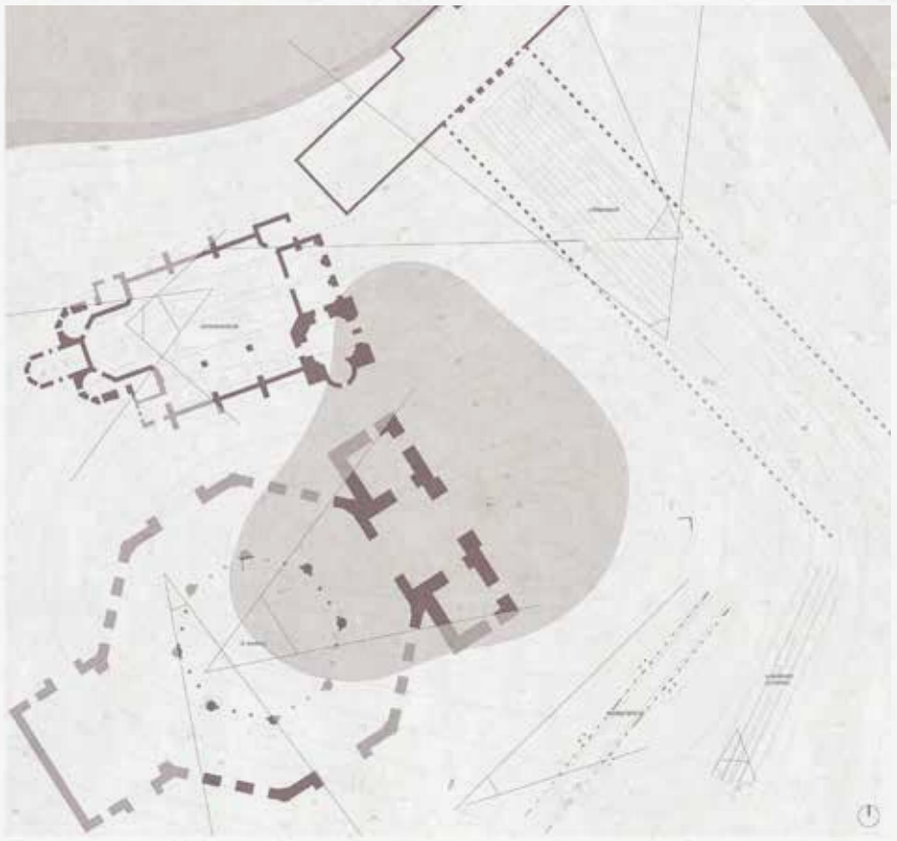
Site plan.

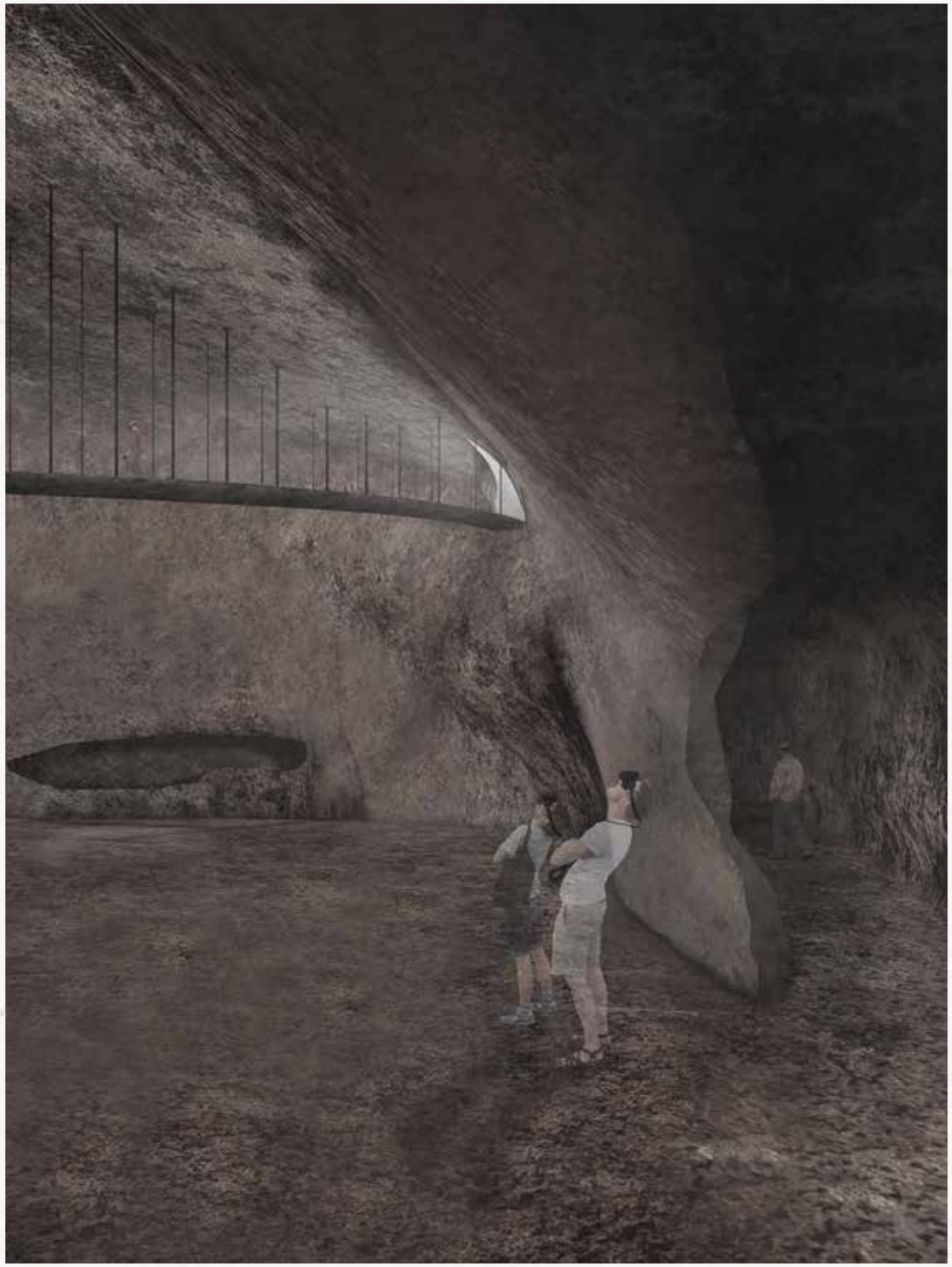
Floor plan with the buildings that lie buried under this mountain, aligned in their original direction.

52° 30’ 27” N | 13° 34’ 20” O
Biesdorfer Höhe
Ht. = 82 meters
Year of creation: 1952

Group 4: Rubble from two or more districts
Design strategy: Excavation

The surroundings of the so-called »Biesdorfer Höhe« are defined by a park with a district urban and suburban railroad connection to the northeast and by two cemeteries at the foot of the mountain. This mountain represents all debris mountains with debris from two or more districts and was heaped up in Berlin’s Biesdorf district. The mountain is composed of debris from Friedrichshain and Mitte and is mostly made up of religious buildings and ones that have to do with transport. Since train stations and churches are uniform in their ungraspable ceiling heights, the idea of hollowing out the mountain, based on brown coal mining and its terraced working, came to mind. The same technique is then used from the highest point of the mountain and is gradually brought down.





Jennifer Li Kamm
Seeing What Is Invisible

A virtual reality presentation that brings back to life the buildings whose rubble formed the mountains, or which are still buried beneath them.

Lehrter Bahnhof in the Trümmerberg Lichterfelde.

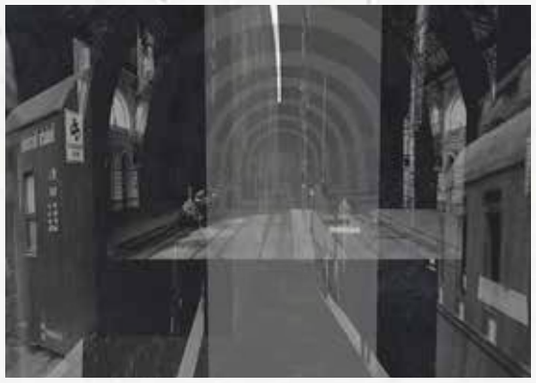
Central-Hotel in the Großer Bunkerberg.

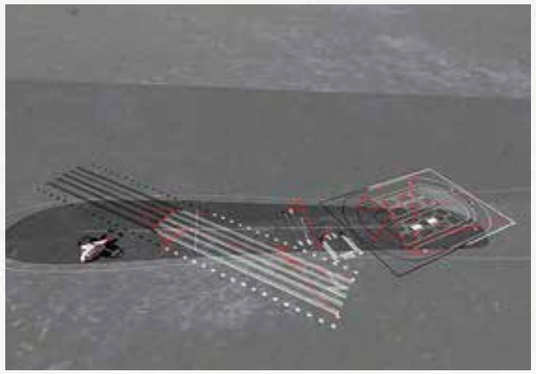
Kaufhaus des Westens (left) and Volksbad Dennewitzstraße (right) in the Insulaner.

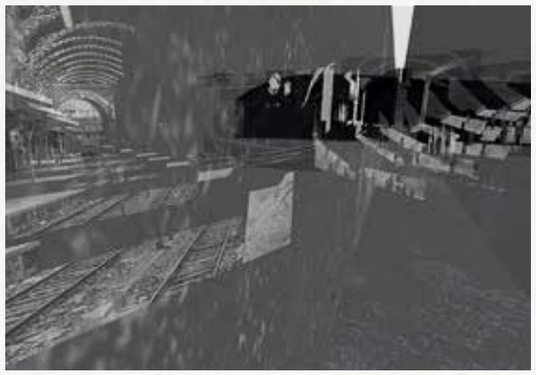
Platform hall of the Lehrter Bahnhof.

Floor plans of the buried architectures in the Trümmerberg Lichterfelde.

Lehrter Bahnhof (left) and Deutschlandhalle (right) in the Trümmerberg Lichterfelde.







Year	2022
Participant	Miriam Haack
Text	Miriam Haack
Led by	Prof. Matthias Karch and Prof. Dr. Alexander von Kienlin
Guest review by	Dr. Philipp Reinfeld

The Yellow Tower

An Underground and Physical VR-Based Architecture

Tower and Observatory

Southeast of the city of Hildesheim is the »Gelbe Turm« (»Yellow Tower«), built in 1886. In earlier times, this lookout tower attracted many citizens to the wooded landscape hill and offered a panoramic view over the North German Plain. Gradually, the trees grew over the height of the yellow brick building and obscured the view.

An increase in height was intended to remedy this and return the old monument to its original use. A steel viewing platform was erected to rise above the treetops and restore the panoramic view of earlier days. The extension was completed with the addition of an observatory, giving the tower a new use. These two architectural phases, the yellow brick tower and the steel structure with the observatory, are clearly recognizable in their form. Their different materiality shows the evolution of technology. Through this structural change, the Yellow Tower allows the visitor to look out into the surrounding landscape and complements it with a telescopic view of the universe. In this way, the two architectural levels, the tower and the observatory, deal with the view of the reality that surrounds man.

What Is Reality?

The design of the Yellow Tower addresses the question: What is reality? Based on the first two construction phases of the tower, which deal with the perception of reality, the design takes up this theme and opens up a third extension of the view, which works with the medium of virtual reality (VR) glasses. In this way, the visitor is invited to engage with the themes of reality and virtuality, experiencing differences, boundaries, and overlaps. The interaction between tangible, architecturally real spaces and virtual spaces creates new impressions and experiences for the visitor. To control this sensation, the building design is located underground. In this way, the influences of the outside world can be suppressed.

In order to analyze the boundaries between real and virtual spaces, the design works intensively with the human senses, which are used as »measuring instruments« of the body. Here, the senses can both detect realities and fall prey to deception. Visitors begin their journey at the entrance to the Yellow Tower. The visitor entering the underground building can decide whether to actively move through the building and its virtual spaces with the VR goggles or passively experience the different architectural spaces and observe other visitors.

The Yellow Tower is a reference to reality. Through memories of the physically experienced tower and its architectural elements, these familiar situations can be encountered in a completely different way in virtual reality. For example, the real dimensions and haptic characteristics of the tower's facade are used in a designed spatial situation. The facade becomes a floor that can change depending on the position of the person walking across it. This haptic feedback, together with the inclination of the floor, creates the sensation of walking along the four walls of the tower in virtual reality.

In the other underground rooms, different types of virtual reality locomotion can be experienced. These are architecturally designed and adapted to specific requirements. Their dimensions and geometric shapes are planned from the inside out, depending on their specific use and circulation, as in the case of the Infinity Ring. Its shape is based on the fact that when using VR glasses with a virtually straight path, the curvature of the path in reality with a minimum radius of 22 meters is no longer perceived. The person walking along this ring with VR glasses can walk infinitely in the physical world in a circle, while in virtual reality feeling that he or she is walking infinitely straight ahead.

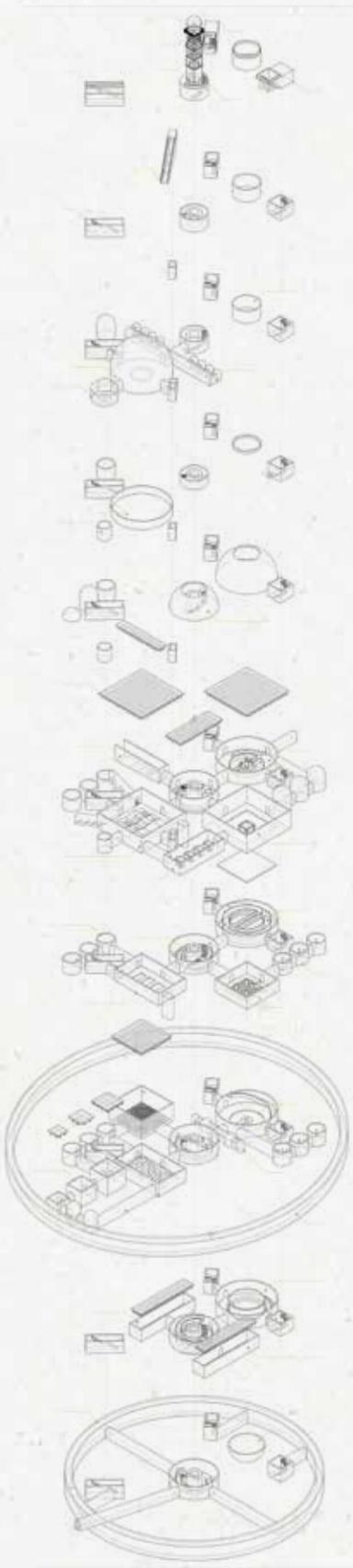
The design deals with these and other developed spatial situations and allows its visitors to work with reality and virtuality at the same time. They can test these limits through their perception and thus seek an answer to the question of reality.

Miriam Haack
The Yellow Tower

Site model.

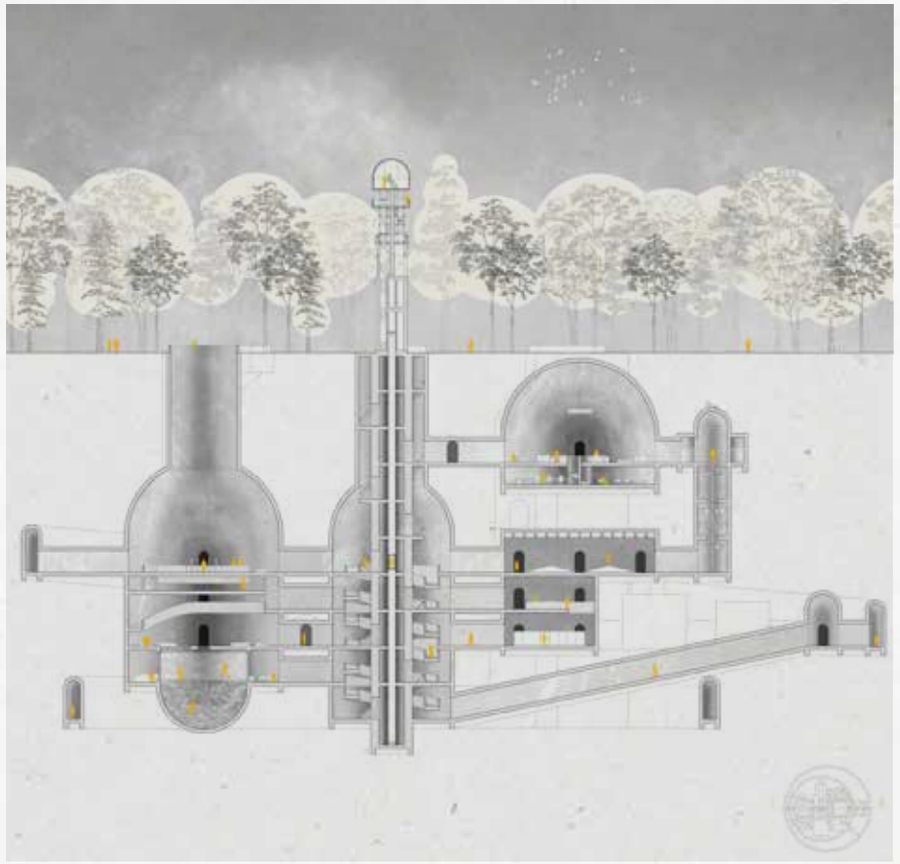
Perspective view.

Exploded axonometry of the floor plans with the physical VR scenes and spaces.



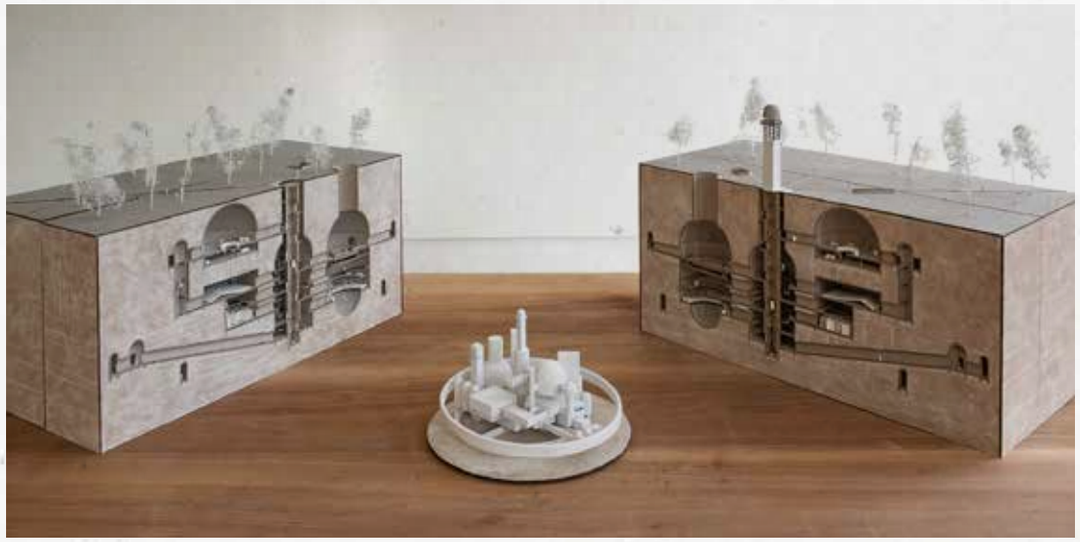
Section I.

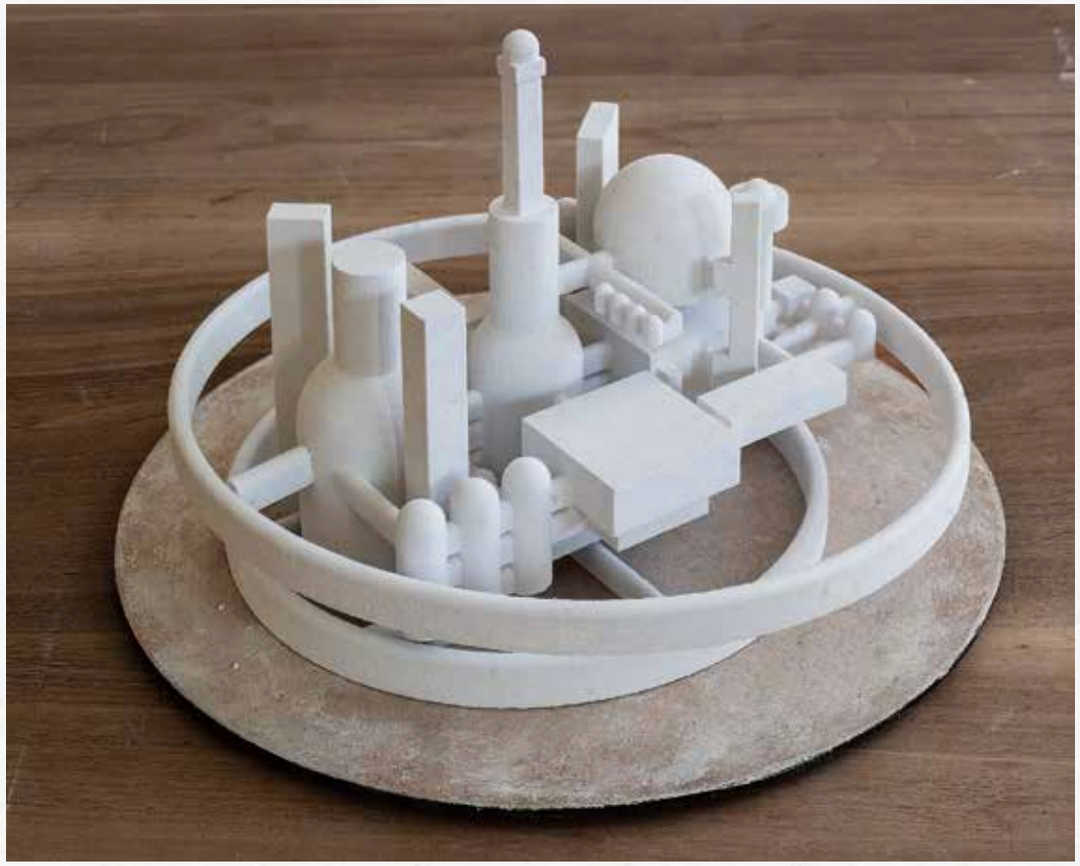
Section II.



Section model and solid model of the underground space.

Solid model of the underground space.





Section models.

Year	2022
Participant	Mohammad Reza Abdollahi Bidhendi
Text	Mohammad Reza Abdollahi Bidhendi
Scans and 3D models	Mohammad Reza Abdollahi Bidhendi
Led by	Prof. Matthias Karch and Prof. Corinna Schnitt
Guest review by	Max Justus Hoven and Dr. Philipp Reinfeld

In Limbus

An Architectural Investigation of the Mória Migrant Camp on Lesbos

The Mória migrant camp on Lesbos, initially conceived as a temporary shelter, evolved into a sprawling symbol of the European refugee crisis. Its transformation raises a critical question: What does this metamorphosis reveal about the broader humanitarian challenges in Europe? Established in 2015 to accommodate around 3000 individuals, Mória expanded exponentially, eventually housing over 20,000 refugees. This rapid growth transformed it from a manageable asylum center into a dense labyrinth of makeshift shelters, reflecting not only a logistical quandary but also the profound depth of the refugee crisis, often marginalized in mainstream discussions.

In Limbus, a documentary utilizing photogrammetry, offers more than a visual representation of Mória: it reconstructs the camp's multi-faceted narrative. This approach, reminiscent of gray box testing in software development, pieces together a comprehensive picture from disparate external data sources, such as satellite imagery and video clips. The documentary's method, akin to looking through a kaleidoscope, reveals diverse facets of life in Mória, marked by human resilience amid extreme adversity. Yet, this fragmented portrayal prompts the question: Are we witnessing the entirety of the narrative or merely isolated fragments of a more complex story?

The narrative of *In Limbus* underscores the resourcefulness within Mória, where olive trees, once emblematic of Lesbos's tranquil landscape, became the foundation for makeshift shelters. This ingenuity, born out of necessity, is also a subtle indictment of the extremities of deprivation faced by the refugees. The social dynamics within the camp, characterized by a rich tapestry of cultures and experiences, were nevertheless strained under the harsh realities of camp life. Children's laughter, contrasted against the backdrop of their struggles, serves as a poignant reminder of both lost innocence and the indomitable human spirit. This dichotomy raises critical reflections on the systemic failures that allow such conditions to persist.

Lesbos's geographic isolation further exacerbated the challenges faced by Mória, rendering it a microcosm of global displacement and a focal point for the successes and failures of European asylum policies. The fire of 2020, which decimated Mória, marked a tragic culmination of these issues, simultaneously posing pressing questions: What are the lessons to be learned from Mória's ashes, and how can future humanitarian responses be shaped to prevent similar tragedies?

Presenting the intricacies of life in Mória compels viewers to critically evaluate global responses to refugee crises. Are we, as an international community, responding adequately, or do we remain passive observers, disengaged from the reality of such situations?

Mohammad Reza Abdollahi Bidhendi
In Limbus

Mória migrant camp, Lesbos, Greece, 2020.

Black: Main camp.
Light Blue: UNHCR family tents, 350 in total.
Red: Overflow tents.

Mohammad Reza Abdollahi Bidhendi
Home | Heimat

Research phase I:
Scans of a typical Middle Eastern house.






Mohammad Reza Abdollahi Bidhendi
Home | Heimat

Research phase I:
Scans of a typical Middle Eastern house. A LiDAR scanner was used to scan the 67-square-meter house. The lighting is implemented in the texture file.

Mohammad Reza Abdollahi Bidhendi
The Mória Camp

Research phase II:
Photogrammetry of the Mória camp.

Photogrammetric model of the campsite.

The Photogrammetric Process

Photogrammetry is a powerful technique used to convert two-dimensional images into three-dimensional digital objects through the use of computer software. This process involves analyzing sequential images with different spatial coordinates. Specialized software identifies common points within the images and estimates their 3D coordinates and the distances between them in other images. This methodology allows for the creation of digital reconstructions complete with photo-based materials and textures, enabling the reuse of visible and in-focus elements across multiple frames. The photogrammetry workflow typically consists of two main phases: capture and processing. During the capture phase, comprehensive photos of the object must be taken to cover its entirety. The processing phase involves the generation of mesh and texture data from these photos. The production time for this process varies, as applying photogrammetry can be challenging, particularly in terms of object complexity and retopology considerations.

In the context of the project, which relies primarily on amateur video footage and remote research conducted across various times and locations, video-based photogrammetry plays a central role. The videos used for the project were typically recorded at 30 frames per second (fps), meaning that each second of video contained 30 constant frames. Extracting multiple frames from each second allowed for the creation of an image dataset for processing. However, the quality of the final mesh depended on various factors, including video quality, the type of recording device (drone, handheld, cell phone, or digital camera), and the range of angles covered.

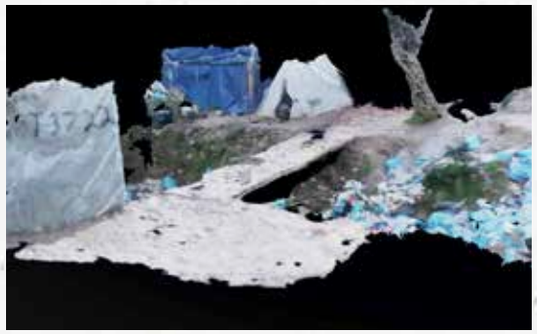
3D Meshes inside the Camp





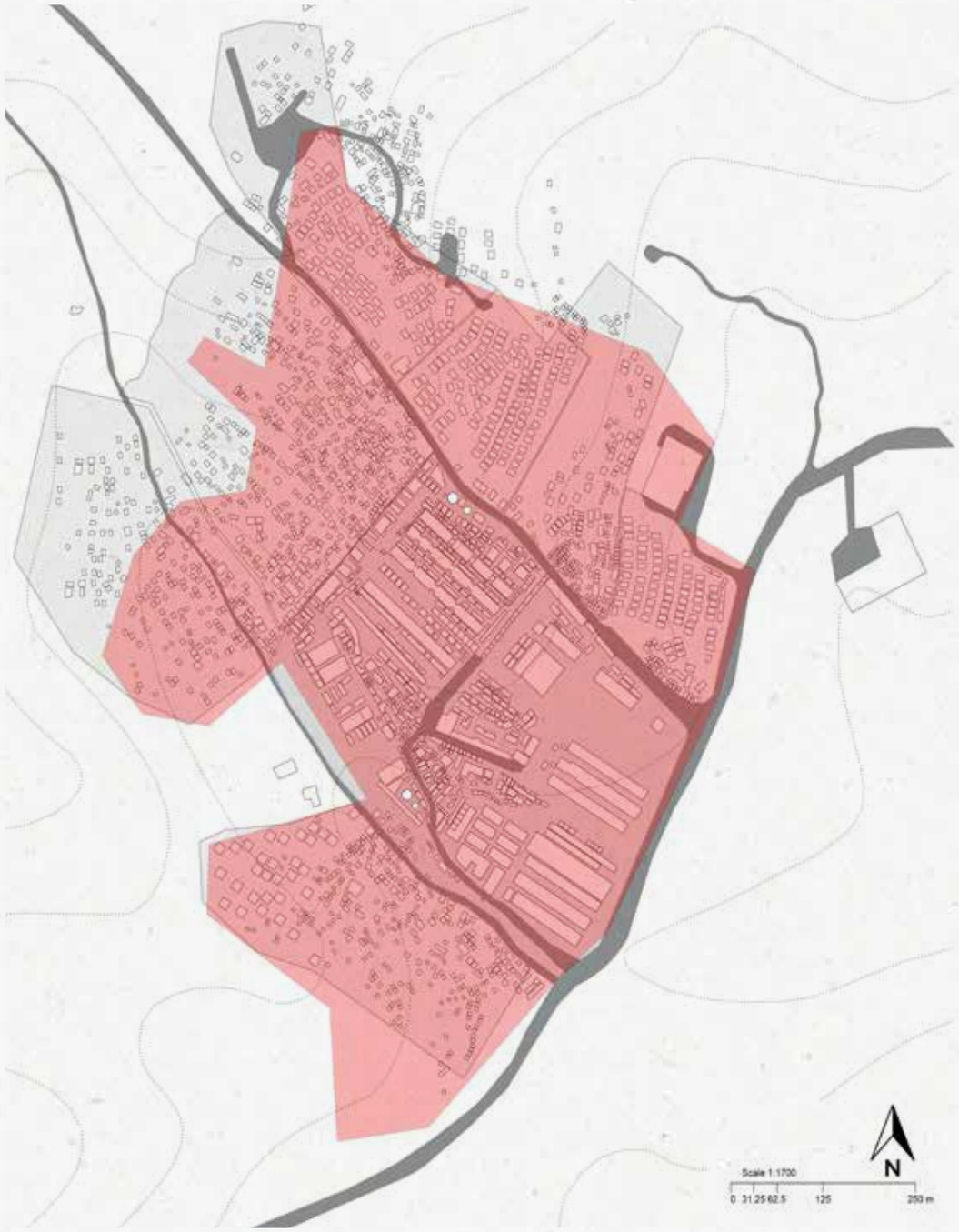






The Fire at the Mória Camp

Research phase III:
The Mória camp fire of September 8, 2020.
Red: The actual spread of the fire.



The site of the Mória camp after the fire.
Textured 3D model.

INFORMING & PERFORMING

Material Acts: Modeling between »Knowing-less« and »Knowing-more«

Carolin Höfler

Scaling Up and Down

One of the most enduring narratives about architectural design is the simplified ideal scenario, according to which the design process is a chain of modeling stages that lead from the large to the small, from urban design to detailed structural planning. The architectural theorist Jörg H. Gleiter argues that this conception gained prominence with the introduction of scale drawing by Leon Battista Alberti (1485), where design is achieved via a series of discrete modeling steps from the largest to the smallest scale, with the 1:1 scale representing the final model range (2022: 43). According to this scenario, the beginning of each modeling stage has its own architectural hypothesis with its respective specific promise of an object. The final modeling stage at the end of the chain results in the specific construction. In contrast, the sociologist Albena Yaneva characterizes the architectural design process as a peculiar scaling venture based on multiple ups and downs between small and large models, each used for different purposes (2005). In her perspective, it is a »versatile rhythm, relying on surges, ›jumps‹ and returns« in a series of moves performed with different intensities and speeds, instead of being a logical, linear procedure for generating a new object that becomes progressively more knowable, ascending from the abstract to the concrete (Yaneva 2005: 867). These modeling moves are not successive but parallel, each containing and referring to the other. At least two alternative states of the projected architecture are achieved and maintained simultaneously in each model: »a state of being ›less-known‹, abstract and comprehensive; and a state of being ›more-known‹, concrete and detailed« (ibid.).

Computer-based design processes seem to correspond particularly well to Yavena's up-and-down scaling scenario because they interrupt the supposed sequence of design operations in Alberti's sense. With the help of 3D modeling and simulation software, the design is developed less in successive stages that build on one another and more in a single stage that theoretically includes all other stages. Scales are blurred and designing in discrete scales is weakened; digital process chains eliminate the traditional separation between the *intellectual* act of design and the *material* act of manufacture. Manufacturing technologies directly intervene in the design process that can now manipulate the object itself, as it were, via its real-time digital models. Architects can now simultaneously shape and make two-dimensional digital drawings as well as three-dimensional digital-material prototypes seamlessly and interactively.

In light of these fundamental changes in design processes, drastic crisis scenarios of the loss of importance of architectural design as theory building have been drawn up in recent years. Mario Carpo, for instance, speaks of the »obsolescence« of the Albertian paradigm: In the Albertian tradition, architects are particularly defined by their ability to model a future structure in abstract scale drawings, which would later be implemented by qualified skilled workers on the construction site (2009: 15; Alberti 1986 [1485]: Book I, Chap. I, 1–2). But if the design process is only seen as a gradual progression to reality and the construction process as a realization of a previously conceived plan, the consideration of the active potentials of computer-based models and their implicit theoretical knowledge remains rather underexplored.

The question regarding the active potentials of digital models picks up on the general theory of models of mathematician and scientific philosopher Bernd Mahr, who developed a »model of being a model,« for which the double reference of being a model »of something« and »for something« is constitutive (2008). According to him, models are fundamentally in the field of tension between representation and production, depiction and enabling; they show something and at the same time are oriented toward exploring and designing possibilities (Höfler 2018). This text will therefore focus on digital models and modeling practices that can be considered not only representative but also inventive processes, unfolding through an unbiased and initially purposeless experimentation with materials. They are complex material systems that emerge and behave in real time, rather than renderings of predesigned forms. They have their own active life with a function that gives meaning and guidance for action. Modeling material systems, as tested so far in experimental architectural practice, aims to abandon the notion that the model is merely an abstract scheme. It also undermines the assumption that physical models can be replaced by codes, information, and data. In digital models, a multi-layered event is made tangible in actual execution, which is essentially determined by its relationship to matter and material.

1 IMD students, *Bending Bamboo*, 2018, led by Caroline Hagsbro. Prototype, bamboo.

Gatherings of Materials in Movement

The computer-based design research projects at the IMD _Institute of Media and Design at the Technische Universität Braunschweig pursue such a material-oriented modeling approach, where materials are not passive carriers of an idea of form but are generative drivers in the modeling process. Taking up the ecological paradigm in systems theory and cybernetics, these projects refer to the »morpho-ecological« design approach that was pioneered by architects like Frei Otto in the 1950s and 1960s and developed further by Michael Hensel and Achim Menges in the context of design computation, simulation, and digital fabrication (2006). Examples of this are lightweight modular structures, which allow a high degree of adaptability and performance due to the geometric differentiation of their components and joints (see pages 128–145 of this book). These systems become active through a structure composed of elements that simultaneously generate space, dissipate force, and sometimes conduct and store energy. The elements develop from the specific qualities of the materials and the manufacturing processes used; ideally, they have an undisturbed, reciprocal relationship with their environment.

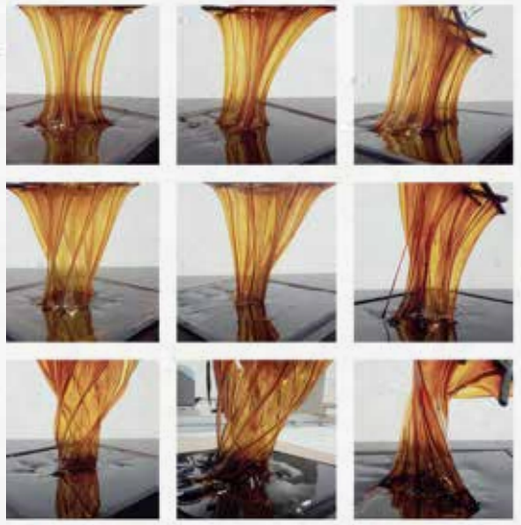
Morpho-ecological models are produced in two ways: On the one hand, a structural element is developed from a specific material; on the other hand, the properties of this element are reproduced in a parametric computer model. Analogous to Frei Otto's models of »natural constructions« (1982), they are mainly constructed from flexible, elastic, and unstable materials such as paper, wood veneer, textile fabric, or fiber, which form themselves automatically as a result of the forces inherent in and exerted on them. In this process, the material is conceived as an operative structure involved in an exchange with the environment. The notion of the self-formation of form is not only fundamental to the material structural element but also to its digital model. Instead of a final form, the computer model defines a provisional scheme of mathematical relationships described with variables and constants. The generic model, in which geometric relationships, material properties, and production processes are inscribed, then forms the basic element of a composite. In the composite, the individual elements are interactively linked with each other, creating flexible structures of mutual dependencies. A specific shape design is only created when numerical values are assigned to the variables. As soon as the element enters into a reciprocal relationship with other elements and is meant to fulfill certain functions, it receives its specific, individual form.

Such a modeling approach is exemplified in projects by the architects Caroline Høgsbro and Daniel Büning, who have worked with IMD students to explore non-standard dynamic articulations of bending-active elements through physical and digital models *(Fig. 1–2)*. The resulting works attempted to utilize the inherent material properties of bamboo and plywood, such as lightness, flexibility, and strength, within larger-scale constructions formed in such a way as to be self-supporting. Contrary to standard design processes where shapes can be defined in advance, the geometrical configurations of these flexible structures relied on the integration of the material behavior as the main agent driving the entire formation process. Their geometrical shapes were therefore not immediately predictable. The structures aimed to physically respond to environmental conditions and stimuli and, at the same time, create new environments. They served as a kind of translator, mediating between material, structure, and environment, between atmosphere and interaction, making one sensible to the other. Modeling in these cases refers to the development of a material interface, a transition medium between inside and outside or different spatial zones, a membrane that plays an active role in selectively transmitting natural movements such as light, air, and sound. No longer do models of this kind see themselves

2 IMD students, *Bending Plywood*, 2016, led by Daniel Büning in cooperation with Markus Matthias Hudert. Prototypes, plywood, metal.

as static coagulated results or objects that depict a temporally fixed state of form. Rather, they gain dynamism; they become changeable at any time and adaptable to different environments or changing requirements.

The notion of a self-regulating form becomes especially vivid in those models that react to environmental influences with changes. Some of the reactive material structures that Andrea Kondziela and Daniel Büning developed together with students of the IMD in recent years are based on the shaping behavior of viscous materials. The project *Solid Fluids,* for example, aimed to establish a grammar of viscous materials, like melted sugar, that interact with robots *(Fig. 3)*. Of special interest in projects like these is how viscous materials influence the active handling of models, and how their special characteristics are expressed in experimental modeling practices and thinking patterns. Viscosity is inherently relational, depending not only on fluid composition but also on temperature and environment. In this way, viscosity disrupts the binary assumption of the boundary between solid and liquid, fixity and flow. To explore the spatial potential of viscosity is to consider that in changing their state, viscous materials demand negotiation, temporal and environmental considerations, and tolerance for heterogeneity. An example of this is the project *Concrete Canvas,* dealing with flexible cement-impregnated fiber-reinforced fabric that is sensitive to fluids *(Fig. 4a–b)*. The process of material activation begins with wetting the fabric, followed by its spatial hanging in a specially constructed framework, in which the material organizes and folds itself under gravity. Following the practices of Antoni Gaudí, Heinz Isler, and Frei Otto, who used hanging chain nets and plaster bandage models to explore a novel convergence between architectural performativity and resource performance, this way of modeling can be considered an »analog« parametric design approach (Tomlow 1989; Ramm/Schunck 2002; Otto 1990: 2.28–2.32; 2.80–2.83). After drying and hardening, the fabrics are inverted to create open spaces formed by self-supporting surfaces. The thin shell concrete structures are only subjected to compressive forces, not bending or tensile forces, thus requiring no further support. Such projects are based on an understanding of modeling that focuses primarily on material transitions and transformations as active generators of design. Modeling in this case means developing an experimental arrangement setup and its physical, technical, and procedural basis to initiate and experience self-organizing material processes in an extended digital-physical environment.



This understanding of a model as a digital-material event in real time becomes more evident when the model is a direct expression of a dynamic and adaptive fabrication process that is unpredictable: Together with students of the IMD, Caroline Høgsbro and Lara Wischnewski experimented with precisely operating robots to extrude flexible, fluid-dense materials in the form of filaments and to deposit them layer by layer onto irregularly shaped objects according to the data information of a digital model *(Fig. 5)*. Technical systems of measurability and reproducibility were

3 IMD students, *Solid Fluids*, 2016, led by Andrea Kondziela. Models, heated and pulled sugar by a collaborative robot with various grid structures.

4+5 IMD students, *Concrete Canvas*, 2015, led by Daniel Büning. Prototypes, cement-impregnated fiber-reinforced fabric.

5 Daniela Krause, *Roboramics,* IMD, 2018, led by Caroline Høgsbro and Lara Wischnewski. Model, Limoges porcelain, printed by a collaborative robot with a ceramic extruder.

used to deliberately create structures that were unpredictable, unrepeatable, and transient. Here, 3D and robot technologies act as generators of moments of material incalculability. For example, the project *Roboramics* explores the idea of robotically positioning material in space from a distance by printing Limoges porcelain directly onto natural formations, e.g., a piece of rock. This approach was tested and analyzed through a series of prototypical structures. Despite digital control, it is difficult to fully predict and simulate specific deformations upon impact and the resulting local construction patterns to their full extent. Therefore, evaluation and feedback as integral parts of the model setup ensure that those components that have already been physically created are related to and continuously alter the digital model.

The models discussed here are »things« in the sense of Timothy Ingold. The British anthropologist calls them »gatherings of materials in movement« to emphasize their constant mutability and permanent mobility (2014: 65). Ingold pleads for a shift in perspective with his »ecology of materials«—away from form as a fixed and final material entity and toward a modeled environment as a force field and a circulation of resources, energies, and materials (2014: 60, 64–65). An architectural model that physically reacts to its environment and affects its surroundings is no longer to be regarded as an object. The range of external factors influencing it, as well as its own radius of action, reach beyond the space it materially occupies. It thus interacts with the environment in a relationship that is better understood as an ecosystem of interdependent processes. Of central interest here is the temporal dimension of models, which heralds a transformation of the conventional object-like static model concept in architecture.

Such concepts of material agency aim to activate the model as a creative instance. They pursue the assertion of a new, active paradigm of the model as a real-time system, which has many preconditions, as it presumes both the undisturbed functioning of the system and an intact relationship to the environment. Its definition as an ecosystem assigns the model the status of a living being (Höfler 2021). By implication, models that are characterized by inactivity are considered deficient.

Models in Reality

Computational material systems are not conceived as works of artistic imagination, but rather as seemingly objective results of reciprocal interactions between material, structure, and environment, and thus as artificial forms analogous to nature that are detached from any cultural or architectural historical context. Differences between living and non-living, analog and digital, past and present forms are thus deliberately obscured. Modeling in this sense can be understood as a cultural technique or technology that relates to processes of hybridization: It produces phenomena of the supposedly living that defy established patterns of interpretation such as the nature/culture difference.

These model approaches provide important impulses both for a renewal of design practice and for an alternative theory of architectural form that sets itself apart from the relevant provisions of the aesthetic tradition. Like the polemics of the architectural avant-garde in the early 20th century, the criticism of the computer pioneers at the turn of the 21st century is directed against generally accepted styles and design systems and is part of a paradigm shift from the predetermined, transcendent form to the self-generated, immanent form. Drawing on material and digital processes of self-formation, architects are working on developing dynamic, time-based concepts of form that seek to counter the tradition of static spatial orders with a pliable and flexible architecture.

In the course of this paradigm shift, the weighting of the individual work phases of the architect is shifting in favor of modeling, which is no longer just a stage on the way to the realized building but has become a generative process in its own right. Moreover, it is not only the concept of the architectural model that undergoes a fundamental reinterpretation in this way. The presented works provide examples of this change, for as modeling grows in importance as an open process, normative models in the form of ideal types or exemplary blueprints become obsolete. They are replaced by dynamic models that appear as a material event of a real milieu, without the result being foreseeable from the outset. The material components and the techniques of their digital processing form a heterogeneous structure that is designed by the architects but not completely determined. Their responsibility is thus partially ceded to an emergent, independently acting model. The model literally steps into action to give an idea of itself in two respects: On the one hand, it appears as an event that takes place in reality; on the other hand, it enables an idea of the complexity of the medial and material context of effects, which includes a multitude of highly heterogeneous factors. In this perspective, models are understood as technical-ecological assemblages that set spatial, material, and atmospheric processes in motion, thereby giving rise to a wide range of new ideas. This understanding thus directly contradicts the notion of the computer model as a »digital twin« as negotiated in the current debate about the »metaverse« (Gramelsberger 2023). The digital twin represents an intended or actual physical product, system, or process of the real world. It is understood to be an indistinguishable digital counterpart used for simulations, testing, and monitoring; the digital twin concept is led by the virtual object, which the real object has to follow or adapt to. But how helpful is it to distinguish between a »real« object and its »digital twin« model and to recognize in models merely advanced illusionism? Ultimately, models never represent *real* phenomena—they are distinct, and they generate new reality relations and phenomena.

Bibliography

Alberti, Leon Battista (1485): *De re aedificatoria.* – English translation: *The Ten Books of Architecture: The 1755 Leoni Edition,* transl. by James Leoni, New York: Dover Publications, 1986.

Carpo, Mario (2009): »Revolutions: Some New Technologies in Search of an Author,« in: *Zona: For the Observation of an Unstable Territory* 3, 14–17, http://pro.unibz.it/library/bupress/publications/fulltext/Zona3.pdf, accessed January 1, 2024.

Gleiter, Jörg H. (2022): »The Promise of an Object: Design Processes as Processes of Theory Construction,« in: Caterina Barioglio/Daniele Campobenedetto/Andrea Alberto Dutto/Valeria Federighi/Caterina Quaglio/Elena Todella (eds.): *Innovation in Practice in Theory: Positioning Architectural Design and Its Agency,* Novato, CA: Applied Research and Design Publishing/ORO Editions, 43–53.

Gramelsberger, Gabriele (2023): *Philosophie des Digitalen zur Einführung,* Hamburg: Junius.

Hensel, Michael/Menges, Achim, eds. (2006): *Morpho-Ecologies,* London: AA Publications.

Höfler, Carolin (2018): »Modelloperationen. Zur Formierung gesellschaftlicher Wirklichkeiten,« in: Christoph Rodatz/Pierre Smolarski (eds.): *Was ist Public Interest Design? Beiträge zur Gestaltung öffentlicher Interessen,* Berlin: transcript, 283–311.

Höfler, Carolin (2021): »Model Operations: Morphogenesis and the Design Process,« in: *Perspectives on Science: Historical, Philosophical, Social* 29/5, 602–626.

Ingold, Timothy (2014): »An Ecology of Materials,« in: Susanne Witzgall/Kerstin Stakemeier (eds.): *Power of Material/Politics of Materiality,* Zurich/Berlin: diaphanes, 59–65.

Mahr, Bernd (2008): »Ein Modell des Modellseins. Ein Beitrag zur Aufklärung des Modellbegriffs,« in: Ulrich Dirks/Eberhard Knobloch (eds.): *Modelle,* Frankfurt a. M.: Peter Lang, 187–218.

Otto, Frei (1982): *Natürliche Konstruktionen. Formen und Konstruktionen in Natur und Technik und Prozesse ihrer Entstehung,* Stuttgart: Deutsche Verlags-Anstalt.

Otto, Frei, ed. (1990): *IL 25, Experimente. Form Kraft Masse 5 / Experiments: Form Force Mass 5,* Mitteilungen des Instituts für leichte Flächentragwerke der Universität Stuttgart, Stuttgart.

Ramm, Ekkehard/Schunck, Eberhard (2002): *Heinz Isler, Schalen,* 3rd supplemented edition, Zurich: vdf, Hochsch.-Verl. an der ETH.

Tomlow, Jos (1989): *IL 34, Das Modell. Antoni Gaudis Hängemodell und seine Rekonstruktion / The Model: Antoni Gaudí's Hanging Model and Its Reconstruction / El modelo. El modelo colgante de Antoni Gaudí y su reconstruccion,* Mitteilungen des Instituts für leichte Flächentragwerke der Universität Stuttgart, Stuttgart.

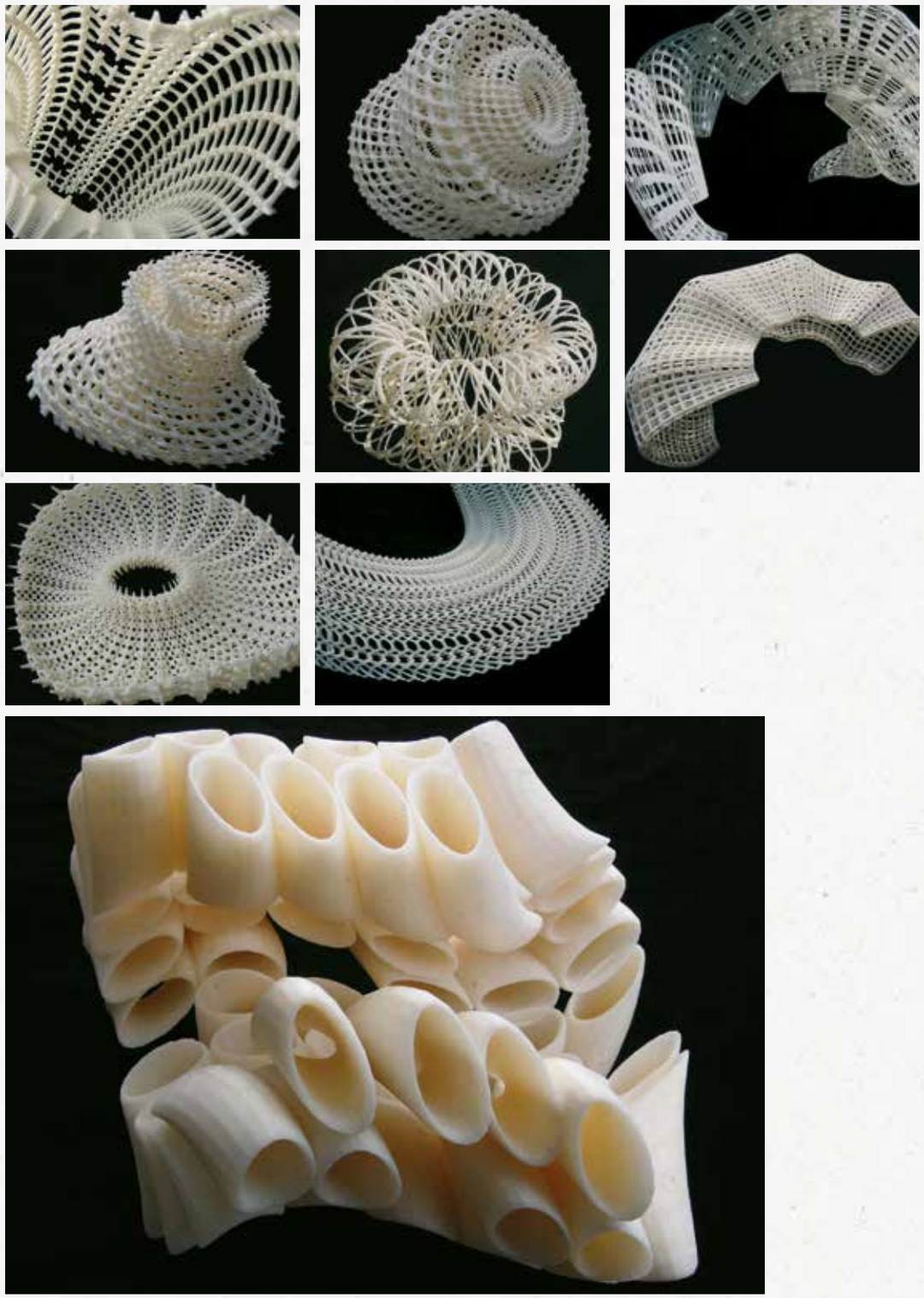
Yaneva, Albena (2005): »Scaling Up and Down: Extraction Trials in Architectural Design,« in: *Social Studies of Science* 35/6, 867–894.

Year	2008
Participants	Kyan Etemadi, Alexander Hummel, Fahim Mohammadi, Isabella Örtel, Jan Pingel, and Arne Rosenhagen
Led by	Prof. Matthias Karch
With the support of	Matthias F. Richter

Smart Surfaces

The workshop covers the 3D computer graphics application Autodesk Maya and the SmartDuplicate plug-in. At the workshop, each participant materializes a computer-generated structural 3D model using digital modeling techniques. The node-based program Maya is particularly suited for creating digital environments based on a structural connection between form and information. Essential to digital structures is the reciprocal relationship between the whole and its parts, which interact flexibly and topologically. SmartDuplicate is a plug-in for Maya that allows the creation of duplicate objects along spline and non-uniform rational basis spline (NURBS) surfaces. By using a NURBS curve as a guide object, it is possible to create complex structures from individual elements without compromising the deformability of the overall construct.

The parametrically generated shapes are 3D printed in collaboration with Stratasys, USA.



Time-Based 3D Printings

Year	2010
Participants	Ulrike Knauer and Robert Uhl
Led by	Prof. Matthias Karch
With the support of	Thilo Aschmutat and Matthias F. Richter
In cooperation with	Norbert Linda and the CNC milling lab of the HAWK Hildesheim

nDynamics

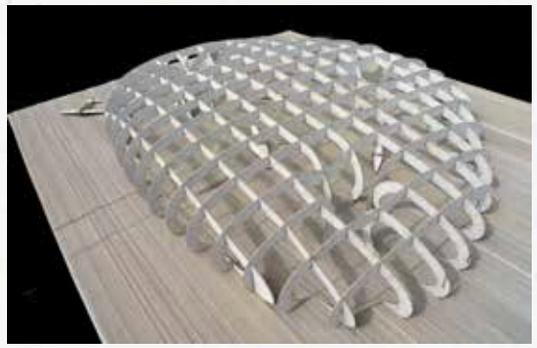
Working With nCloth Geometries

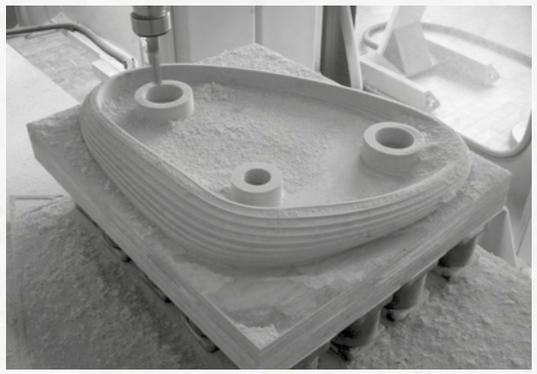
The latest version of the Maya software further enhances the capabilities of the so-called »nDynamics.« It includes geometries such as »nMeshes« or »nParticles,« which can be configured with real physics properties such as gravity, elasticity, friction, and more. These elements interact dynamically with each other or with passive collision objects over a given time frame, and their physical behavior can be precisely controlled.

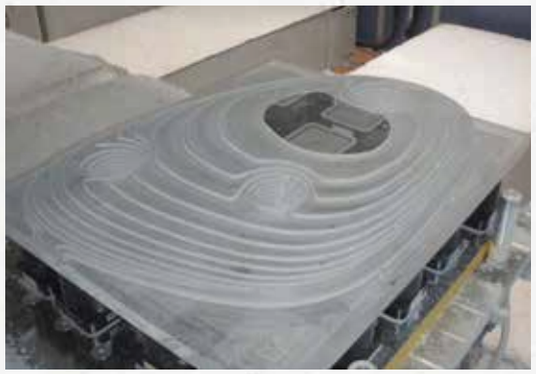
In this workshop, we focus exclusively on the so-called »nCloths,« which are nMeshes, polygonal surfaces that are always associated with a »nucleus« in the native Maya node structure. This nucleus determines the physical behavior of the nCloths among each other and with so-called »passive colliders.« Within the nCloth interface, its physical properties, such as elasticity, stiffness, positive or negative gravity, mass, friction, or recovery energy after deformation, can be controlled.

Each of these properties is keyable, meaning they can be assigned keyframes on a timeline, allowing them to change over time. In an architectural context, nCloth is particularly well suited for simulating wide-span structures, membranes, facades, halls, as well as inflatable envelopes and chain models. Through the sophisticated capabilities of »nConstraints,« the dynamic deformation events of nMeshes can be controlled in a manner similar to how a disk jockey combines, collages, samples, and fuses musical modules to create a unique sonic experience. These nConstraints, represented by control points, lines, and surfaces, are also keyable, allowing them to perform independent movements on the timeline and be active or inactive as needed.

Ulrike Knauer and Robert Uhl: *A Design for an Airplane Hangar.* CNC milling and laser cutting models.







Year	2008
Participant	Fahim Mohammadi
Led by	Prof. Matthias Karch
In cooperation with	Norbert Linda and the CNC milling lab of the HAWK Hildesheim

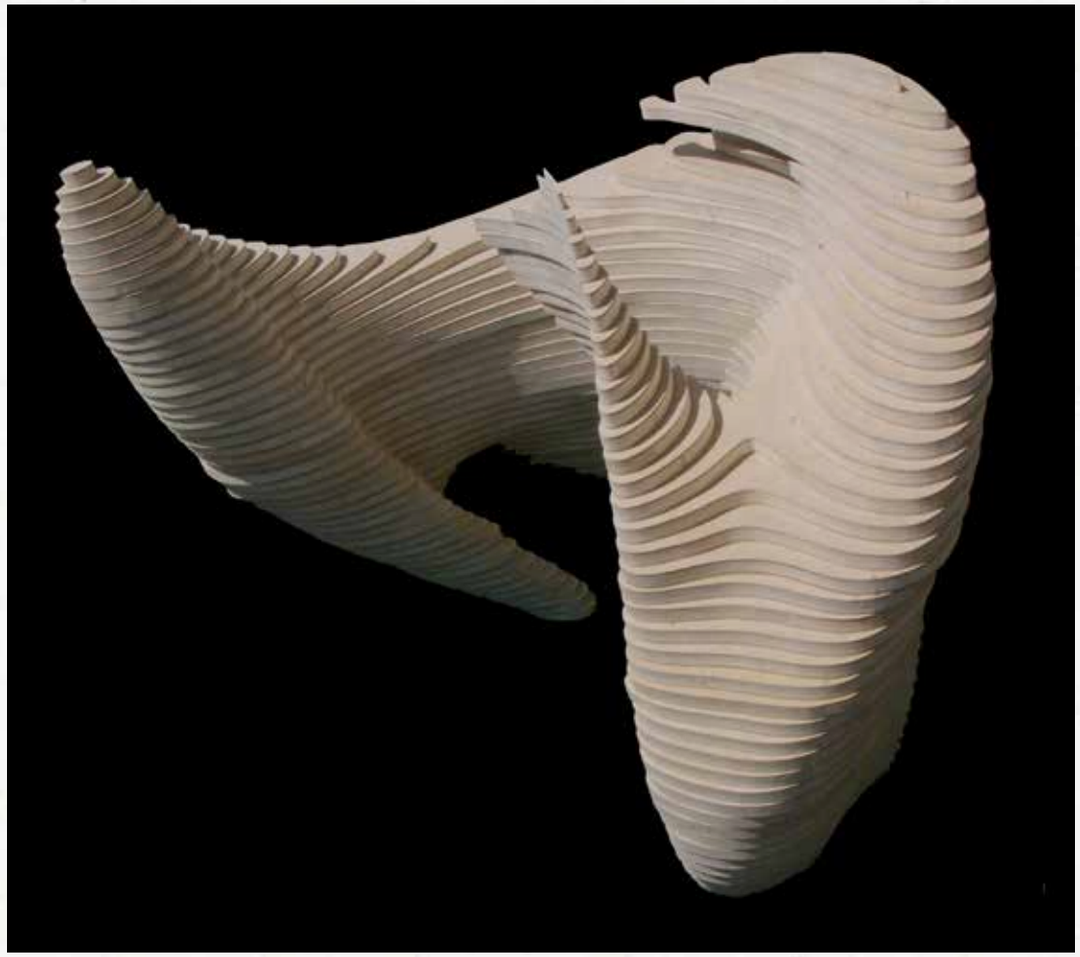
The Imperfect Form

Early Forms After William Shakespeare's *Twelfth Night, or What You Will*

The project explores the generation of time-based forms. The starting point of the project is the development of a scenography for William Shakespeare's play *Twelfth Night, or What You Will.* Based on the theatrical practices of disguise, masking, and misdirection, the scenographic development is less about finding definitive spaces and forms than it is about an ongoing process of transformation. The design process begins with the development of »early forms«: undifferentiated shapes that need to evolve. They are generated primarily through the dynamics of digital simulations of physical forces such as gravity, turbulence, and non-linear deformations. In each act of the drama, an early form evolves into a complex spatial system through a continuous process that is never complete.

The exemplary realization of one of these time-based forms for the fifth act of Shakespeare's drama was done in collaboration with Norbert Linda and the CNC milling laboratory of HAWK Hildesheim using a 5-axis CNC milling machine.

Fahim Mohammadi: *Trans-Form.* CNC milling model.



Year	2014
Participants	IMD students
Text	Andrea Kondziela
Led by	Andrea Kondziela

Cut to Fit

Digital Manufacturing

»Making becomes knowledge or intelligence creation. In this way, thinking and doing, design and fabrication, and prototype and final design become blurred, interactive, and part of nonlinear means of innovation.«
Michael Speaks (2005: 75)

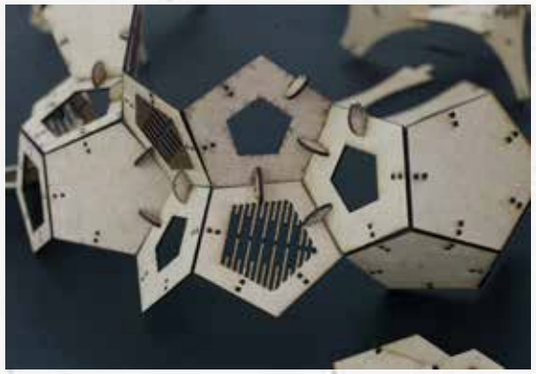
In contrast to the avant-garde design approaches of the 1960s and ‘70s, where significant theories preceded each movement, Michael Speaks argues that contemporary experimental architecture is no longer characterized by revolutionary theories. Instead, it is profoundly influenced by rapid and significant technological advances in digital design tools and architectural construction through digital fabrication techniques. He identifies »Interactive Prototyping« as a new design methodology that allows designers to develop specific design intelligence during the creative process.

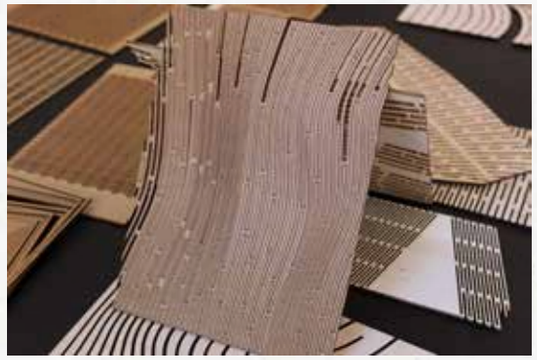
This project aims to explore the potential of Interactive Prototyping as a working and research method and to integrate it into the students’ design practice. For the digital fabrication technique, students have access to a laser cutter. During the iterative process, questions about scalability, material properties, performance, and design specifications are addressed and answered using digital and physical models.

Drawing from an exploration of various cutting patterns and their impact on material properties, along with fabrication-related connection techniques, students develop designs for a spatial structure composed of numerous interlocked modular components. The core of innovation lies in the iterative design development and underlying logic of the modular component system. By the end of the course, one design is realized on a 1:1 scale to assess factors such as scalability, spatial qualities, and constructive aspects. It is this kind of speculative testing and prototyping that Michael Speaks calls »a form of thinking-as-doing that creates design knowledge« (ibid.).

Speaks, Michael (2005): »After Theory,« in: *Architectural Record* 193/6, 72–75.

Laser-cut prototypes for modular connection strategies.





Year	2009
Participants	Frederik Bakker, Stefan Mrosek, and Alina Schwichtenberg
Led by	Prof. Matthias Karch and Dr. Carolin Höfler

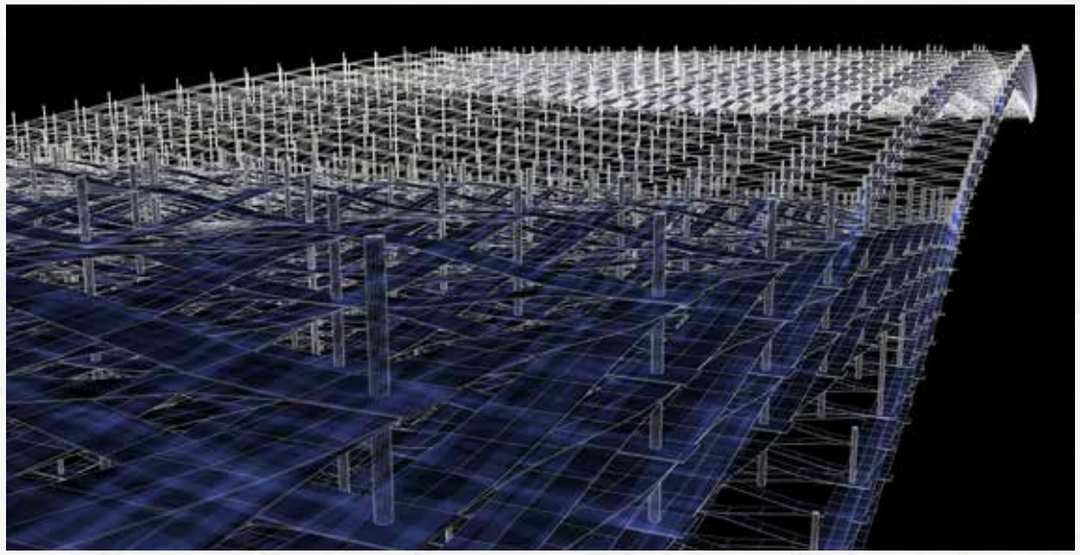
Simple Systems Complex Capacities

Computational Morphogenesis in Architecture

Based on an open competition organized by *ARCH+* magazine, this project focuses on developing a material system that interacts with the environment and responds to functional and performative requirements. The working hypothesis of the competition is that materials with the same chemical composition can develop very different properties. The difference is in the structure. The performance of natural material systems is based on structural differentiation, i.e., how the same material can react to changing requirements by different structuring. How this potential of structural differentiation can be used for architecture and construction is the central question of the competition.

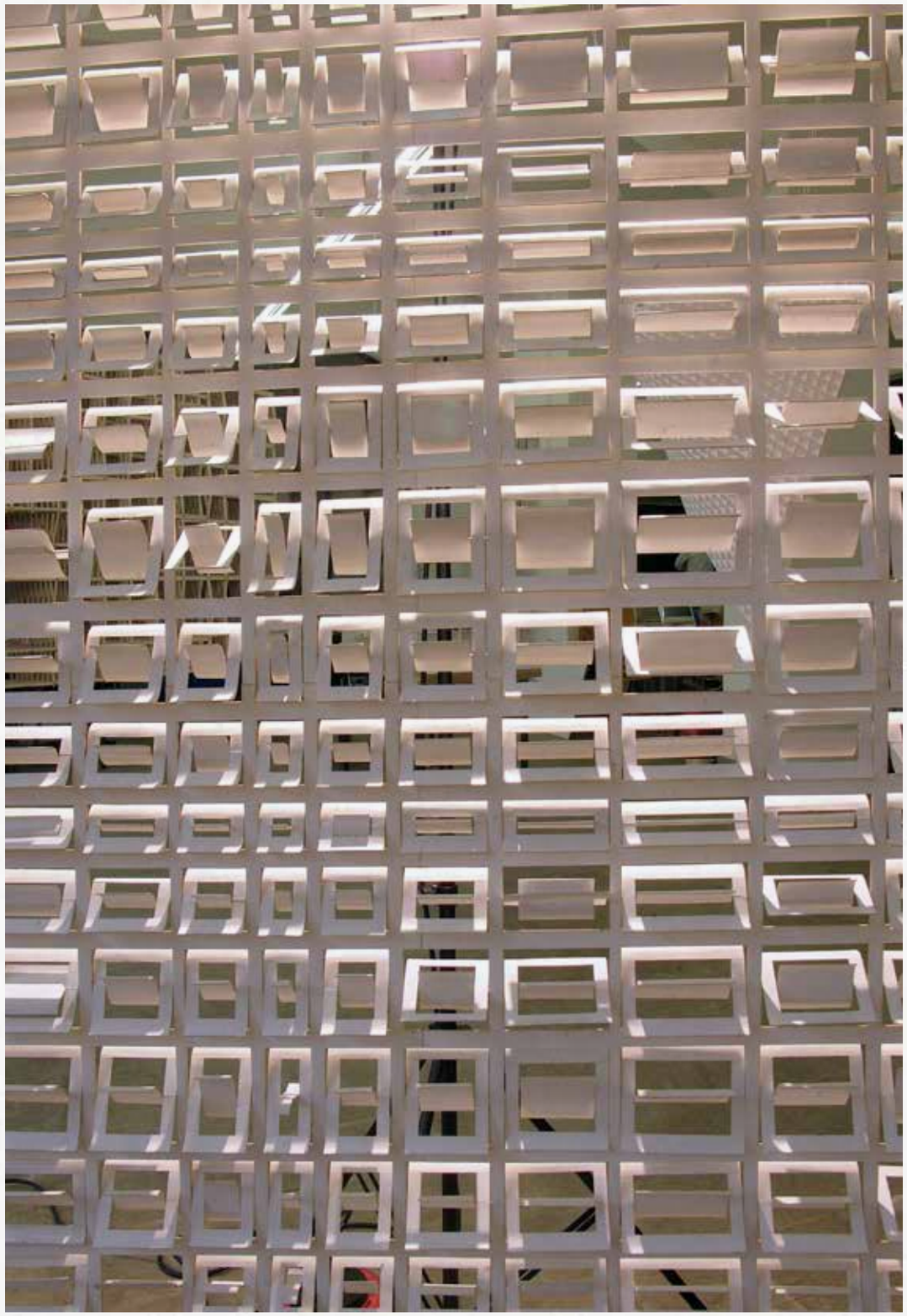
The first prerequisite is the choice of the right scale, which makes it possible to develop the space- and form-building, force-conducting, and climate-modulating properties of structures. The second prerequisite is the development of a systemic approach. But it is not all about the material. The concept of the material system encompasses both the material and the constructive, as well as the interactions with the environment that result from the properties of the material and the constructive configuration. The third prerequisite is the use of appropriate tools that both enable the differentiation of structures in the design process and create an interface with production. The project aims to rethink architecture as a systemic interplay of form, material, and structure.

Frederik Bakker: *Three-Dimensional Mesh*. Model and digital system drawing.



Stefan Mrosek
Repetition and Difference

Model.



Alina Schwichtenberg
Curved Foldings

Model.

Year	2016
Participants	IMD students
Text	Daniel Büning
Led by	Daniel Büning
Structural advice	Dr. Markus Matthias Hudert, Aarhus University

Bending Plywood

Creating Connection and Community

In this design course, students conceive and realize a space- and community-building installation made of bent plywood for the foyer of the Forum building of Technische Universität Braunschweig. The design process takes into account the local and spatial conditions and dynamics of this location. The course works with digital-analog form-finding strategies combined with skilled techniques to create a comprehensive installation consisting of numerous individual modules. The workshop focuses on the development of an intelligent module capable of generating geometrically complex structures through its embedded construction logic and multiplication capabilities. Using recent developments in simulation software, physical form-finding methods can be applied in a digital design environment, such as Rhinoceros 3D. The implementation of a digital workflow allows students to maintain control over the complex geometry of the resulting spatial installations throughout the manufacturing process.

The IMD team from left to right:
Daniel Büning, Philipp Reinfeld, Katharina Puhle, and Andrea Kondziela.

Bent plywood installation in the foyer of the Forum building of Technische Universität Braunschweig.

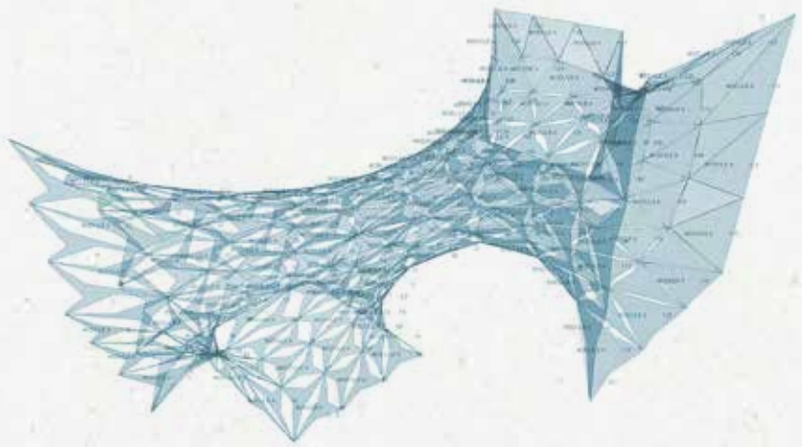
Year	2014
Participants	IMD students
Text	Daniel Büning
Led by	Daniel Büning

Dissolving Funnel

On the Fragility of the Digital

Dissolving Funnel **is an installation project that explores the concept and manifestations of fragility in the context of digital manufacturing processes. Using a digital fabrication sequence consisting of 3D modeling, simulation, and CNC laser cutting, an increasingly dissolving, lightweight, fragile, and temporary structure is created. In the final version of the spatial network configuration, distance-based constraints are added to create the effect of a gradually dissolving installation depending on the viewer's perspective. The overall installation is divided into 324 individual flat triangular panels to facilitate two-dimensional laser cutting. Each element is numbered to facilitate sorting during the subsequent assembly process. The individual pieces are aligned and joined to form flat strips that are folded into circular rings to create the overall shape. In this way, what is fragile and floating becomes the consequence of the standardized and rationalized, which is normally seen as its opposite.**

Paper laser-cut installation.



Year	2015
Participants	IMD students
Text	Daniel Büning
Led by	Daniel Büning
In cooperation with	Norbert Linda and the CNC milling lab of the HAWK Hildesheim
Structural advice	Dr. Markus Matthias Hudert, Aarhus University

Woven Wood Wall

A Morpho-Ecological Experiment

The *Woven Wood Wall* project pursues the modulation of light and shadow through a structured surface-active modular system, parametrically defined by two sub-systems: the shape of the modules and their distribution on the surface. The aim of the project is to materialize 25 individual modules that follow a simple stacking logic and, at the same time, form a self-supporting structural system when assembled.

The structure of the wall system is created parametrically using »Grasshopper,« a visual programming environment integrated with Rhino's 3D modeling tools, to allow precise control during the design process and a high degree of flexibility in managing digital model updates during the production phase. Using a parametric design environment, the 25 double-curved modules, each consisting of two individual parts, can be precisely modified and controlled in real time. Because each element is geometrically unique, there are angular deviations of up to ten degrees between the centerline of the modules and the vertical sliding direction, which is implemented as a uniform path of motion for all elements, depending on their local position within the wall system.

In addition to the precise implementation of the joint system and the preparation of the production data set, Grasshopper is also used to integrate simulation data. In this case, an »Autodesk Ecotect« solar simulation is run to determine the radiation values for each of the 25 underlying quad surfaces on which the modules are based. Consequently, the overall appearance of the perforated wall is gradually changed by modifying the geometry of each individual element based on the locally determined radiation values to improve the shading performance.

This is achieved by modifying the individual modules based on three parameters: 1) the width of the central strip, 2) the total depth of the module, and 3) the variable thickness of the top element. A high radiation value results in a flat module with a wide web and high wall thickness to minimize it, while a low value has the opposite effect. As a result, each module has a unique geometric appearance that is a direct result of the simulation data parametrically linked to the 3D model. The porosity of each panel is therefore not a random choice but is directly influenced by the extracted simulation values.

Woven wood wall installation for the study of light-shadow modulation.

Year	2011
Participants	IMD students
Text	Stefan Neudecker
Led by	Stefan Neudecker

Space Inversion

Reenvisioning the Knot in Architecture

The goal of the project is to design reconfigurable material systems from intelligent, serially producible modules and to implement exemplary configurations in physical 1:1 mock-ups. The modular systems should be able to freely occupy three-dimensional space and generate a high degree of spatial differentiation through intelligent arrangement rules.

The design process is closely linked to the manufacturing processes of a computer-controlled hot-wire cutting machine and the structural properties of the lightweight plastic polystyrene. Form-finding, digital simulation, and integral manufacturing are considered to be parts of one coherent process based on the individual study of periodic and aperiodic lattices. The knowledge gained helps to derive individual basic spatial modules and transition into analog and digital model studies. In the end, complex spatial systems are formed from numerous »virtual« individual modules, whose spatial relationships are made comprehensible by self-developed programs.

Knots without Lines

If we consider built architecture as a modular system of components, fundamental geometric relationships and associated rules of arrangement play a central role. Grids are usually used to define the different structures of a building. A volume or surface can be divided into smaller individual elements that are repeated at different scales. In this way, architectural structures are decomposed into self-similar assemblies, then into individual components, and finally, after several iterations, into basic molecular elements.

While in computational design, grid systems are usually developed only after numerous transformations, such as the scaling, compressing, stretching, and twisting of volumes and surfaces, in order to be able to constructively implement individually shaped elements, the reverse approach—i.e., the investigation and development of grid systems at the beginning of the design process—holds great potential: Computer-aided fabrication processes are thus fundamentally simplified, while at the same time offering great creative freedom.

The *Space Inversion* structures shown are based on regular periodic partitioning rules or are hybrid systems consisting of aperiodic and periodic elements. Each of these systems consists of a maximum of four interconnected standard elements. Nodes and connecting lines merge to form a spatial and constructive module.

Material Feedback Loops

The design characteristics of each module are largely determined by the structural properties of the polystyrene material, the manufacturing process, and the possible joining techniques. Design ideas developed on the computer or on small material models must therefore be adapted to the specific material and production conditions.

The modules are manufactured using the modified computerized hot-wire cutting machine and intuitive software tools developed specifically for this application to manage the design specifications. Using Rhino, an architecture-oriented 3D modeling program, the edges of virtual volumetric objects can be converted into cutting paths and sent directly to the production machine.

Many design and engineering problems arise only after the first full-scale prototypes have been produced: Weak joining systems, production-related material shrinkage, surface defects due to cutting paths, and positioning errors in multiple cuts are difficult to predict in advance and may need to be solved by improved module design and intelligent adjustment of machine settings. Finally, mass production requires further optimization in terms of production time, optimal use of materials, manufacturing processes, and quality assurance.

Working with the computer-controlled hot-wire cutting machine.

Test models.

Knot installation exhibited at the architecture pavilion of the Technische Universität Braunschweig.

Year	2008
Participants	IMD students
Led by	Prof. Matthias Karch and Dr. Carolin Höfler
Exhibition design	Prof. Matthias Karch and Dr. Carolin Höfler with Steffen Busse, Mirko Prahl, and Tanja Rudahl
With the support of	Anna Allenstein, Thilo Aschmutat, Kyan Etemadi, Manfred Fischer, Jennifer Hauger, Hannes Langguth, Jan Müller, Christoph Peetz, Katharina Puhle, Dr. Philipp Reinfeld, Matthias F. Richter, Nicolai Schlapps, Charlotte Schmidt, and Markus Willeke
In cooperation with	Norbert Linda and the CNC milling lab of the HAWK Hildesheim

Mediatures No. 1

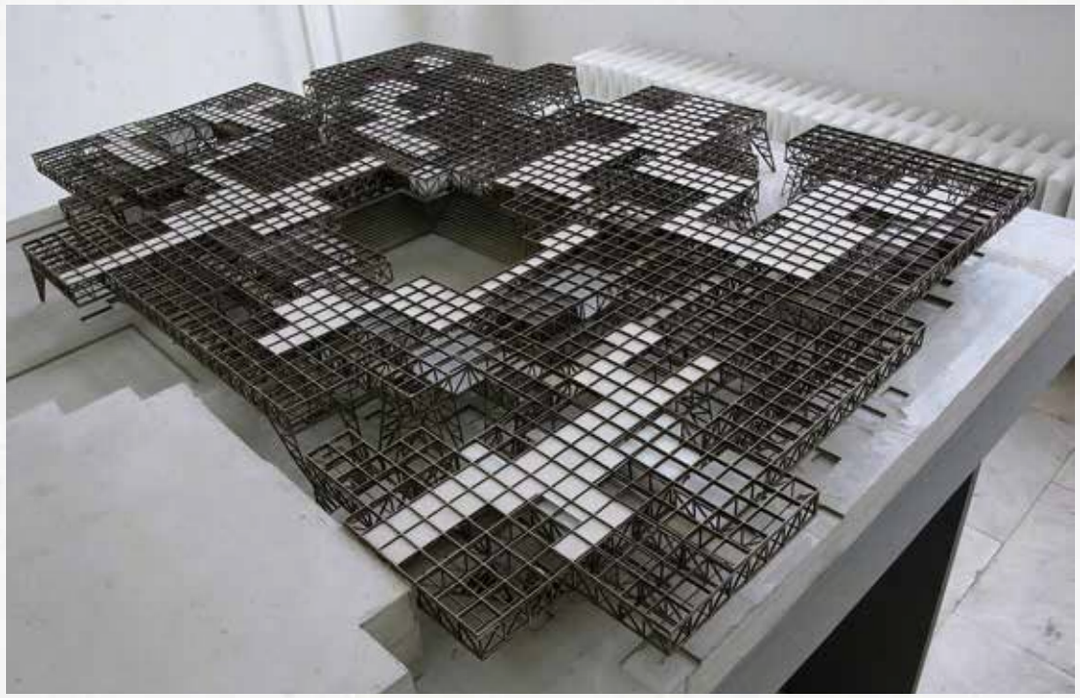
Exhibition at the Architektur Galerie Berlin

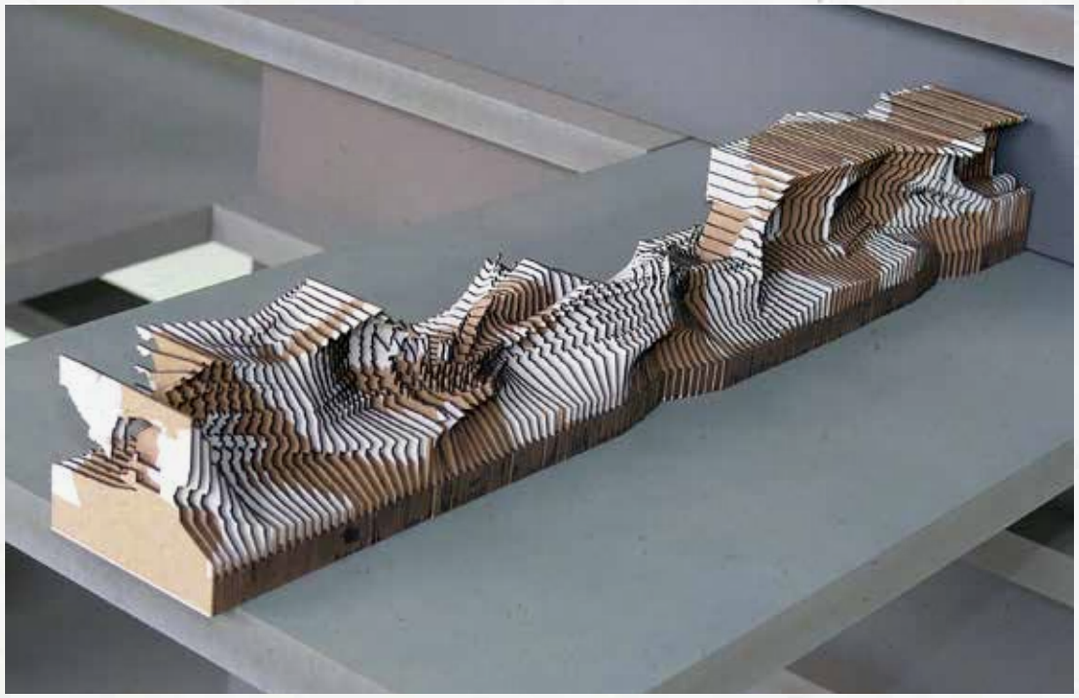
On the one hand, the research exhibition *Mediatures No. 1* explores the potential of digital form-finding in architectural contexts to develop and transform the reciprocal relationships between image, space, and action. On the other hand, the project addresses the experience of reception by focusing on the function, use, and effects of digital-material spatial forms.

The exhibited objects are so-called »mediatures,« an artificial word made up of »media« and »architecture.« They are material manifestations of computer-aided design processes as well as additive and subtractive manufacturing processes, such as 3D printing and laser cutting. They range from simple system studies to complex architectural designs resulting from the interplay of various process parameters in relation to the properties of the environment, program, geometry, and material. They are presented in an exhibition architecture designed and built by the team, transforming the gallery space into a research laboratory by combining the storage and display of computational architecture.

Through the introduction of time-based media and the intensive interweaving of architectural design, representation, and production, the subject of design shifts from object to process. The exhibits are therefore not understood as individual forms in the sense of unique pieces, but as temporary states of form and potential forms, which is why they are shown in series, repetitions, and variations. The character of serial variation is also reflected in the exhibition architecture, which covers the gallery space with various rhythmically organized grid structures.

Architektur Galerie Berlin, *Mediatures No. 1*





EXCEEDING & EMBODYING

The »Art-Architecture Complex,« Revisited: Interdisciplinary Perspectives on Architecture

Kassandra Nakas

This article looks at architecture and its teaching at the Technische Universität Braunschweig from an interdisciplinary perspective. It draws on a number of years of my teaching at the IMD _Institute of Media and Design that understood architectural design as not isolated from, but rather embedded in a variety of cultural discourses on spatial practice and theory. Designing architecture, conceiving spaces, and realizing buildings are manifestations of a cultural system that is fed by interrelationships between the (permanently) built environment, its medial mediation, and its social preconditions. What is more, the perception of architecture in these different contexts is characterized by a variety of media formats: from photographs, models, and drawings to digital and virtual modes of representation. They all combine to create an imaginary space in which architecture can mean far more than a physically built structure in a fixed location.

The aim of the courses held at IMD was therefore to create an awareness of artistic and cultural contexts which, beyond traditional notions of architecture, reflect the references, simulations, and animations of built spaces that constitute this imaginative space. Key points of reference were artistic, cinematic, and virtual allusions to architecture: installations, staged or scenic locations, and digital spaces of action.

As I will try to outline, an interdisciplinary view, fed by impulses from art studies as well as gender-critical and media theory, allows the social and aesthetic potentials of architecture to emerge more clearly. To begin, the much-discussed »spatial turn« in cultural studies obviously relates to the perception and reflection of architectural spaces, too. More precisely, installations and »situations« have been prominent spatial structures in the visual arts since the 1960s.

Installation art makes it possible to build social or individual, sensual or narrative, realistic or dream-like environments, which, in their comprehensive design, often have the character of a Gesamtkunstwerk (a »total« work of art). The fact that this branch of (post-)modern art was born in the post-war period of the 20th century was not least due to the break with the long prevailing modernist forms of the International Style in architecture at the time. Constant's *New Babylon,* the activities of the Independent Group in London, and Archigram's *Living City* were attempts to create playful and experimental forms of coexistence by crossing the boundaries between art and architecture, aesthetics and everyday life, countering rationalism and functionalism with physical and sensual forms of experience.

These architectural positions flourished in close exchange with visual art developments in Situationism and early Pop Art. In the United States, boundaries between art and everyday life were blurring when the first happenings took place. Their spiritual father Allan Kaprow not only developed a terminology of strategies that activate space, such as »happening« and »environment,« but fundamentally changed the understanding of space to something that should be experienced by one's senses.

His initial *18 Happenings in 6 Parts* (1959) took place in a provisional, semi-transparent plastic tarpaulin structure that he had installed at Reuben Gallery in New York. It produced a variable image that turned the effortless everyday actions of the performers into memorable events. Shortly after, Kaprow's works left the traditional locations of the art world and moved into the run-down backyards of apartment buildings or the courtyard of a former New York luxury hotel (*Yard,* 1961; *Courtyard,* 1962). These events focused on the collective revitalization of abandoned spaces through *building* new structures—even more so in the happening entitled *Fluids* (1967). This »architecture game« (Ursprung 2013) offered manifold references to architectural practice: the construction and disappearance of a house (made of ice blocks), whose form oscillated between temple, igloo, and warehouse, its collaborative production, which understood »building« as both an everyday and artistic practice, the local and semantic proximity to the »indifferent architecture« (Kaprow, quoted in Ursprung 2013: 192) of nearby warehouses, distribution centers, and fast food restaurants in Pasadena and Los Angeles, respectively. With all this, Kaprow turned architecture, the practice of building, and physical and symbolic spaces into cultural topoi that continue to inspire artistic discourse to this day.

The 1960s saw a rise in installation-based, expansive works by artists that conquered the cityscape. The term »environment« appeared in various contexts: In Kaprow's case, it indicated, quite broadly, »an art form that fills an entire room (or outdoor space) surrounding the visitor and consisting of any materials whatsoever, including lights, sound and color« (Moose 1962: n.pag.). This came close to work that we today refer to as installation art —with the difference that Kaprow's environments were closely

connected to his happenings. As such, they were always settings for concrete actions in physical space: narratively charged and characterized by everyday objects or, more precisely, by objects that appear like traces of an event.

Beyond that, Edward Kienholz's works are often referred to as »environments,« although they are settings of purely imaginative and never actual performative actions. Kienholz himself preferred the term »tableau,« which is linked to an array of meanings, such as »tableau vivant« and »scene.« »Environment« was a popular component of work titles in the 1960s and indicated their expansive, spatial dimension (see Gustav Metzger's *Liquid Crystal Environment* from 1965, for example). At the same time, it increasingly had an ecological dimension that has gained new relevance in today's installation art (think of Ólafur Elíasson or Andreas Greiner). In order to avoid the ecological connotation, however, artists such as Les Levine preferred to operate with alternative terms such as »place.«

In the spring of 1967, Levine wrapped the interior spaces of the Architectural League of New York in silver foil. *Slipcover: A Place by Les Levine* was conceived as a walk-in sculpture made of a tactile membrane of inflatable air cushions, whose silver Mylar foil light reflected colors and body outlines. That same year, Levine took part in the *Sculpture in Environment* exhibition with *All Star Cast (A Place)*, which turned the streets of New York City into a stage for artistic intervention in one of the first open-air sculpture exhibitions. Between Sixth Avenue's bank buildings and temples of consumption, two-meter-high, transparent, and convex Plexiglas panes formed temporary architectures and invited passers-by to enter and gain new perspectives on the city. With Mylar foil and Plexiglas, Levine opted for industrial, non-artistic materials that were only intended to last for the duration of his intervention. He spoke of »disposable art«—which he understood to exist in the service of a temporary spatial experience and which could be destroyed afterward.

Robert Smithson's dichotomy of »site« and »non-site« also fits into the series of terms that clearly illustrate the spatial expansion of art and its orientation toward architectural structures and landscapes in the 1960s. The term »situation« (from the Latin »situs«: location, position, local conditions, etc.) also plays a role in Michael Asher's architectural interventions, which mark the beginning of artistic institutional critique. In his influential oeuvre, galleries and exhibition halls are exposed as social spaces of exclusion, places of invisible work, and infrastructures of maintenance (cf. Peltomäki 2010).

Via a detour through art history since the 1950s and 1960s, a great deal can be learned about the symbolic power structures and contextual interdependencies of architecture as a cultural complex. This »Art-Architecture Complex,« to quote a book title by Hal Foster (2011), was at the center of my teaching at IMD, which addressed artistic appropriations of architecture with different emphases. Foster's book can be read, in the first place, as a critique of the design developments in the 1990s which entailed, in museum buildings especially, an architectural aesthetic that seemed to compete with artistic artifacts. In this present text, however, and in the context of the teaching program at IMD, the title is rather taken as a manifestation of an »architectural imperative« that is inherent to installation art and—given that this is one of the currently privileged artistic expressions—seems to be so to contemporary art in general. The recent surge of performance art usually does not take place in random spaces either, but often refers to their specific history and function. In other cases, architecture itself becomes the protagonist—this could be said of some particularly characteristic exhibition spaces. The Turbine Hall at the Tate Modern in London is a case in point, as its gigantic proportions relentlessly present the invited artists with new challenges in terms of content, technology, and dimensions.

My teaching program at the IMD aimed at taking into account these multi-layered aesthetic, social, and functional aspects of architecture. Architecture was reflected on as a topic for artistic discourse, be it as an expression of social and aesthetic principles, or in regard to its psychological implications. Then-current exhibitions, such as *Question the Wall Itself* (Walker Art Center, Minneapolis, 2017), served as starting points for discussing work by artist-architects such as Frederick Kiesler and Gordon Matta-Clark as well as architectural interventions by Ayşe Erkmen and many others. Artists like Louise Bourgeois, Rachel Whiteread, Gregor Schneider, and Do Ho Suh focus on the historical-psychological facets of built spaces, while others bring in gender-critical references to the history of architecture and interior design (Nairy Baghramian, Monica Bonvicini) or reflections of queer identities (Marc Camille Chaimowicz, Michael Elmgreen and Ingar Dragset, Tom Burr). Domestic interiors in particular play a central role from this perspective, which becomes clear when looking at historical designs by Adolf Loos, Mies van der Rohe, and Lilly Reich or Le Corbusier and Charlotte Perriand—which are submitted to critical revision by artists like Lucy McKenzie and Shannon Bool.

In a further step, the interdisciplinary take of artistic appropriations was extended to filmic and virtual media. In the run-up to the symposium »Entwerfen bildhafter Räume und begehbarer Bilder. Virtuelle Architekturen im Spannungsfeld der Disziplinen« (»Designing Pictorial Spaces and Walk-In Images: Virtual Architectures between the Disciplines«), organized by the IMD with the support of the Volkswagen Foundation in Herrenhausen Castle, Hannover in autumn 2020 (cf. Nakas/Reinfeld 2023), some of the courses were exploring early and contemporary imaginaria of »cyberspace.«

In its beginnings, »cyberspace« was seen as a place of emancipation, with gender boundaries and social norms suspended (cf. Haraway 1991). Today, even if this post-humanist utopia did not come to pass, artistic videos and computer games offer opportunities to leave behind essentialist and naturalistic subjectivities and body concepts, as in Lu Yang's 3D animated film *UterusMan* (2013). Affect theories and theories of embodiment in virtual spaces come to the fore, i.e., the idea that our perception is primarily linked to sensorimotoric processes and physical activity (cf. Kasprowicz 2020). This understanding, which valorizes the physical-sensory dimension, replaced the Cartesian concept of disembodiment which was long favored by cybernetics, conceiving the body as a passive recipient of human-machine interaction. In recent years, technological progress has contributed to a reevaluation of these forms of interaction, which have been tellingly explored in (fictitious) cinematic narratives of human bodies in virtual spaces since the 1990s. Literary, theoretical, and filmic imaginaria offered ways to historically reflect the development of digital and virtual spaces, while most recent VR experiences in the context of special exhibitions and the Hannover symposium presented opportunities for »self-experiments« in regard to the cognitive and sensual dimensions of perception in virtual spaces.

Such thematic and media expansions of theoretical teaching in architecture are indeed useful, as may be clear not least by the fact that computer games and virtual architectural presentation tools are a growing branch for practicing architects (cf. Gerber/Götz 2019). The courses at IMD, which were open to design students from the Braunschweig University of Art, offered opportunities for interdisciplinary exchange on a personal level, too. The »architectural imperative,« which makes architectural designing and building—in different media and formats—a defining practice and shapes our living environment in many different ways, can only be adequately considered and appreciated by looking beyond the disciplinary horizon.

Bibliography

Foster, Hal (2011): *The Art-Architecture Complex,* London et al.: Verso.

Gerber, Andri/Götz, Ulrich, eds. (2019): *Architectonics of Game Spaces: The Spatial Logic of the Virtual and Its Meaning for the Real,* Bielefeld: Transcript.

Haraway, Donna J. (1991): *Simians, Cyborgs, and Women: The Reinvention of Nature,* New York: Routledge.

Kasprowicz, Dawid (2020): »Virtual Embodiment,« in: Dawid Kasprowicz/Stefan Rieger (eds.), *Handbuch Virtualität,* Wiesbaden: Springer Gabler, 385–402.

Moose, Rose (1962): *Allan Kaprow's Words: About Allan Kaprow,* New York: Smolin Gallery, https://archives.sva.edu/blog/post/allan-kaprows-words, accessed January 1, 2024.

Nakas, Kassandra/Reinfeld, Philipp, eds. (2023): *Bildhafte Räume, begehbare Bilder. Virtuelle Architekturen interdisziplinär* (Architektur der Medien | Medien der Architektur, Bd. 2), Paderborn: Brill Fink.

Peltomäki, Kirsi (2010): *Situation Aesthetics: The Work of Michael Asher,* Cambridge, MA: MIT Press.

Ursprung, Philip (2013): *Allan Kaprow, Robert Smithson, and the Limits to Art,* Berkeley et al.: University of California Press.

Year	2005
Participants of the University of the Arts Bremen	Hyun-Jee Doh, Jana Fieckel, Antonia Gust, Agnes Hermes, Hyun-Ju Lee, Lin Lin Li, Isabell Marquardt, Ha-Young Na, Hiroko Oike, Natallia Panassiuk, and Matthias Repovs
Participants of the T.A.N.Z. Braunschweig	Sylvia Heyden and Peter Thiemann
Participants of the IMD	Imad Aljouda, Christiane Brüchner-Hüttemann, Ines Burkhardt, Nora Graw, Henri Greil, Nils Grieger, Malte Kaiser, Daniela Klose, Iunia Macavei, Annika Osteroth, Ulrich Pohl, André Rittershaus, Rolandas Sarapajevas, Gunnar Schulz, André Stossun, Rüdiger Wesskallnies, Hendrik Winter, Janine Woitoschek, and Maren Worthmann
Led by	Prof. Matthias Karch with Manfred Fischer, Jennifer Hauger, Torsten Heine, Dr. Carolin Höfler, and Marc-Aurel Jensen
Musical direction	Ulrich Sprenger
Scenic support	Pit Holzwarth
Choreography	Sylvia Heyden

Mediatures No. 2

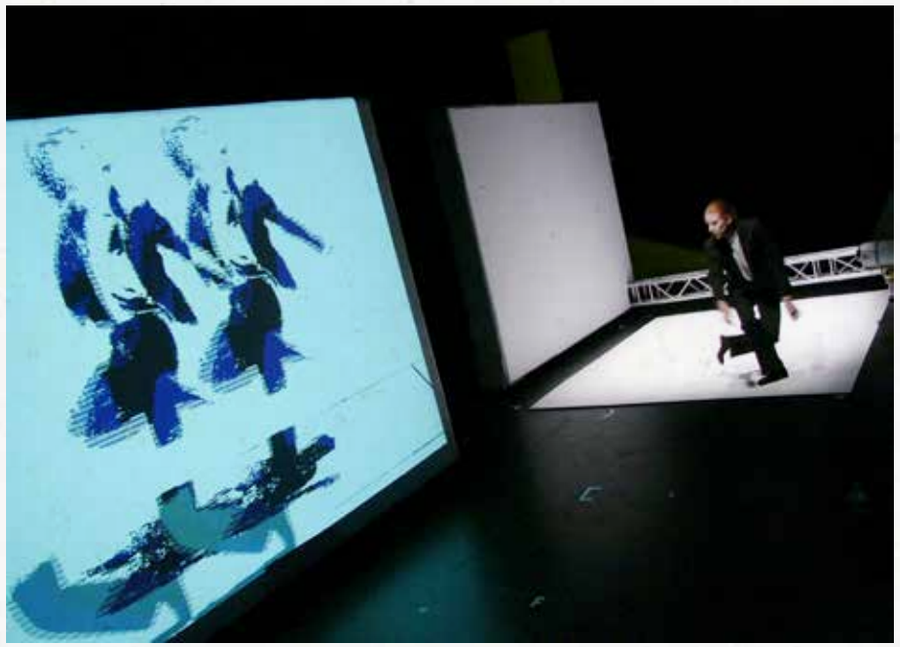
Interdisciplinary Performance at the LOT Theater in Braunschweig

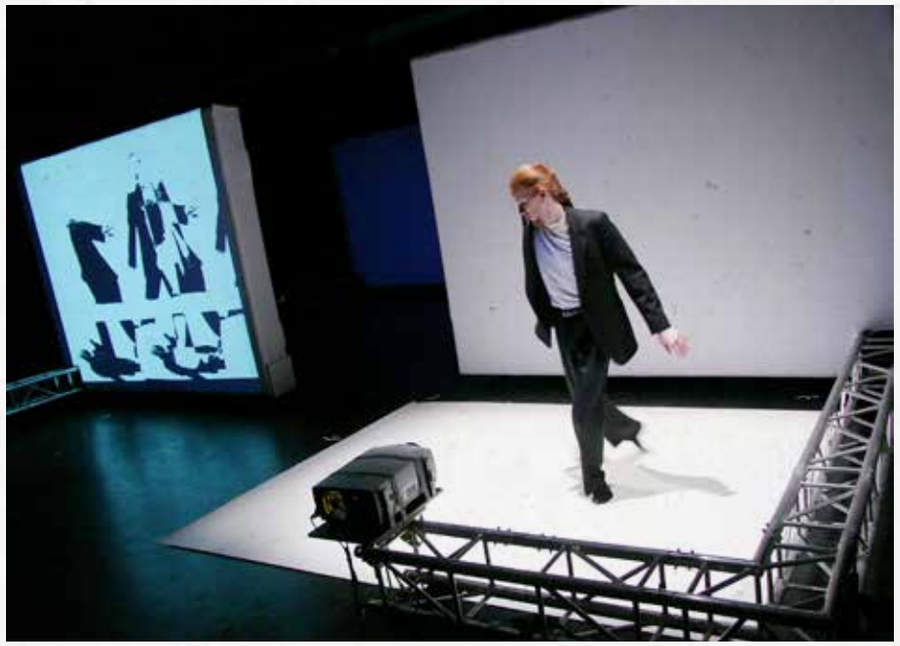
Mediatures No. 2 **is a series of short audiovisual performances that deal intensively with rhythm, timing, and duration as structuring moments of aesthetic perception. Digital moving images are interwoven with dance, sound, song, and light in physical space. Abstract forms and sound collages, structured by rhythm and timbre, visualize the phenomena of speed, deceleration, and repetition, synchronized with the positions and movements of the performers. The fusion of live performance, live singing, and digitally generated audiovisuals creates playful and poetic scenarios that blur the boundaries between real-physical and virtual reality.**

The public performance at the LOT Theater Braunschweig presents an interdisciplinary work by students from the Institute for Media and Design at the Technische Universität Braunschweig, opera singers from the University of the Arts Bremen, and dancers from the T.A.N.Z. Braunschweig.

LOT Theater Braunschweig, *Mediatures No. 2.* Performance »Time Spaces.«

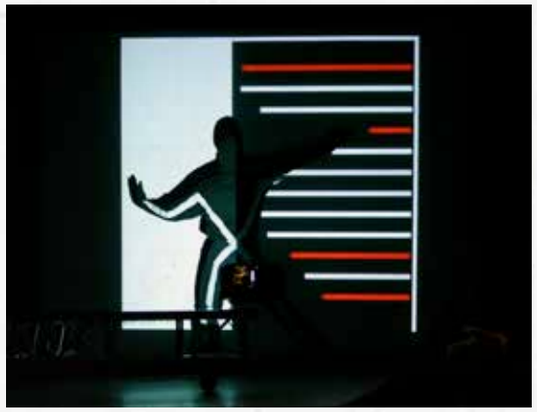
Performance »Afterimages.«





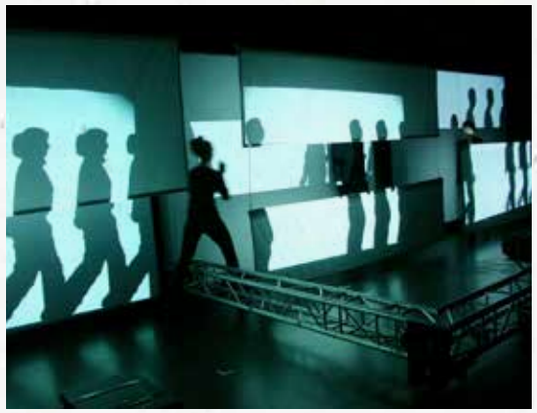
Performance »Split Screens.«

Performance »Split Bodies.«



Performance »Interferences.«

Performance »Rotation Moments.«



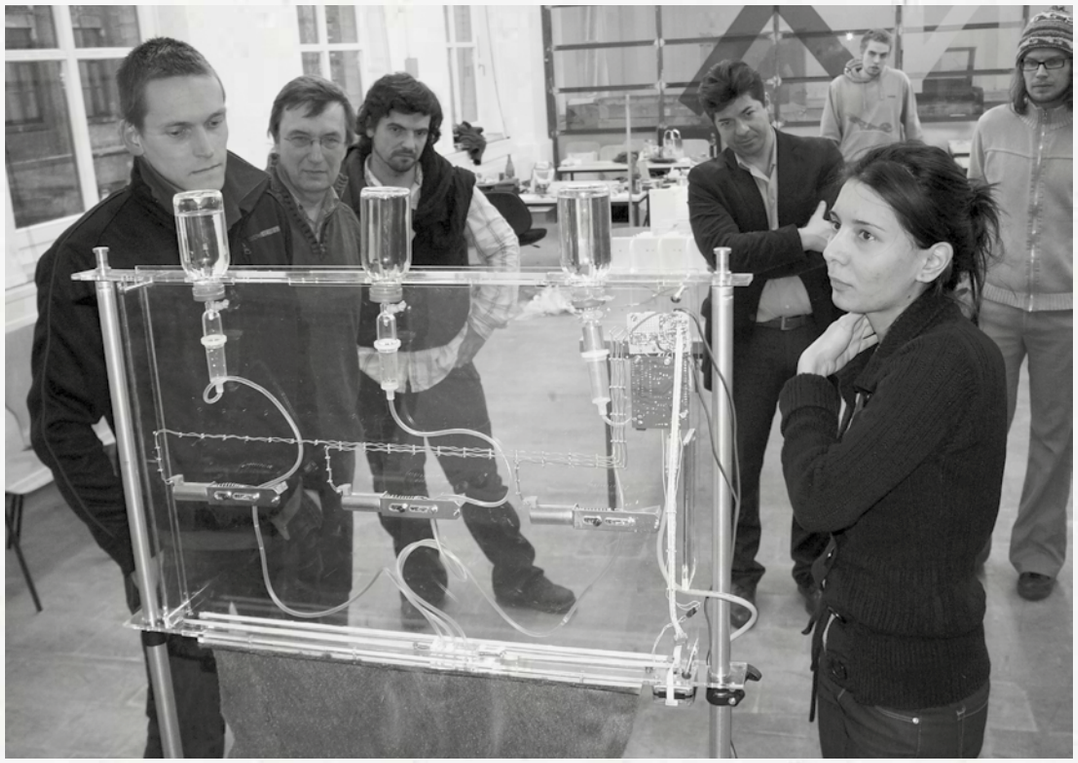
Year	2009
Participants	Anita Milewski, Jonathan Nestler, and Aysegül Tek
Led by	Stefan Neudecker

Data in Motion

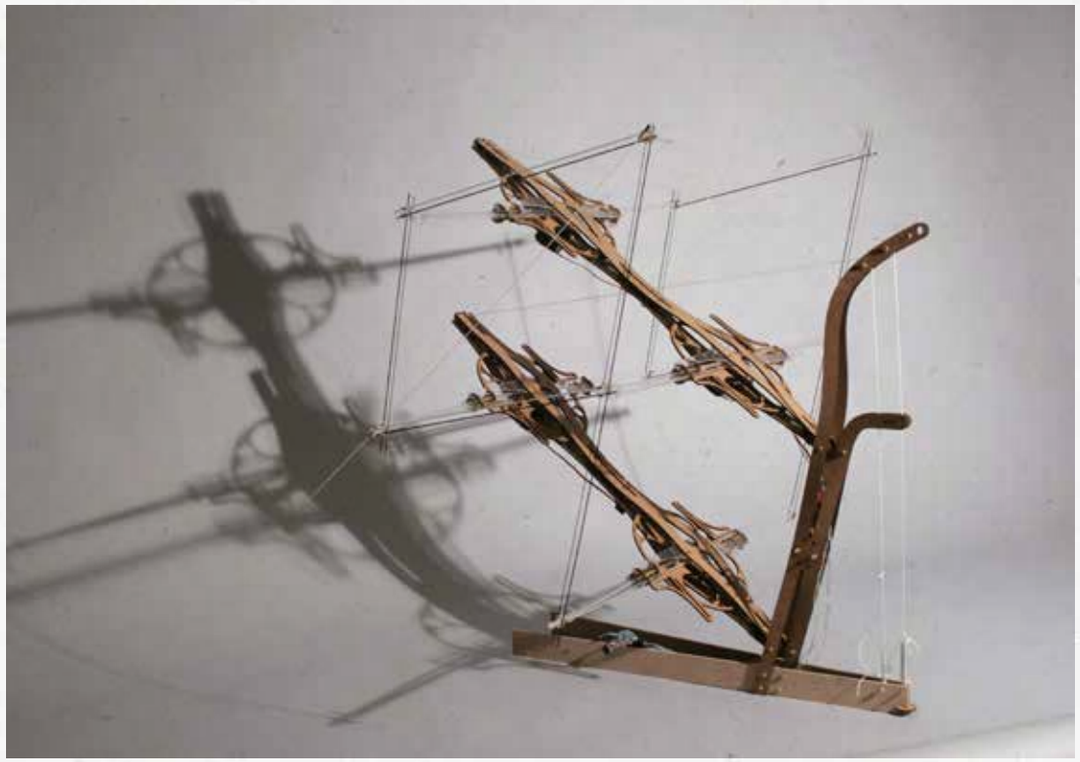
New Imaginaries of the Machinic, the Spatial, and the Real

The *Data in Motion* workshop explores real-time meteorological-geographic data in endangered spaces, such as data on air pollution or UV radiation, and their often-invisible effects on the human body. Developing autonomous machines, the participants explored the underlying mechanisms of data collection media and technologies. The strict geometric and filigree constructions allow the viewers to follow the entire logic circuit of the machines. However, it was not possible for them to grasp the individual conditions of the machines. While the machines openly produced an output based on the input, they simultaneously concealed the processing rules and thus manifested a strict self-referentiality. They performed physical realizations of thought experiments, functioning as subjective epistemological objects to raise fundamental questions about digital, technological, and complex systems and their entanglements with the sociopolitical sphere. The resulting projects seek to provoke new imaginaries of the machinic, the spatial, and the real.

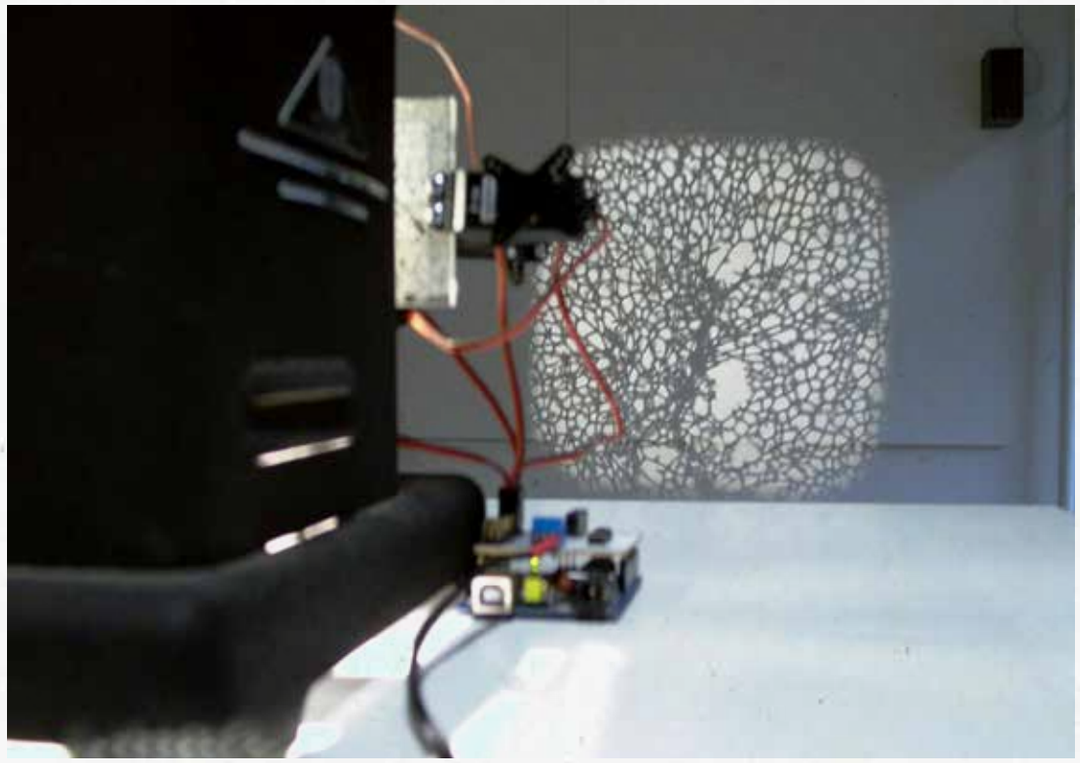
Aysegül Tek: *CO2 Data Plotter*



Jonathan Nestler
Weather Forecast Machine



Anita Milewski
Perforated Skin



Year	2014
Participants	Darja Möhlmann and Aljosa Bjelotomic
Led by	Prof. Matthias Karch and Daniel Büning

Time-Out Zone

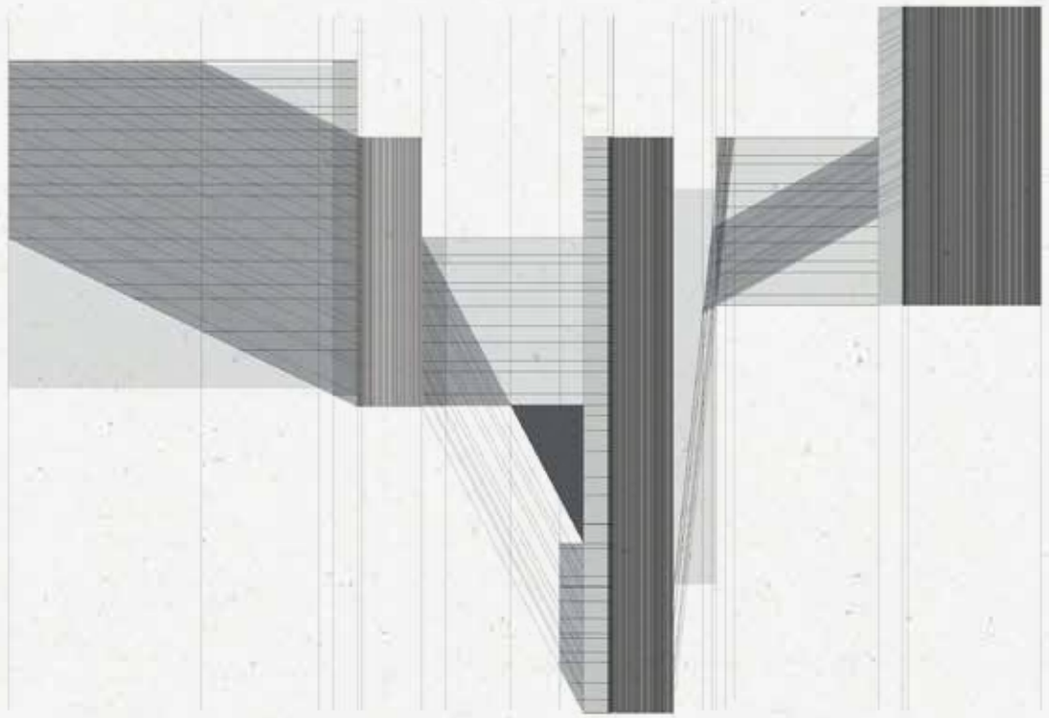
An Interactive Road Church in Michendorf

»Our highways are battlefields, their lanes a breakneck patchwork, bridges, and overpasses weathered into risk factors. […]. Deutsche Bahn is saving itself to death by cutting its workforce, failing to maintain its tracks, failing to provide new ICE trains, and temporarily closing major city stations […]. Strikes by air traffic controllers and airline staff make travel plans increasingly unpredictable […]. As travel risks increase, so does the need for security. This brings into focus a type of building that has long been considered a marginal phenomenon: the road church.«
Dieter Bartetzko (2013: n.pag. Translation: author)

Dieter Bartetzko's polemical analysis of travel today makes an important point: Mobility as a symbol and core element of modernity, as a synonym for progress and innovation, is in crisis. It is not only the increasingly dilapidated transportation infrastructure and the unsustainable economic conditions of employees that make travel a nightmare. The digital interconnectivity and automation of systems also make travel more uncomfortable, as every movement of travelers can potentially be controlled. In this sense, the project of a road church is subversive and dialectical: It aims to create a time-out zone through architecture, presence, and atmosphere—an interruption of the constant uncertainty and surveillance. Rhythm and structure as spatiotemporal forms of organization are at the heart of the design. The architecture is conceived as an interactive, rhythmic structure. It consists of linear elements that respond to changes in the weather and the movements of visitors. The road church at the highway service area Michendorf-Süd is a place where people of different religions can meet, get to know each other, and exchange ideas. It is also a home for people who don't follow any religions.

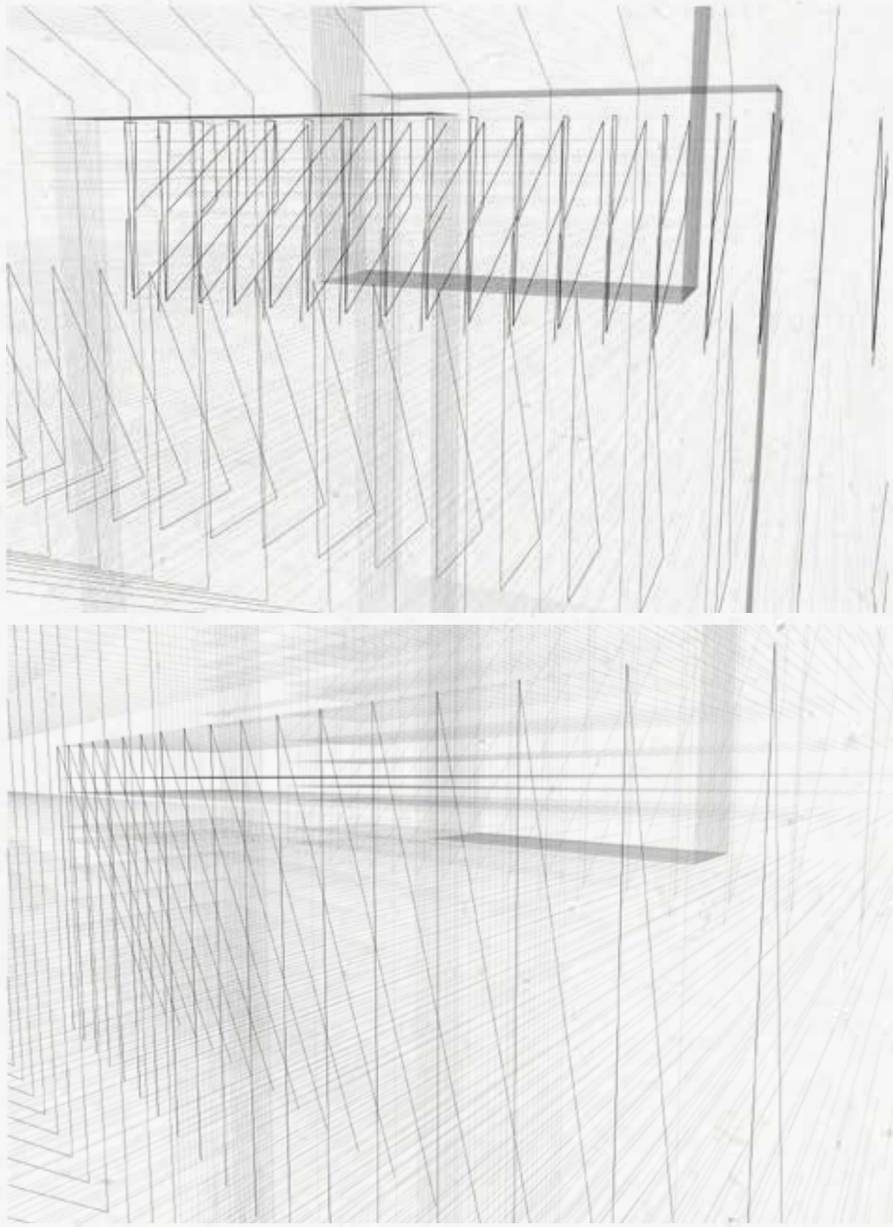
Bartetzko, Dieter (2013): »Neue Autobahnkirche Siegerland: Wenn Beten noch helfen soll,« in: *FAZ.NET – Frankfurter Allgemeine Zeitung,* https://www.faz.net/-gqz-7gkku, accessed January 1, 2024.

Darja Möhlmann and Aljosa Bjelotomic: *Time-Out Zone.* Rhythm study.

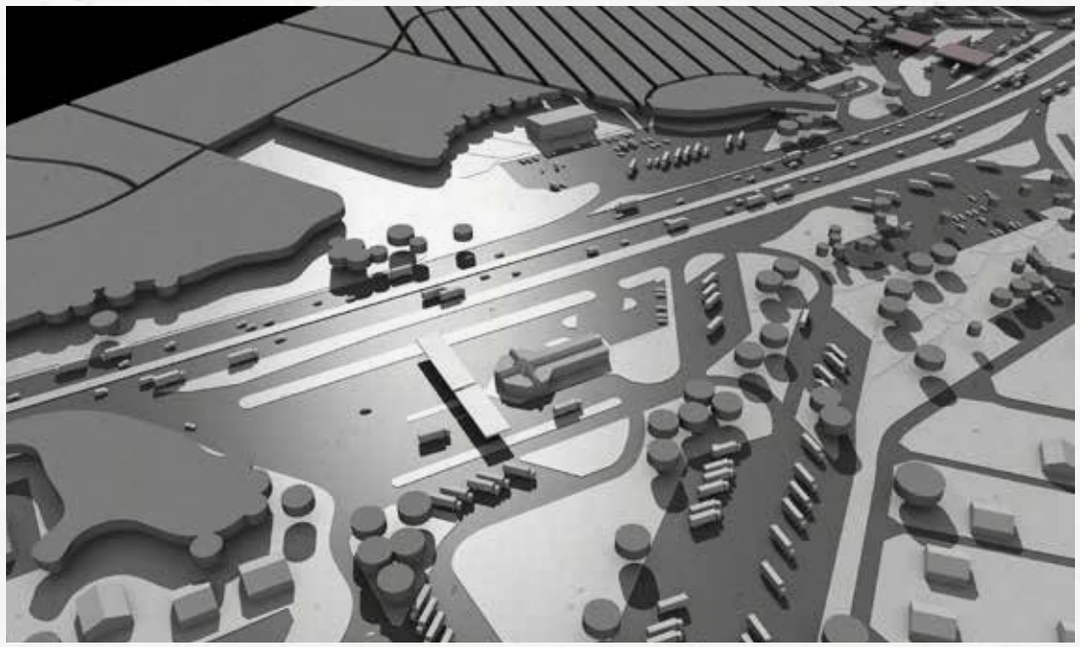


Darja Möhlmann and Aljosa Bjelotomic
Time-Out Zone

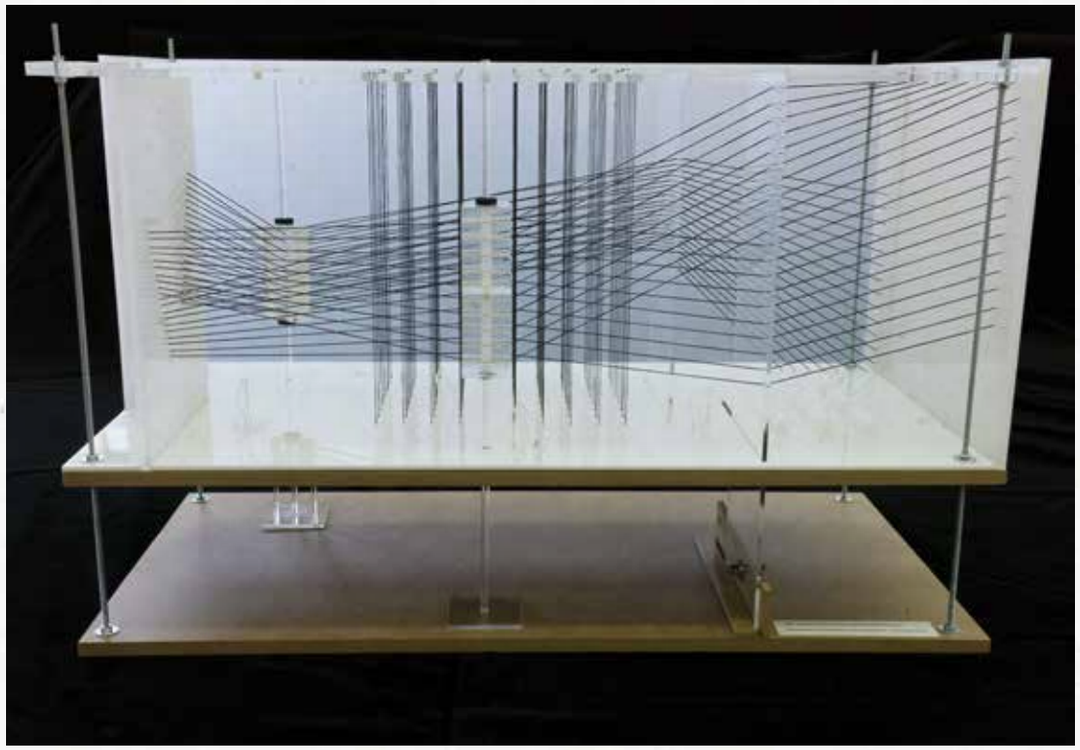
Rhythm studies.



3D rendering of the highway service area Michendorf-Süd.



Model of the road church as a rhythmic construction.



Year	2019
Participants	Darja Möhlmann
Led by	Prof. Matthias Karch and Prof. Folke Köbberling

The Third Space

A Center for Art and Media in Berlin

How do ideas and practices of public and private change when almost all functional and living spaces are controlled and managed by digital codes? What are the meanings and functions of space when it becomes a physical-digital environment—a third space? How can communal and communicative spaces be conceived in architecture in this field of tension between digital and physical, private and public activities? Founded in 1989, the ZKM | Zentrum für Kunst und Medien (»Center for Art and Media«) in Karlsruhe, Germany, has made a name for itself in the cultural and exhibition context by exploring the changes in the understanding of reality brought about by the digital. Using performative, narrative, and spatial means, it addresses questions on the threshold of the digital revolution. The ZKM is located in the empty halls of a former munitions factory. The huge building represents the era of industrial architecture of the late 19th century. It addresses current issues related to the digitalization of the world we live in but does so in spaces that date back to the era of industrialization. This discrepancy between architecture and program is seen as a developmental opportunity for its Berlin counterpart.

The project for a Center for Art and Media in Berlin poses the fundamental question of how the architectural environment must change in the course of digitalization. The focus is on exploring a future architecture that relates spatially, programmatically, and atmospherically to digital phenomena, questions of immersion and AI, and linking physical and simulated environments, space and information, body and action, image and volume. Spherical spaces are included as collective, media-driven, and immersive places for communication and experience. This makes the Center for Art and Media an innovative environment for research and development in the field of multimedia artworks and information technologies of sociocultural, scientific, and economic significance.

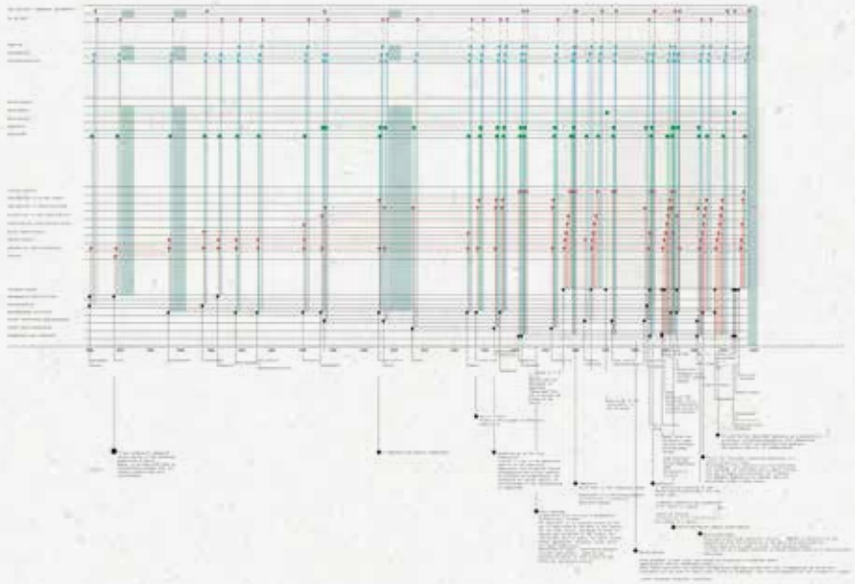
Darja Möhlmann: *A Mechanical Ballet*

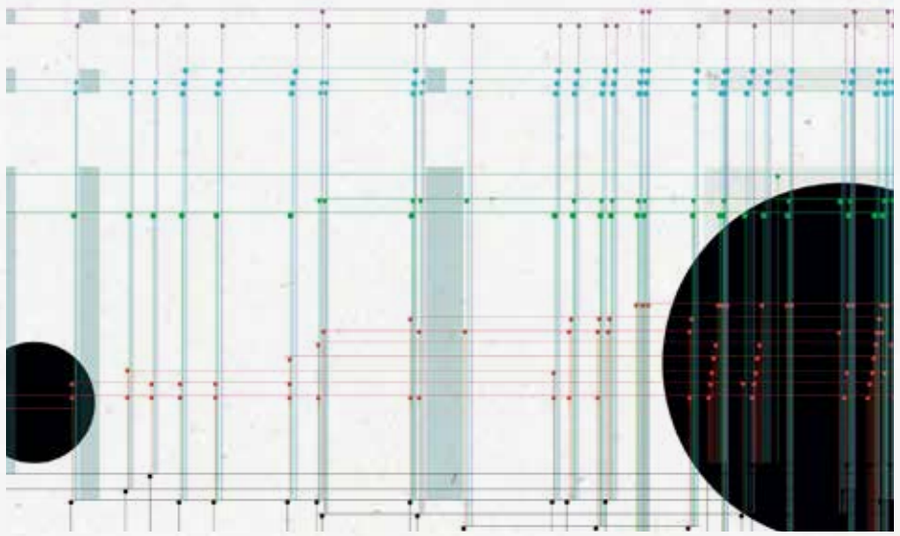
Darja Möhlmann
A Mechanical Ballet

**Development area »Europacity Berlin,«
Berlin Moabit.**

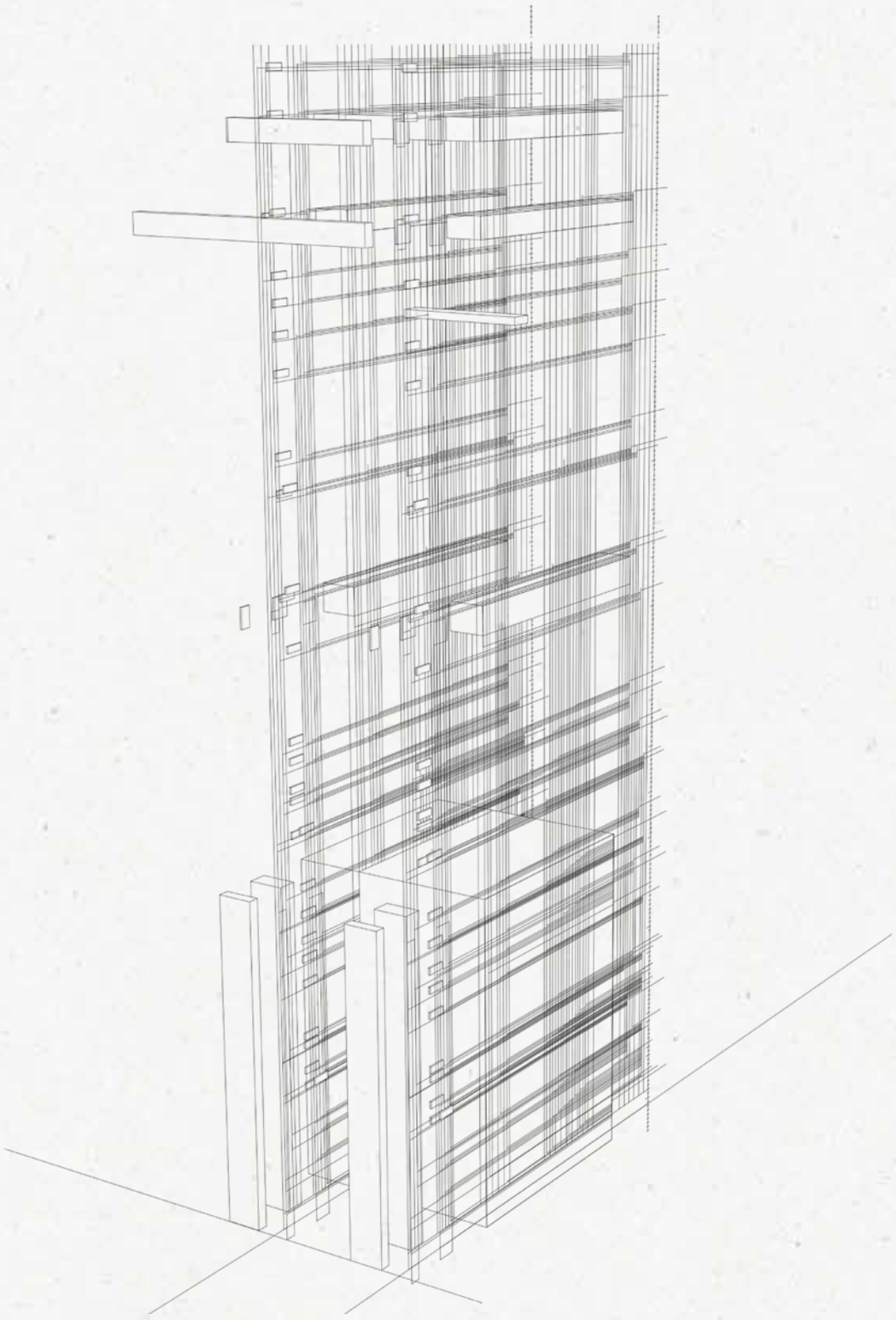
Timeline diagram of the history of media and environments.

Structural modulation diagram.





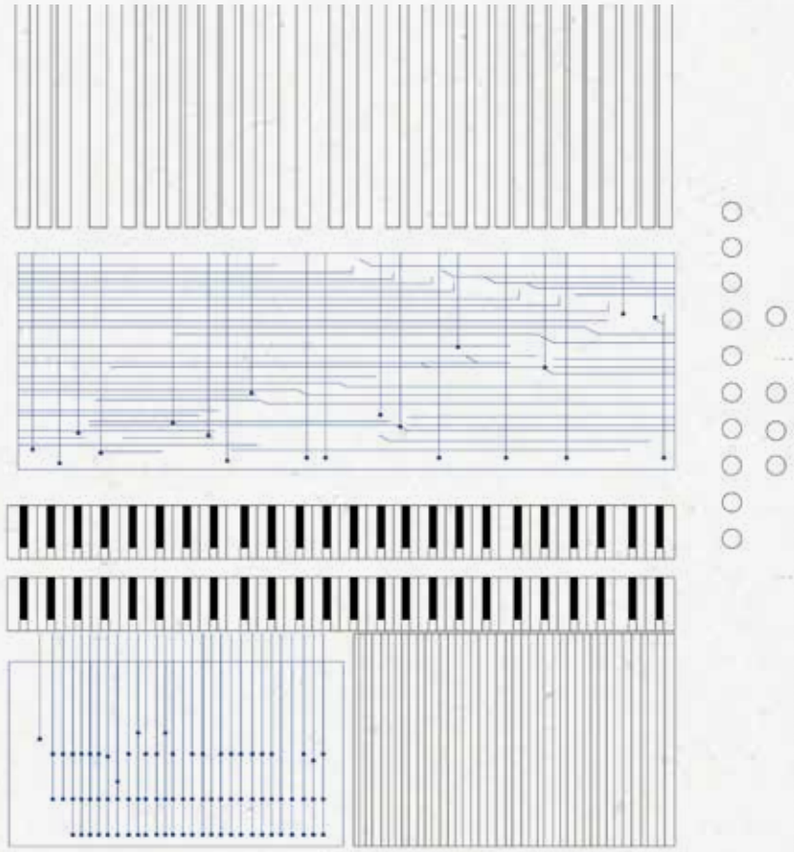
3D diagram.

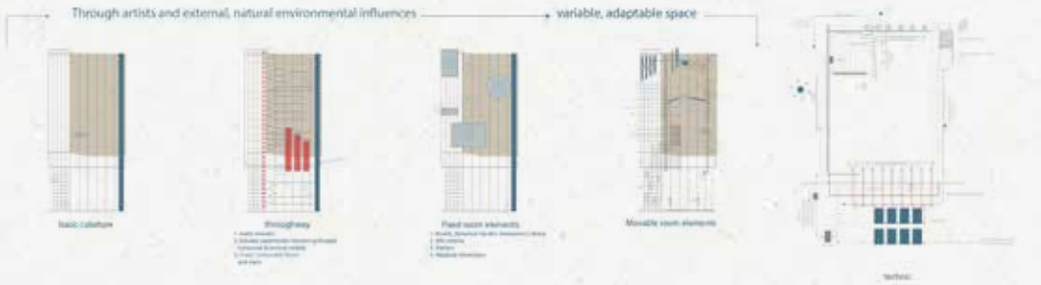


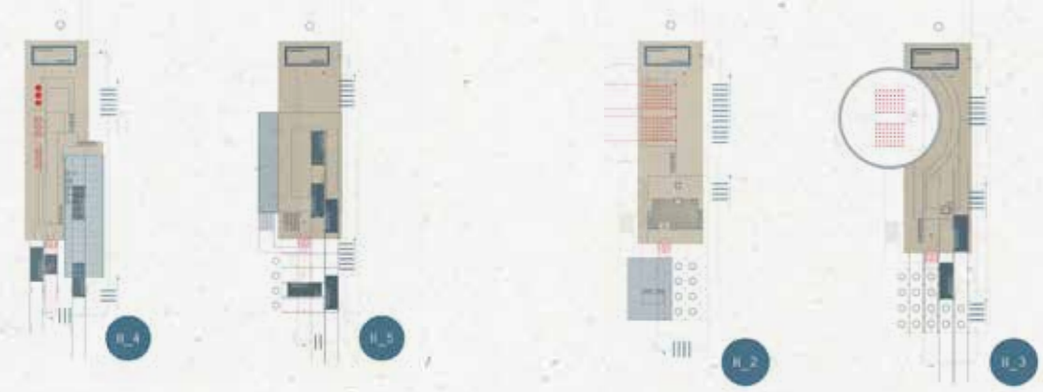
Concept drawing.

Sections.

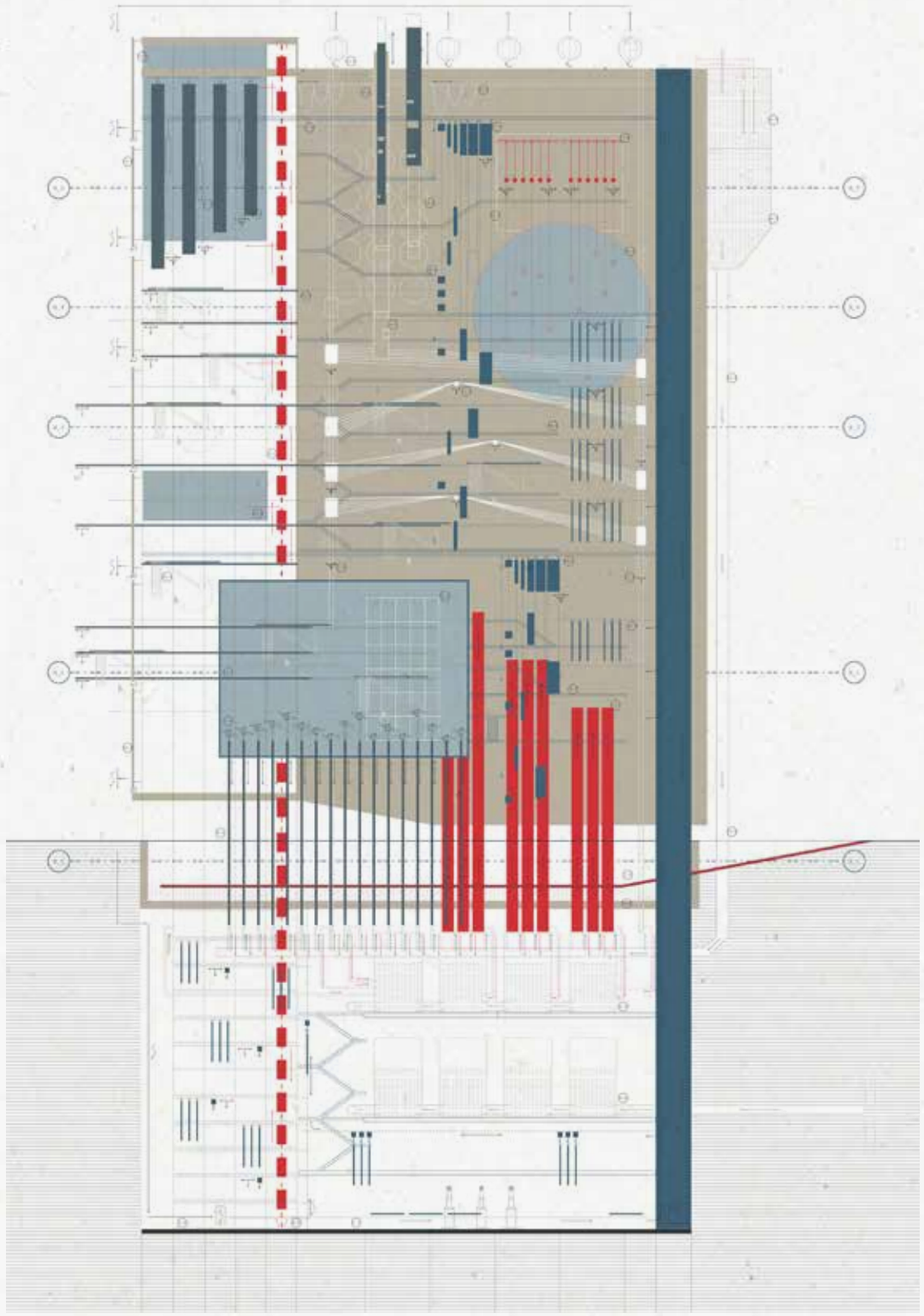
Floor plans.







Section.



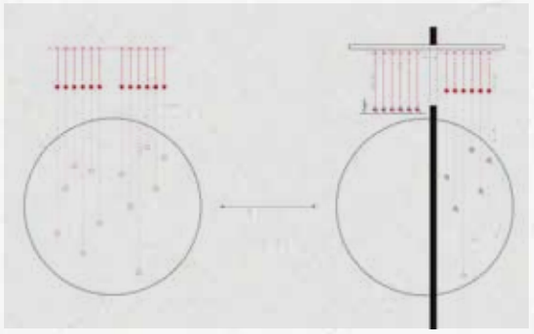
The 360-degree cinema.

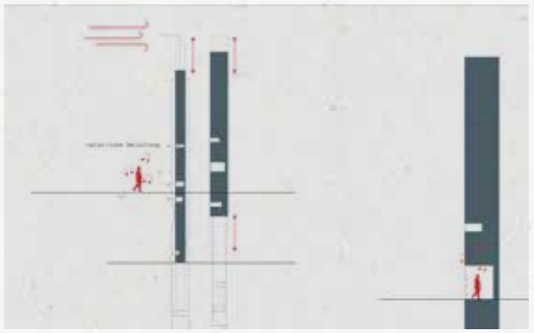
Ventilation and sound flute.

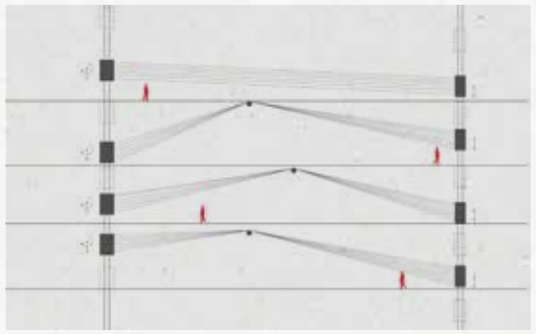
Moving ceiling system.

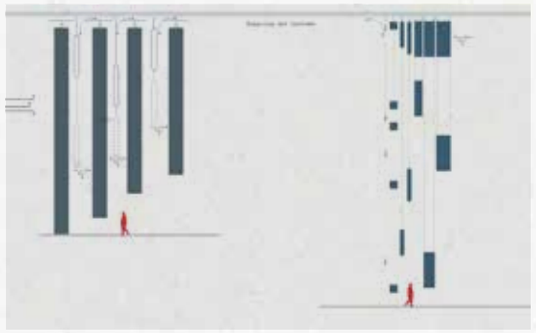
Sound theater and suspended storage.

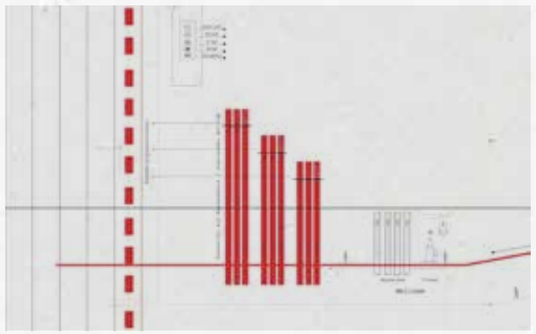
Passageways.



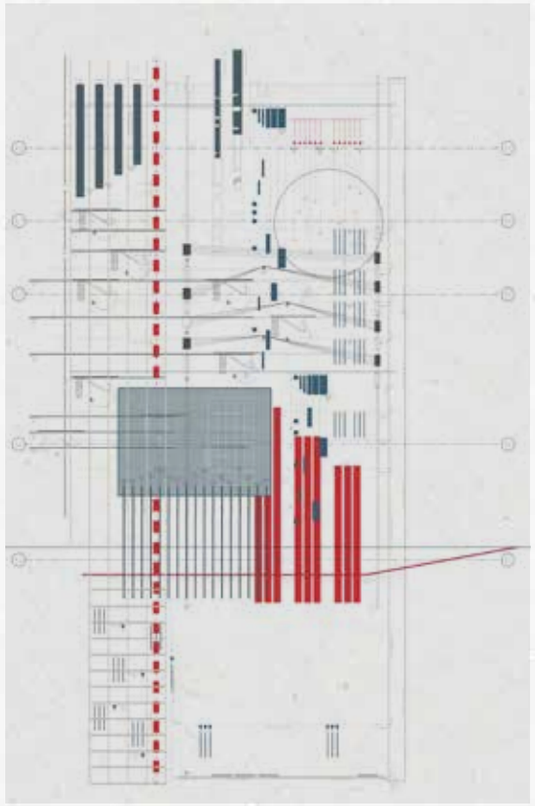








Conceptual section.



Model.

Year	2021
Participant	Julia Metzger
Led by	Prof. Matthias Karch and Prof. Dan Schürch

»Dance, Dance, Otherwise We Are Lost.« Pina Bausch, 2007

A House for Dance and Choreography

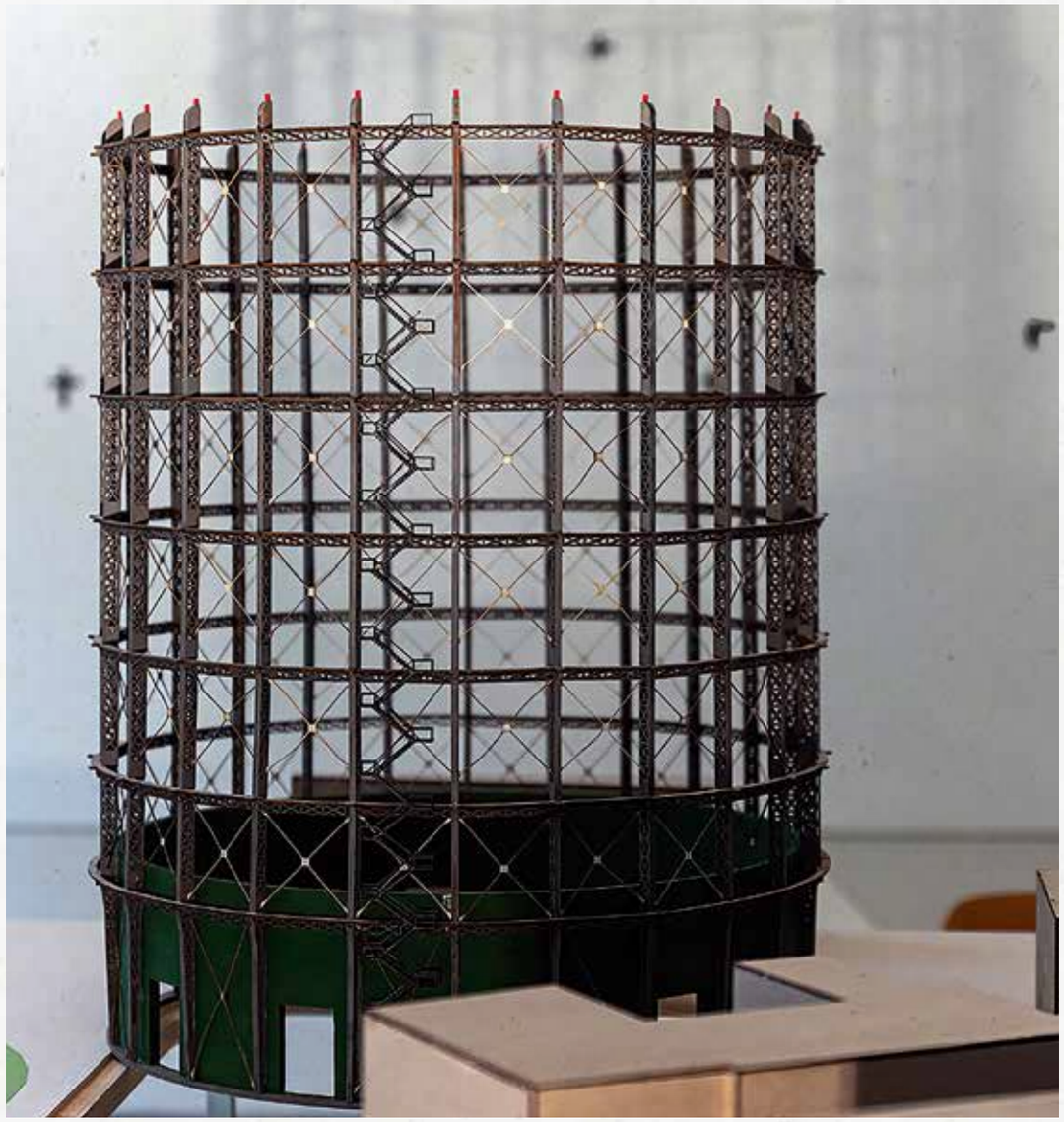
Choreographer Pina Bausch was one of the most important protagonists of German dance theater in the 1970s and 1980s. In the Tanztheater Wuppertal Pina Bausch, which she founded, she gave the dancers tasks instead of steps and asked questions instead of giving instructions. Always concerned with the fundamental questions of human existence, her credo was: »I am not interested in how people move, but in what moves them.« She liberated dance from the idea that it was a competitive sport that only very young dancers could do for a short time. Bausch worked with dancers of all ages, and her performances were especially powerful because they showed the dancing body in its vulnerability and imperfection. The visible humanity and personality of the dancers, whose biographies could be followed over the years, moved the audience more than perfectly executed dance movements.

The resounding success of choreographer Sasha Waltz in Berlin in the early 2000s would have been inconceivable without Pina Bausch's dance theater. Unfortunately, Waltz's interdisciplinary work at Berlin's Schaubühne am Lehniner Platz (»Theater on Lehniner Square«) was short-lived. Since then, the experimental interpretation of dance and the dance scene in Berlin have been without a home. The Berlin Senate Department for Culture and Europe was therefore looking for concepts for a »House of Dance and Choreography« in 2021.

The project takes this call as an opportunity to develop such a house and to find a suitable location for it in Berlin. One of Berlin's most visible landmarks is the Schöneberg Gasometer. A landmark since the beginning of the 20th century, the skeletal steel structure looms 78 meters over the surrounding area. After serving its original purpose as a low-pressure gas container, it was used alternatively as an advertising space, event space, and television studio. The radial geometry, height, and size of the gasometer lend themselves to the design of an architectural implant in which the bodies and people in it are in continuous circular motion.

Pina – tanzt, tanzt, sonst sind wir verloren (2011). Directed by Wim Wenders. [Feature film]. Germany: NFP Marketing & Distribution.

Model of the Schöneberg Gasometer in Berlin.

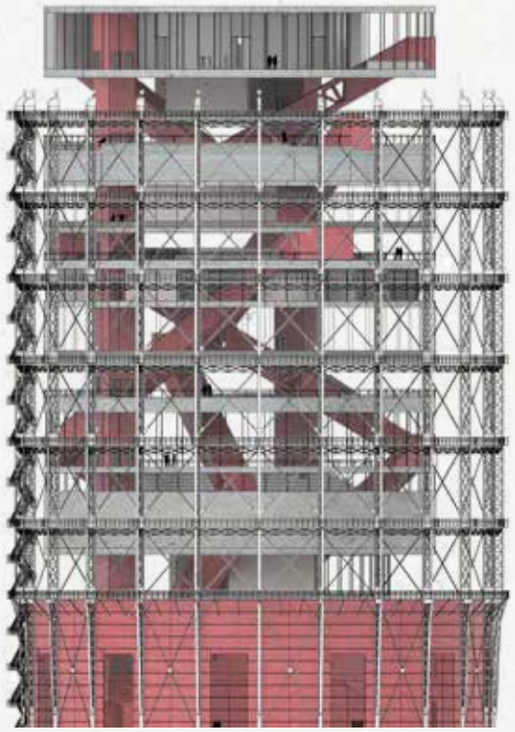


Julia Metzger
Equilibristic Construction

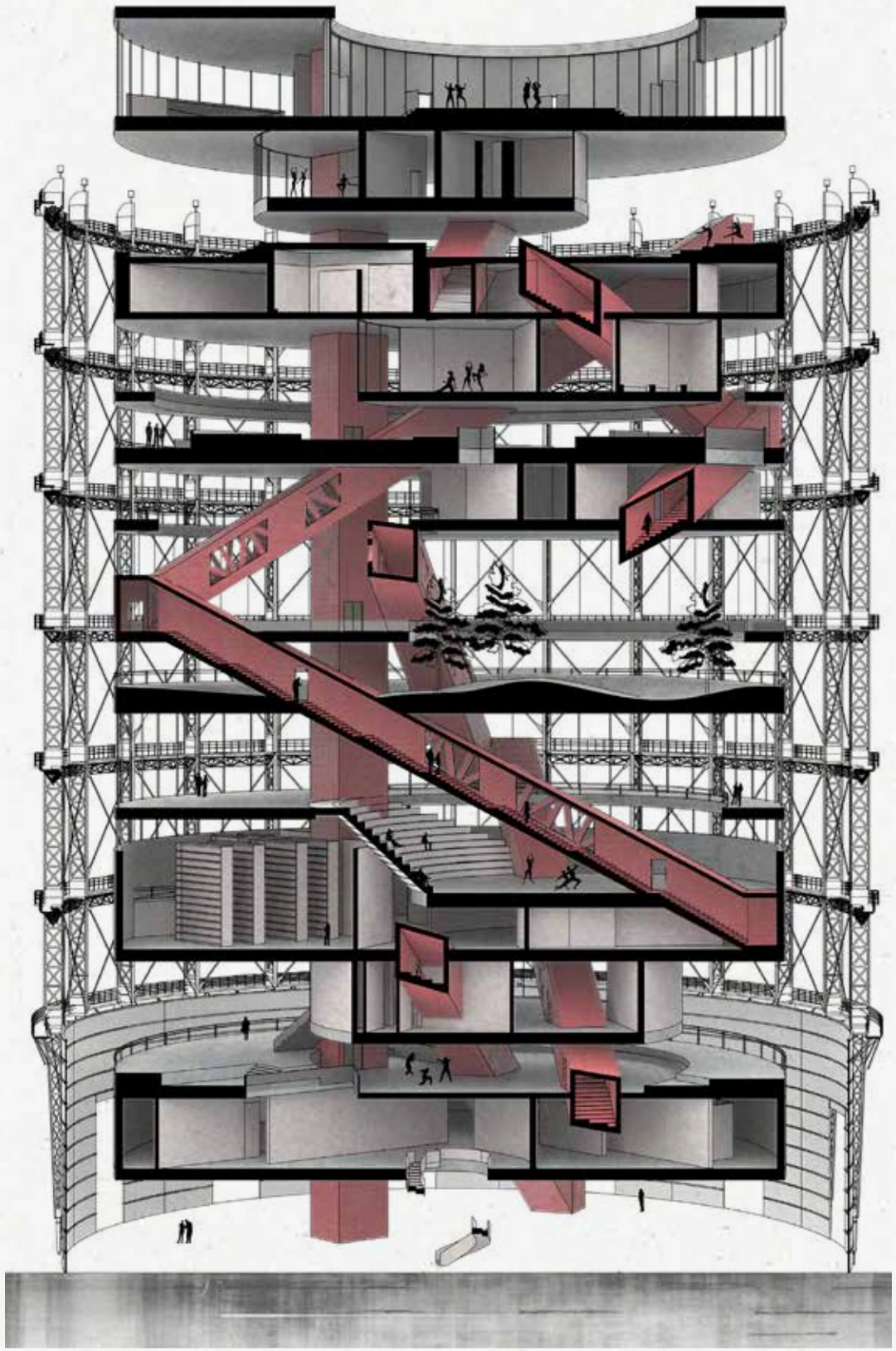
3D rendering of the Schöneberg Gasometer in Berlin.

Architectural program diagram.

Elevation.



Section.



Floor plans:

Level + 82 meters.

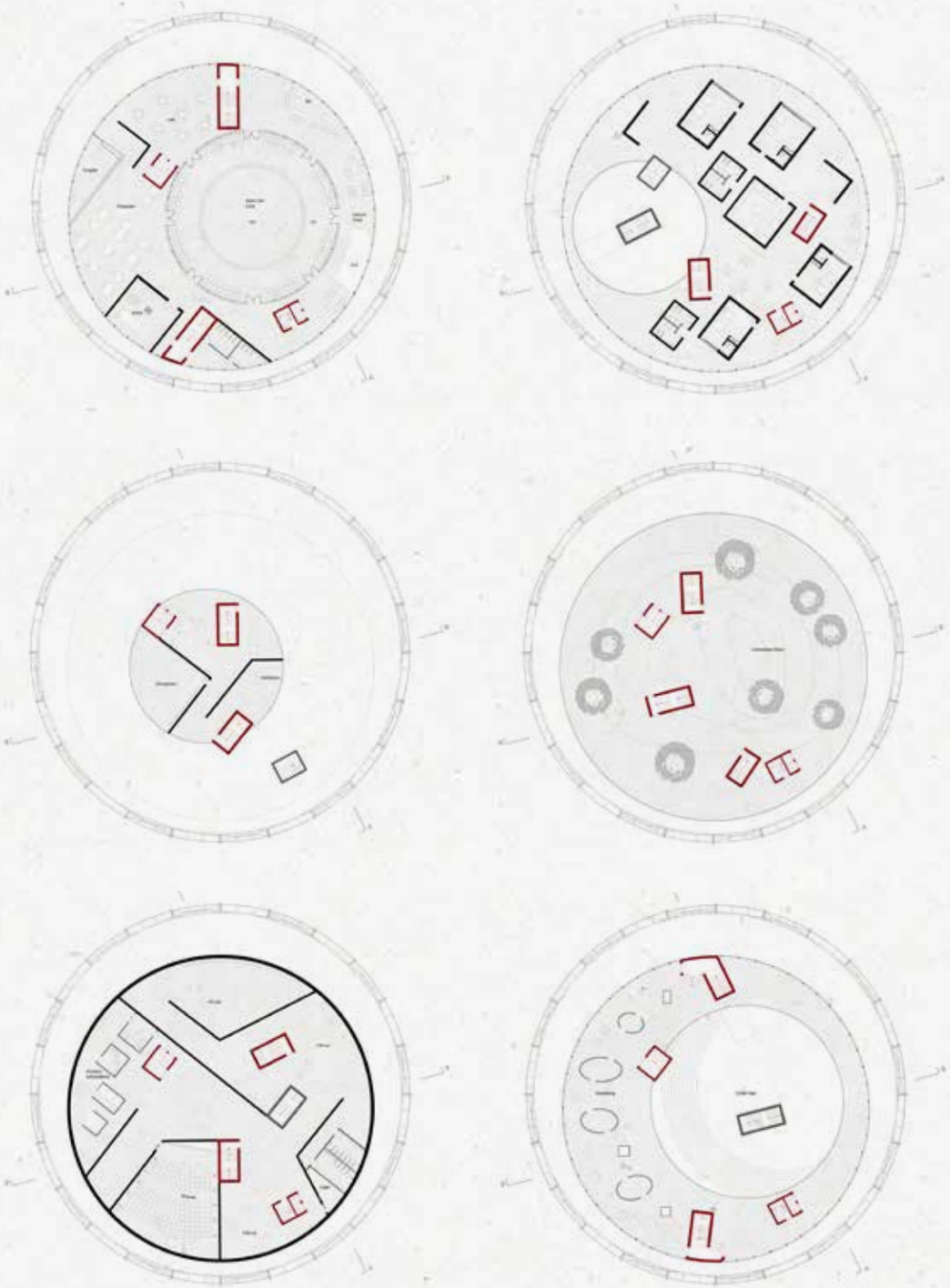
Level + 76 meters.

Level + 68 meters.

Level + 53 meters.

Level + 41 meters.

Level + 33 meters.



Final model.

Year	2015
Participants	Niklas Labuhn and Ahmed Kria
Led by	Prof. Matthias Karch and Prof. Dr. Harad Kloft

On the Seam

A House of Performing Arts at Berlin's Checkpoint Charlie

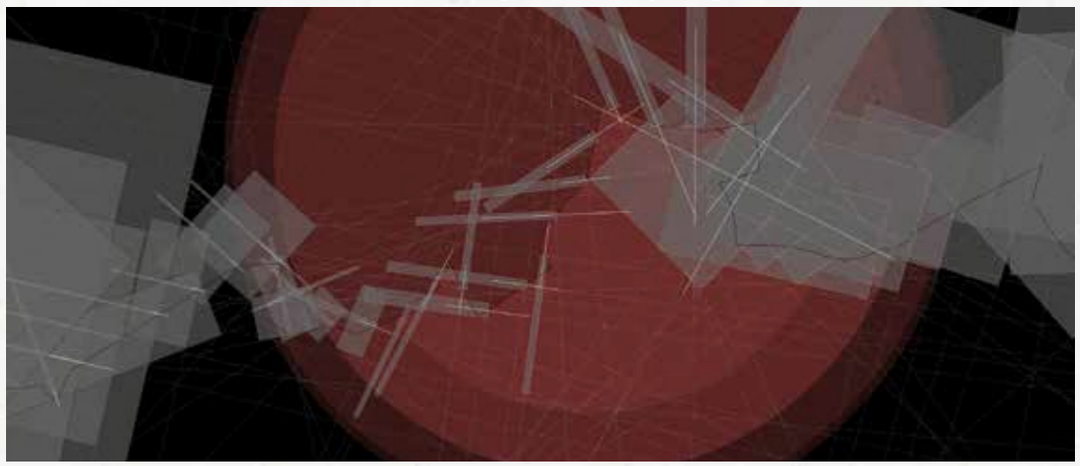
»I can take any empty space and call it a bare stage.
A man walks across this empty space whilst someone else is watching him,
and this is all that is needed for an act of theatre to be engaged.«
Peter Brook (2008: 11)

The project deals with a historical site in Berlin-Mitte on the former Berlin Wall: Checkpoint Charlie, the border crossing between East and West Berlin during the Cold War, named by the Western Allies and the site of what was nearly a military confrontation between the USA and the Soviet Union in the early 1960s. As a result of the Socialist Unity Party of Germany (SED) leadership's attempt to restrict the rights of the Western powers in Berlin, Soviet and American tanks faced each other ready for battle on October 27, 1961.

Today, 25 years after the fall of the Berlin Wall, the site of the former Checkpoint Charlie is one of Berlin's most famous landmarks. On August 13, 2000, an exact replica of the first checkpoint barracks was inaugurated, attracting tourists from all over the world. This kind of reenactment is an example of how history is remembered and experienced in Germany through media productions and reenactments. The project responds to this with a form of reappropriation of the site that focuses less on sensory entertainment and more on urban experimentation, collective memory, and social interaction. It focuses on a house of performing arts that uses the history of this place to imagine a different, better world, a house that explores artistic and political forms of action for the future in the present, a house that opens up to urban society and the neighborhoods of the place where it is located.

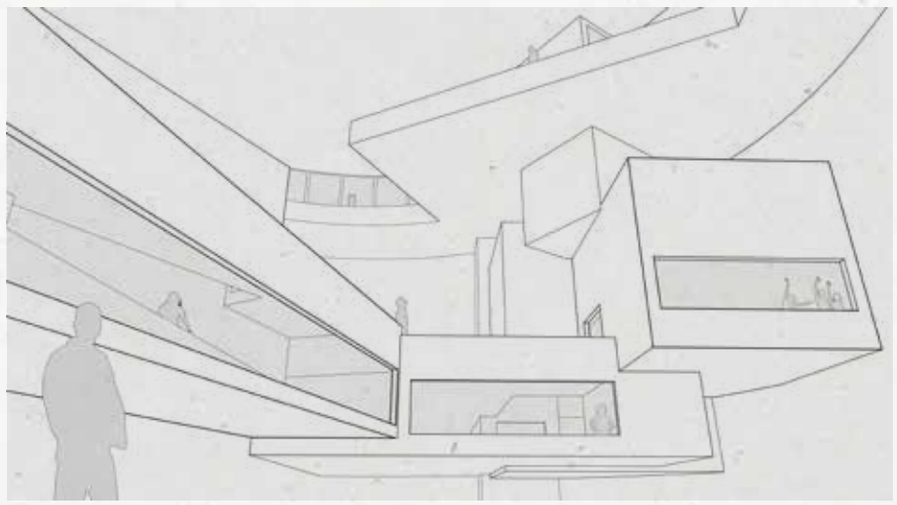
Brook, Peter (2008): *The Empty Space,* London: Penguin.

Niklas Labuhn and Ahmed Kria: *Oblivious Labyrinth.* Concept diagram.



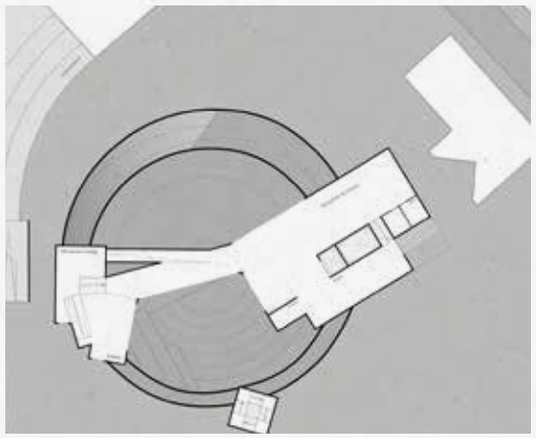
Niklas Labuhn and Ahmed Kria
Oblivious Labyrinth

Interior perspective.

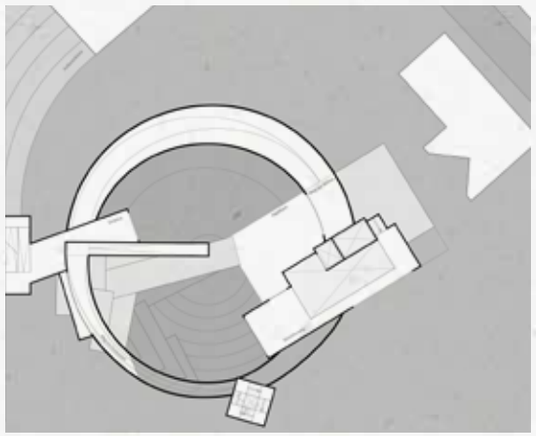


Floor plans:

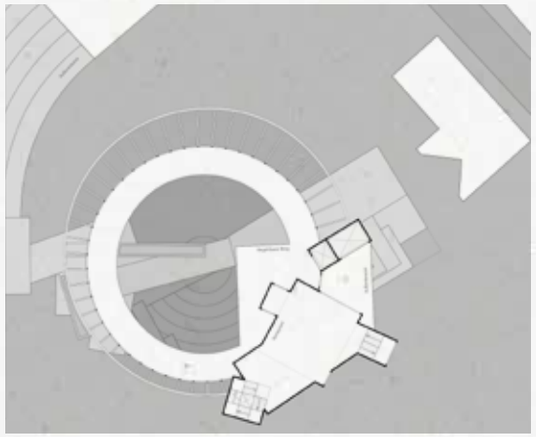
Level 0.



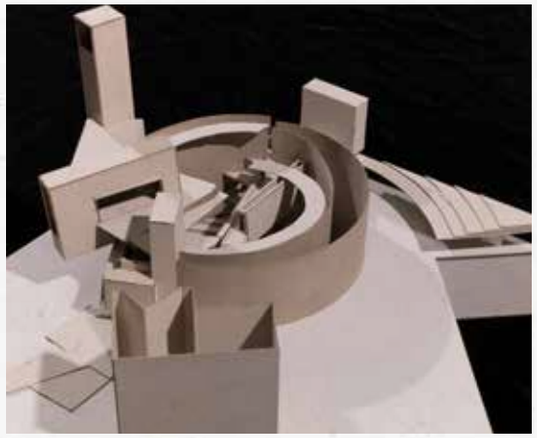
Level 1.



Level 2.



Concept model.



Final section model.

Close-up of the final section model.

INVESTIGATING & INTERVENING

Grounded Practice: Intervening Models as Urgent Architectural Media

Carolin Höfler

In view of the crisis-ridden present, contemporary architecture is witnessing a boom in investigative, counterfactual, and speculative scenarios that reach into both the past and the future. It is particularly the current confrontations with the history of colonialism and with ecological problems that lead to questions about how architecture can become socially impactful as an intervening practice of remembering and imagining. This article looks at three student projects and installations that were created at the IMD _Institute of Media and Design at Technische Universität Braunschweig between 2016 and 2022. Using different media and design practices, they are dedicated to the reconstruction of marginalized cultural spaces, unseen architectures, material relics, and narratives. They explore the question of how creative and performative processes of reimagining the past intervene in dominant historical narratives, creating space for alternative narratives that question the current constitution of society. Such an intervening practice characterizes what was and what is as something that could also be different. This article examines architectural and artistic practices of visualizing a past reality that multiplies improbable possibilities in the present to open up new scopes of action for shaping alternative futures.

Introduction

Against the backdrop of ecological, social, political, and economic tensions, architecture's potential for intervention is being challenged in a completely new way. Developments like the climate catastrophe and its consequences, the rise of populist governments, and violent conflicts have permanently shaken the certainty of a stable social and economic order in industrialized societies. Even if the era of grand utopias is over, the proneness of the present to crisis inevitably leads to the question of what a completely different world might look like (Axer 2022). This also seems to be linked to a shift in the social legitimization of architecture. Increasingly, architectural designs and projects are expected to have an explicit political or social impact. For this reason, projects that place creative and media-based methods of investigation, intervention, and transformation at the heart of design processes are currently experiencing a boom. Understood as a »tool for political intervention« (Weizman 2019), architecture traces the upheavals in the global political geography to uncover specific grievances in politics, economics, and society and to hold those responsible to account. The spectrum of action ranges from engagement to interference and disruption through to assault.

In times perceived as crisis-ridden, however, there is not only a boom in explicit interventions that use creative forms and processes to intervene in specific political and social situations with the aim of changing them for the better (Otto/Zorn 2022: 7–8). Increasingly, counterfactual and speculative scenarios are also being designed, whose potential for intervention unfolds more subliminally. They draw their intervening power primarily from their medial and material obstinacy as well as their performative dynamics, with which they irritate familiar perceptions, disrupt routine actions, and interrupt expected situations without being any less effective.

At the heart of such projects are processes of translating collectively significant places and events of the past into images, spaces, and actions. This involves practices that move away from the idea that an intervention is primarily an activity that draws attention to grievances or problems intending to remedy or prevent them. The aim is rather to make past places and events tangible in such a way that new horizons of thought can be opened up and spaces of resistance created that undermine or at least destabilize the historical narratives and social imaginaries that serve to legitimize hegemonic power relations. This requires a form of »grounded practice« that can be understood as a counterpart to »grounded theory« in the social sciences (Strübing 2014). The term »grounded« means that interventions are not based on preconceived hypotheses or theoretical assumptions, but rather on field observations, experiences, interviews, media recordings, collective experiments, and open-source research.

This kind of retelling of past places and events is essentially determined by the media and materials used, the actors involved, and the milieu in which it is situated and takes place. The experimental architectures, drawings, and models that emerge from this process intervene in a given situation or an existing context by literally taking action to present themselves in two ways: On the one hand, they appear in a sociocultural context as media and material events that take place in reality and develop their own particular force of agency, setting affective and social processes in motion to trigger diverse, thought-provoking impulses. On the other hand, they convey an idea of the complexity of the reconstructed spaces

and the relivable events that involves several highly heterogeneous factors. The following article is dedicated to these mechanisms of action.

(P)Reenacting Spaces

The examination of marginalized cultural spaces is a key aspect of the interventions discussed here. Since the late 1980s, the question of the location of these spaces has been associated in cultural and spatial studies theories with terms such as »beyond,« »in-between,« »liminal,« »interstitial,« and »third space,« as listed by the literary scholar Homi K. Bhabha at the beginning of his book *The Location of Culture* (1994: 1–4, 36–39). What these paraphrases have in common is that they are both material and imaginary border areas; marginal, intermediate, or outer zones; and contingent, decentered spaces that lie between the socially prestructured, clearly defined spatial arrangements and are therefore usually overlooked, forgotten, or consciously abandoned (Möntmann 2022: 34). The term »in-between space« is used here in two senses: on the one hand as an abstract space, as a sphere of overlapping ways of life, semantics, and world views that are culturally coded in different ways, and on the other hand as a concrete place of encounter (Wirth 2012: 12).

Interventions identify and analyze, deconstruct and reconstruct, recontextualize, and update such in-between spaces. This form of »reenactment« is not to be understood as an attempt at a faithful recreation or »mere« repetition, but as an interpretation with new means in an expanded or altered context (Baecker/Paul/Sick 2020: 11). It opens up the possibility of experiencing past in-between spaces and their contexts anew and immersing oneself in their conditions of production. In this way, underlying systems of power that have created such spaces in processes of exclusion can be uncovered, as can collectively shared memories of events that took place in these spaces. Architectural »reenactment«—it is argued—becomes effective as an intervening practice

1a–d Mohammad Reza Abdollahi Bidhendi, *In Limbus: An Architectural Investigation of the Mória Migrant Camp on Lesbos*, IMD, 2022, led by Matthias Karch and Corinna Schnitt. 3D model of a typical house in the Middle East, captured with a LiDAR scanner (a), textured 3D mesh models of the camp, based on found footage (b–d).

when design processes are used not only to discuss diverse perspectives on historical spaces and narratives, but also to question contemporary social contexts that are based on these spaces and narratives. In this respect, their reconstruction is less a method of cultural-scientific memory research than an instrument of intervention in processes of remembrance culture. It can be understood as a design practice of »doing memory« or—as social and communication scientists Fabian Virchow and Tanja Thomas put it—as a »performative practice of remembering embedded in a hegemonic basic narrative and intervening in it« (2022: 68. Translation: author).

In such a practice of remembering, past spaces are not functionalized for the purpose of a representation that »suggests that something that exists somewhere is made available in another place« (Rheinberger 2010: 144. Translation: author). Instead, they are made visible in the sense of visualization »because in making them visible it remains clear,« according to historian of science Hans-Jörg Rheinberger, »that the representation is linked to an intervention« (ibid.). Rheinberger thus emphasizes the actively constructive character of visualization. The process of making visible also holds creative potential inasmuch as revealing the construction of historical spaces also opens up perspectives on alternative ideas and experiences. To make visible in this context means to focus on the omitted, the suppressed, the concealed.

The design and video project *In Limbus: An Architectural Investigation of the Mória Migrant Camp on Lesbos* by Mohammad Reza Abdollahi Bidhendi is an example of visualization in this sense. The project focuses on spaces of migration that were researched and digitally reconstructed with the help of information from publicly accessible Internet sources (see pages 102–113 of this book). The subjects of the reconstructions are, on the one hand, a typical Middle Eastern home—sung about in the video as »Grandma's House«—with richly detailed interiors, which for refugees from this region are associated with memories of their abandoned homeland *(Fig. 1a)*. On the other hand, there is the Mória migrant camp on the Greek island of Lesbos—once one of

the largest refugee camps in Europe (with around 20,000 people) and the most catastrophic in terms of humanitarian conditions following its major fire in 2020 *(Fig. 1b)*. *In Limbus* is an attempt to make the traumatic history of refugees tangible, and thus memorable, by relating the house and camp as places of origin and reception. In line with Pierre Nora's »lieux de mémoire,« places of remembrance such as these are not only geographical locations or physical spaces, but also events, institutions, practices, or objects (1984). Based on this concept, the house and the camp can also be understood as two interrelated nodes that connect different historical trajectories, narrative strands, ideas, desires, worries, positions, memories, and longings.

In the project, the mediatized (re-)appropriation of the house and camp is linked to their gradual erasure, both literally and metaphorically. While the house is still presented as a homogeneous, coherent space, the substance of the camp architecture appears hollowed out and fragile. The impression of a dissolving materiality is created not least by the use of specific technical processes: Having captured the house on-site with a mobile 3D laser scanner, the construction of the camp is based on digital techniques such as point cloud processing, meshing, and 3D texture mapping, which draw on found footage from open source research. In the video, the architecture of the camp unfolds from the perspective of the residents *(Fig. 1c–d)*. The fragmented spaces float weightlessly in a deterritorializing void, without the usual reconstruction of missing parts or embedding contextualization that is common in architectural history and archeology. As disorienting as the increasingly fragmentary architecture is, the interspersed photorealistic image fragments allow the viewer to experience narrow, neglected spaces: The viewer's gaze glides or diffuses across narrow paths between the refugee tents, in which everyday objects and motionless bodies are present as texture maps, into frayed zones that appear like folded architectural dioramas (Abdollahi 2022: 10:27–12:55 min).

The medial-spatial reenactment of the camp proves to be a manifestation of a collective imagination that interweaves videos shared on the net with statements by residents and observations by journalists. It blends documentary with poetic elements, factual with suggestive representations, and official information with personal narratives. The retelling of the camp stories thus embodies the potential to break with the hegemonic interpretation of migration, culture, and society. It allows the recipients to think differently about historical developments and social conditions and to create a different genealogy of the present that opposes the »migrantization« and marginalization of people, narratives, and spaces. Cultural theorist Ariella Aïsha Azoulay has coined the term »potential history« for this kind of historical understanding, according to which alternative histories and unredeemed visions of the future—previously excluded from the dominant construction of the past—are reclaimed as potential materials for collective actions of self-empowerment (2019). To tell these other stories, past spaces and narratives are extracted as fragments from the canonical historiography and released as »time capsules« (Smith 2001; Möntmann 2017), »construction[s] of the past that refer to the present and the future« (Virchow/Thomas 2022: 74. Translation: author). They confront historical facts with the present by rejecting the inevitability of past events and suggesting a conditional future, in line with »if things could have gone differently then, they could still go differently today.« In this respect, the commemorative reconstructions of the house and camp can also be understood as a »pre-enactment,« in which the lost battles of the past are perceived as unfinished tasks of the present and carried forward into the future by means of architecture and media design (Marchart 2018).

Trajectories of Elements

The visualization of past architectures via deconstructing and updating their elements proves to be a particularly effective practice of »doing memory.« In places where political, economic, and social upheavals have taken place in the past, the material relics of these changes become all the more apparent as interventions in existing architecture and urban spaces. If such relics are treated like documents in an archive and made accessible to the public, the realities of life and events inscribed in them can be reconstructed, knowledge about them can be shared collectively, and new possibilities for experiencing and reusing them can be imagined.

The project *Topographies of Memory: The Berlin Mountains of Debris* (2016) by Jennifer Li Kamm outlines such an interplay of material and memory cycles (see pages 80–93 of this book). For her master's thesis at the IMD, she examined the 19 known

2a–b Jennifer Li Kamm, *Topographies of Memory: The Berlin Mountains of Debris*, IMD, 2016, led by Matthias Karch and Folke Köberling. Ground plan of the Church of St. George and the Church of St. Mark in their original orientation, the ruins of which are located at the »Biesdorfer Höhe,« Berlin Marzahn-Hellersdorf (top); section through a destroyed bunker still lying under the mountain »Großer Bunkerberg,« Berlin Friedrichshain-Kreuzberg (bottom).

Berlin mountains of debris, or »Trümmerberge,« that have been integrated into green spaces. World War II resulted in around 80 to 90 million cubic meters of rubble in Berlin. Of the city's former 1.5 million residences, less than half were still habitable after the war, but the losses of public and religious buildings, trade, industry, and technical infrastructure were also extensive. From 1945 to 1958, the enormous quantities of ruins that were no longer usable were transported to the ever-higher mountains on »rubble trains.« Unwelcome remnants of National Socialist buildings also disappeared into the hills of the capital: anti-aircraft towers and bunkers or, as on Teufelsberg in the Grunewald forest in Berlin, the ruins of the »Faculty of Defense Technology« of the Technical University, which was built in 1937 as part of a new university campus for the »Reich Capital of Germania,« but never developed further than a shell construction.

For her project, Kamm used historical plans, maps, and other documents to research this architecture, which had been buried and heaped up in the rubble, and reconstructed it speculatively in drawings and model studies *(Fig. 2a)*. In a conceptual design, she developed the idea of making the hidden architecture accessible to the public again by hollowing out the mountains and creating underground passages that would allow people to descend. For example, she drove a steel elevator shaft deep into the 78-meter-high Großer Bunkerberg, or »tall bunker mountain,« in Volkspark Friedrichshain *(Fig. 2b)*. The name of the mountain commemorates an anti-aircraft bunker built in the park in 1941, which was blown up in April 1946 on the orders of the Allies. The monstrous remains were filled in with the debris of the Berlin Palace, among other things. With the help of historical photographs and virtual reality simulations, Kamm brings the buildings and urban situations stored in the piles of rubble back to life and activates the hidden archives, the historical value of which is not always unproblematic. By literally experiencing architectural ruins and rubble materials, which are themselves of completely different ages, she shows the city's different layers of time in a strange simultaneity. Elements and materials convey a high-resolution image of past realities and events, not only in the form of individual, well-preserved objects but also in the form of their relationships to one another.

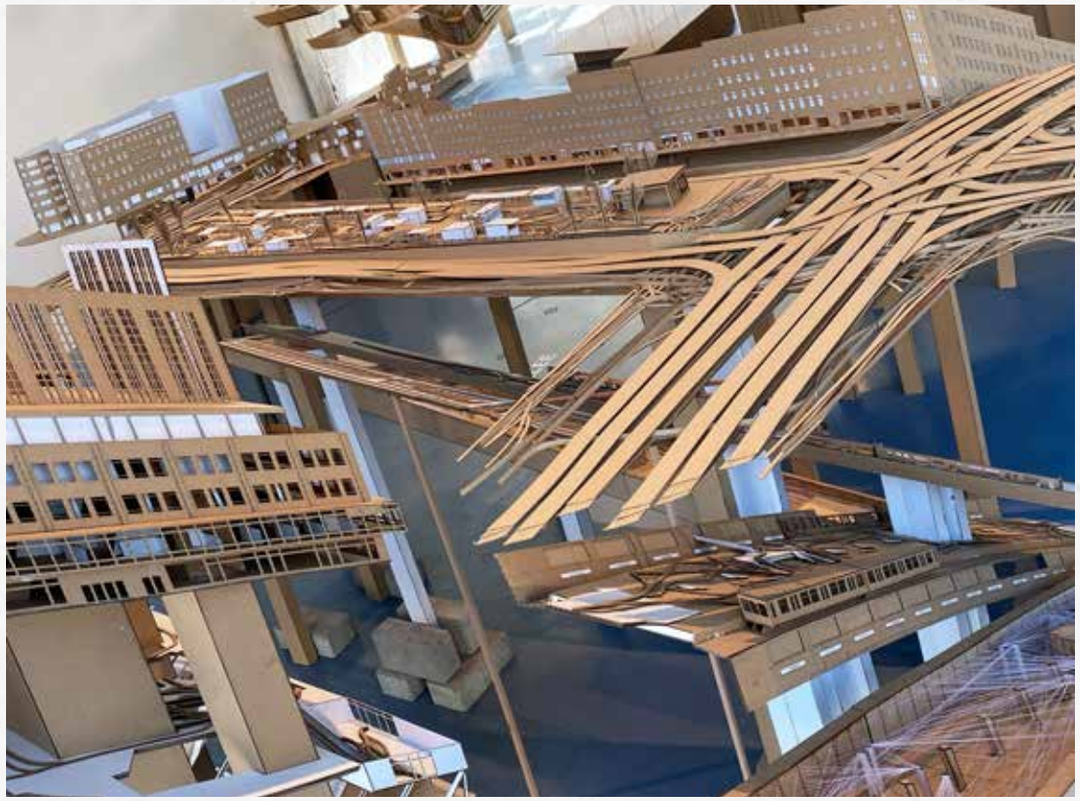
The project gains its interventionist power above all through the fact that it unfolds a processual sequence of actions—from the demolition of the destroyed buildings to the piling up of their elements and the reuse of their materials in a different context by other parties. War architecture is transformed in an exemplary way into collective material and virtual places of remembrance. The project thus shows not only how architectural fragments of memory can be handled in the future—fragments that were previously simply piled up in a heap of garbage—but also how they can be used to create new social spaces in which the urban society of the future can engage with the stories of its past.

This kind of reuse of past materials opens up the possibility of new ascriptions of meaning: In a new configuration, material fragments become parts of a new narrative. The act of retrospection thus makes a double reading possible. By bringing together the various meanings, which differ depending on the context, the materials become collective artifacts that tell an eventful story. Such forms of updating past materials follow a new logic: a relationship to the past that is characterized less by an attempt to overcome history than by a revisiting of it. In doing so, they undermine modernism's promise of progress, which assumes that past and future are related to each other in the sense of »the old« and »the new,« with the old yielding to the new. According to a non-linear understanding of temporality, the past is not simply over. Rather, the deconstructed architectures lend the past a significance in the here and now that forces us to confront it but also offers the potential for speculative designs in the not-yet.

Plural Temporalities

This way of approaching history, which breaks with the concept of chronology and genealogy in favor of updating historical fragments, is specific to an understanding of architecture as a discursively and materially intervening practice of remembering and imagining. Contrary to the simple dictum of »learning from history,« this break from chronology toward a plurality of temporalities enables history to be understood as a complex web of open threads and polychronic narratives that can still be redirected in different directions through processes of reenactment, reexperiencing, and reactualization (Möntmann 2017).

One such tightly woven system of relationships was created in the project *NEUXKÖLLN* (2020) by architect Nicolai Schlapps, which he designed together with students from the IMD (see pages 250–253 of this book). The project examines how marginalized histories of use and everyday experiences of politically contested urban spaces are made visible and how processes of spatial restaging can intervene in dominant historical narratives as



3 IMD students, *NEUXKÖLLN: Reverse Modeling Berlin*, 2020, led by Nicolai Schlapps. Exhibition at CLB Berlin in cooperation with ANICOWORKING.

a methodical »unlearning.« The subject of the study is Hermannplatz in the Berlin district of Neukölln with the adjacent Karl-Marx-Straße to the south. Hermannplatz, which before the fall of the Berlin Wall was a peripheral location on the border with Kreuzberg, has gained a new significance in the urban fabric in recent years and now attracts flocks of international tourists. Karl-Marx-Straße has been undergoing redevelopment for a decade, which has led to significant increases in land values and rents (Tajeri 2020: 28). In light of this and the start of the new private-sector planning of the adjacent department store on Hermannplatz in 2019, an urban political conflict developed. The Austrian company Signa Holding, owner of the department store, published a historically interpreted reconstruction of the facades and light towers of the 1929 building, which were destroyed in World War II—a reconstruction that goes hand in hand with an expansion of the building to an area of around 100,000 square meters. Despite Signa's insolvency in November 2023, the Berlin Senate is adhering to these plans and the development plan procedures that have been initiated.

According to architectural theorist Niloufar Tajeri, the replanning of the department store and square can be seen as an expression of neoliberal urban development that establishes discursive power and claims authority by recourse over a lost historical building (2022). Lived everyday practices and their emerging local heritage, cultural in-between spaces, and forms of migrant self-organization play only a subordinate role in the planning and communication of the construction project on Hermannplatz. They are even, as Tajeri observes, symbolically erased by the dominant discourses and the images used in them so that the new planning can be realized (ibid.). Regarding the historicizing reconstruction of the department store, Tajeri speaks of a »displacement heritage« (ibid.) that marginalizes local histories and practices of the

social construction of space to advance the gentrification of the site and cement the capitalist production of space as the future of urban development without alternatives.

The *NEUXKÖLLN* project aims to tell precisely these local stories and spaces and make them physically and sensually tangible in a model-like reconstruction. To share this experience with as wide an audience as possible, it was exhibited at CLB Berlin, an independent venue for contemporary art and urbanism in Berlin-Kreuzberg *(Fig. 3)*. Contrary to expectations, the city model is not a detailed image of Hermannplatz and Karl-Marx-Straße. Nothing in the expansive model structure is ordered to scale or neatly arranged. Rather, it shows the experiences of crossing squares, passing through underpasses and passages, or looking into the entrances of houses. The students repeatedly observed and roamed the square and its surroundings, collecting and mapping what they found and superimposing it on the constructed space. From observations and interviews on-site as well as open-source research, they developed psycho-geographical city, noise, traffic, and rent maps as well as mappings of fast-food chains and phone companies or informal uses of space to convert them into models.

The process, described as »reverse modeling,« reverses the conventional understanding of architectural modeling (see page 237 of this book). Instead of mentally anticipating future buildings, the models of *NEUXKÖLLN* expose existing urban spaces and their historical, sociocultural, and economic characteristics and place them in relation to one another to reflect anew on their production conditions and contexts, which lends them a sketch-like lightness. The models are consciously to be understood as constructed drawings in various dimensions of meaning. They are based on specially created axonometric and central perspective representations, the projection type of which was transferred to the model. The resulting spatial structures oscillate between surface and volume, creating tilted figures that unsettle perception. The models, derived from exploded architectural and urban drawings, have a similar effect. They, too, convey a complex space that is not easy to perceive, organize, or plan: The separated and layered elements provide insight into forgotten, unseen, or deliberately overlooked spaces, but also into past times, which, although non-synchronous, are all simultaneously active. The interweaving of the different projection methods and types of representation constitutes the urban as a multi-perspective structure that can only be explored in changing interpretative perspectives and open contexts of meaning. As in a kind of vivisection, the fragments reveal life stories on a small scale, simultaneously revealing the distortions of a neoliberal urban society on a large scale.

Weaving Worlds

Models of this kind appear as »carriers of a thought process and not [merely] as a representation of its result,« as Reinhard Wendler stresses in his seminal study *Models in Art and Science* (2013: 25. Translation: author). As stubborn artifacts, they unfold unexpected associations that arise from their respective mediality and materiality (Höfler 2018: 285). This makes them more dynamic, allowing them to be changed and adapted at any time. They are »knots,« in Timothy Ingold's sense. The British anthropologist proposes two different ways of thinking about architecture. In his essay »Of Knots and Blocks: Architecture as Weaving,« he distinguishes between a world that is created »through the hierarchical assembly of preformed parts into larger wholes« and a world that is woven from »ever unspooling threads, [...] growing all the while without ever reaching completion« (2013: 26). The relational model structure of *NEUXKÖLLN* evokes similar readings of a »woven architecture.« In a metaphorical sense, it shows how multi-layered spatial, social, and cultural connections have created a complex, densely interwoven system over time. This creates the image of an urban culture in which extreme interconnectedness ensures stability in both a literal and figurative sense.

The model of the interwoven city also interferes with the prevailing understanding of participation in urban planning processes. Citizen participation commonly takes the form of consultations in development planning procedures, whereby the citizens involved primarily assist the planning staff of administrations and investors. However, they are excluded from the co-determination of the urban development policy agenda and its concrete implementation in construction projects. *NEUXKÖLLN* confronts this double movement of inclusion and exclusion with the complex scenario of a meshwork of interwoven spaces, processes, and actors as a form of resistant action. It can be read as an attempt to create not only new processes of knowledge production, but also alternative methods of will formation and decision making so as to design in a more social and socially relevant way on the one hand and to

participate in the shaping of the social, the political, and the public on the other (Höfler 2018: 299, 305).

Conclusion

Which concept of intervention could be applied to the projects discussed here? The works presented here fundamentally intervene in a reality with which they remain closely entangled. They are not aimed at an abstract overcoming of problems that concrete reality holds in store. On the contrary, they question prevailing problem-solving constructions and refer to a reality that is always in a state of flux, and consequently to a future that cannot be foreseen. In this sense, they break with the traditional genealogical principle of history and with the expectation that the present and future must be innovative. Instead, they deconstruct and expand historical narratives and develop counterfactual scenarios based on revived and unfinished narratives of the past. Their intervening potential lies in the fact that they reinterpret marginalized cultural spaces and collective events in their reenactment and make them physically and materially tangible so that they open up diverse scopes of action for the creation of alternative futures. They thus belong to the performative practices of rehearsal—the rehearsal of a differently experienced or unfolded past and a desired, albeit unpredictable future (Marchart 2022). Then, an egalitarian society, a resource-conserving architecture, or an adaptable and participatory city are not fictions far removed from reality, but rather emerge in the process of the material actualization of the past itself—as a »real utopia« in the present (Marchart 2018; Wright 2010).

Bibliography

Axer, Eva (2022): »Editorial: ZfL-Jahresthema 2022/23 – Gegenwelten,« in: *ZfL – Leibniz-Zentrum für Literatur- und Kulturforschung Berlin,* https://www.zfl-berlin.org/files/zfl/downloads/forschung/ZfL_Jahresthema_Gegenwelten.pdf, accessed January 1, 2024.

Azoulay, Ariella Aïsha (2019): *Potential History: Unlearning Imperialism,* London/New York: Verso.

Baecker, Ralf/Paul, Dennis/Sick, Andrea (2020): »Einleitung / Introduction,« in: Ralf Baecker/Dennis Paul/Andrea Sick (eds.), *Reenactments in Kunst, Gestaltung, Wissenschaft und Technologie / Reenactments in Art, Design, Science and Technology,* Hamburg: Textem, 6–13.

Bhabha, Homi K. (1994): *The Location of Culture,* London/New York: Routledge.

Bidhendi, Mohammad Reza Abdollahi (2022): »In Limbus / An Architectural Investigation of the Moria Migrant Camp on Lesbos,« in: *YouTube.com,* https://www.youtube.com/watch?v=reSVVAOVCVo&t=337s, accessed January 1, 2024.

Höfler, Carolin (2018): »Modelloperationen. Zur Formierung gesellschaftlicher Wirklichkeiten,« in: Christoph Rodatz/Pierre Smolarski (eds.), *Was ist Public Interest Design? Beiträge zur Gestaltung öffentlicher Interessen,* Berlin: Transcript, 283–311. https://doi.org/10.14361/9783839445761-020, accessed January 1, 2024.

Ingold, Timothy (2013): »Of Blocks and Knots: Architecture as Weaving,« in: *The Architectural Review* 25, 26–27, https://www.architectural-review.com/essays/of-blocks-and-knots-architecture-as-weaving, accessed January 1, 2024.

Marchart, Oliver (2018): »Präfiguration und Pre-enactments: Politische und künstlerische Aktionsformen der Zukunft im Jetzt,« in: *Exzellenzcluster »Kulturelle Grundlagen von Integration,« Universität Konstanz,* https://www.exc16.uni-konstanz.de/5521.html, accessed January 1, 2024.

Marchart, Oliver (2022): »Public Movement: The Art of Pre-Enactment,« in: *On Curating* 54, https://on-curating.org/issue-54-reader/public-movement-the-art-of-pre-enactment.html, accessed January 1, 2024.

Möntmann, Nina (2017): »Plunging into the World: On the Potential of Periodic Exhibitions to Reconfigure the Contemporary Moment,« in: *On Curating* 33, https://www.on-curating.org/issue-33-reader/plunging-into-the-world-on-the-potential-of-periodic-exhibitions-to-reconfigure-the-contemporary-moment.html, accessed January 1, 2024.

Möntmann, Nina (2022): »Dezentrierte Räume,« in: *Lerchenfeld* 60, 33–36.

Nora, Pierre, ed. (1984): *Les lieux de mémoire, I. La République,* Paris: Gallimard.

Otto, Ulf/Zorn, Johanna (2022): »Einführung,« in: Ulf Otto/Johanna Zorn (eds.), *Ästhetiken der Intervention: Ein- und Übergriffe im Regime des Theaters,* Berlin: Theater der Zeit, 7–25.

Rheinberger, Hans-Jörg (2010): »Papierpraktiken im Labor. Hans-Jörg Rheinberger im Gespräch mit Karin Krauthausen und Omar W. Nasim,« in: Karin Krauthausen/Omar W. Nasim (eds.), *Notieren, Skizzieren. Schreiben und Zeichnen als Verfahren des Entwurfs,* Zurich: Diaphanes, 139–158.

Smith, John W. (2001): »Saving Time: Andy Warhol's Time Capsules,« in: *Art Documentation: Journal of the Art Libraries Society of North America* 20/1, 8–10, https://doi.org/10.1086/adx.20.1.27949117, accessed January 1, 2024.

Strübing, Jörg (2014): *Grounded Theory: Zur sozialtheoretischen und epistemologischen Fundierung eines pragmatistischen Forschungsstils,* Wiesbaden: Springer VS.

Tajeri, Niloufar (2020): »Hermann und Henriette,« in: *Bauwelt* 22, 28–29.

Tajeri, Niloufar (2022): »The Spatialization of Coloniality at Hermannplatz: A Conflict on the Imagination and Production of Space and Society (Working Title), PhD thesis abstract,« in: *DFG Research Training Group 2227 »Identity and Heritage,«* https://www.identitaet-und-erbe.org/en/personen/niloufar-tajeri-3, accessed January 1, 2024.

Virchow, Fabian/Thomas, Tanja (2022): »Doing Memory an rechte Gewalt in Medienkulturen: Grundzüge eines interdisziplinären Forschungsprogramms,« in: Matthias N. Lorenz/Tanja Thomas/Fabian Virchow (eds.), *Rechte Gewalt erzählen. Doing Memory in Literatur, Theater und Film,* Heidelberg: J.B. Metzler, 29–51 (Kindle eBook, 68–110), https://doi.org/10.1007/978-3-476-05828-7_2, accessed January 1, 2024.

Weizman, Eyal (2019): »Investigative Architecture as a Tool for Political Intervention,« in: *forensic-architecture.org,* https://forensic-architecture.org/programme/events/talk-investigative-architecture-as-a-tool-for-political-intervention, accessed January 1, 2024.

Wendler, Reinhard (2013): *Das Modell zwischen Kunst und Wissenschaft,* Munich: Wilhelm Fink.

Wirth, Uwe (2012): »Zwischenräumliche Bewegungspraktiken,« in: Uwe Wirth (ed.), *Bewegen im Zwischenraum,* Berlin: Kulturverlag Kadmos, 7–34.

Wright, Erik Olin (2010): *Envisioning Real Utopias,* London: Verso.

Year	2018
Participants	Tatjana Popov and Laura Schröter
Text	Katharina Puhle
Led by	Katharina Puhle

Camp Worlds

Kutupalong in Bangladesh

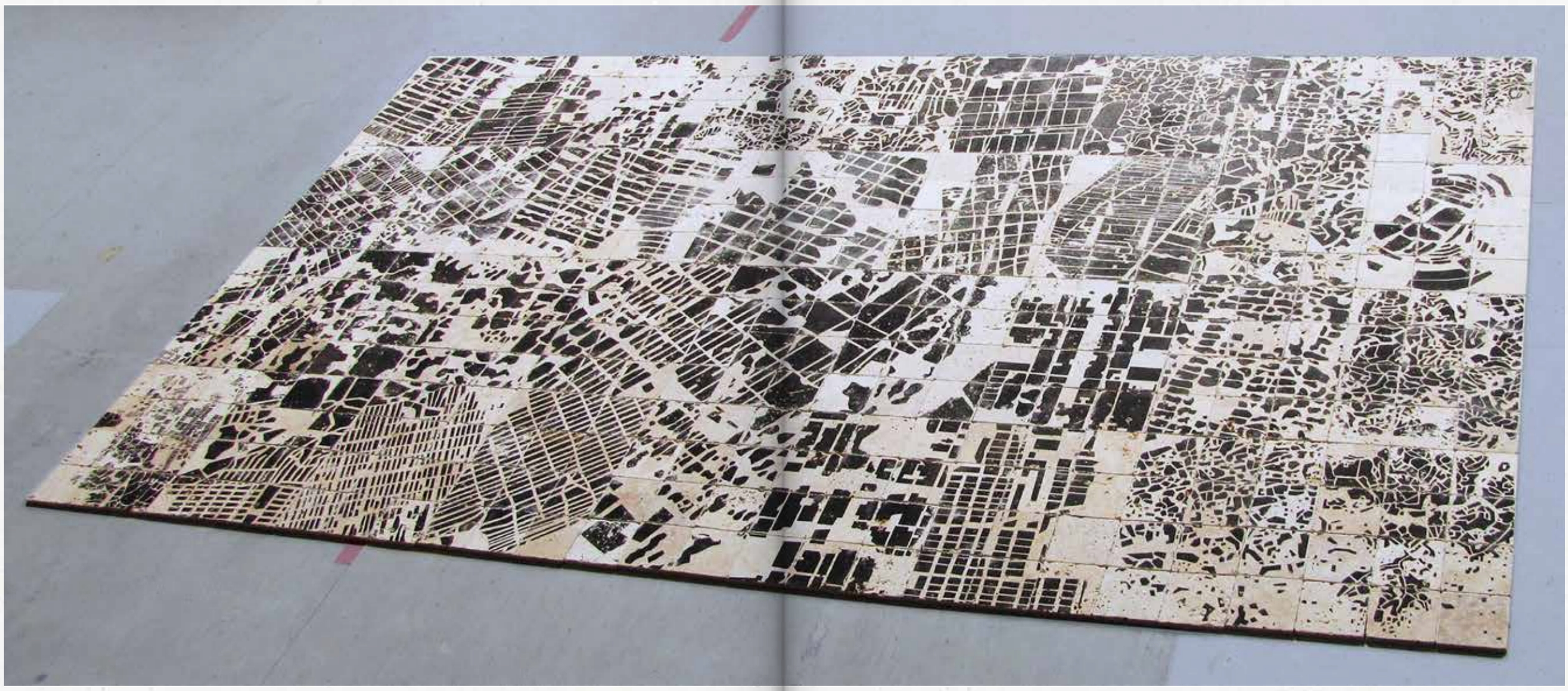
It is only since the 1990s that terms such as »refugee camp,« »deportation center,« and »initial reception facility« have come to the forefront of global reporting, even though millions of people have been living in such camps for decades, as in the Kutupalong refugee camp in Bangladesh. These places have a clear extraterritorial character that leads to the marginalization of their inhabitants and gives them a temporary status that perpetuates the state of emergency. Spatially demarcated as special zones, they often defy conventional cartography, although their extent can be immense. They are subject to their own laws, which determine the degree of political equality between the residents and personnel within their borders. Camp authorities can arbitrarily suspend, delay, or restrict residents' freedom of movement, reinforcing their sense of otherness and highlighting their legal and territorial marginalization.

To ignore the existence of these camps is to ignore an undeniable reality. Visualization is therefore a means of raising awareness of these camp worlds. The methods of approach and expression in the project are diverse, ranging from the depiction of individual fates to the quantitative representation of characteristics, facts, and phenomena to the recording of historical events. Using the screen printing technique, they attempt to relate the various aspects of camp reality—the architectural structures, the infrastructure, the bureaucratic systems—to the inhabitants and examine their political implications.

Tatjana Popov and Laura Schröter: *Kutupalong Refugee Camp*
Figure-ground diagram of the Kutupalong refugee camp in Bangladesh.

Tatjana Popov and Laura Schröter
Kutupalong Refugee Camp

Screen printing on ceramic tiles.



Year	2017
Participants	Jonas Kneisel, Leonie Köhler, Fabian Leiwe, Steffen Rebehn, and Tom Zumdick
Text	Katharina Puhle
Led by	Katharina Puhle

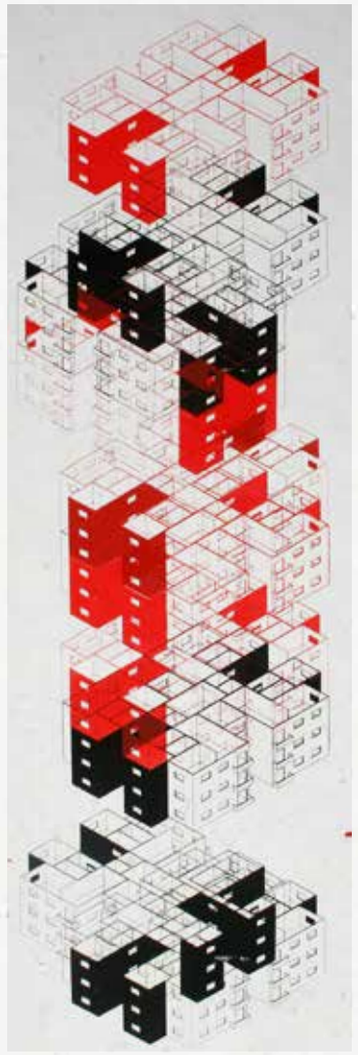
Ghost Towns

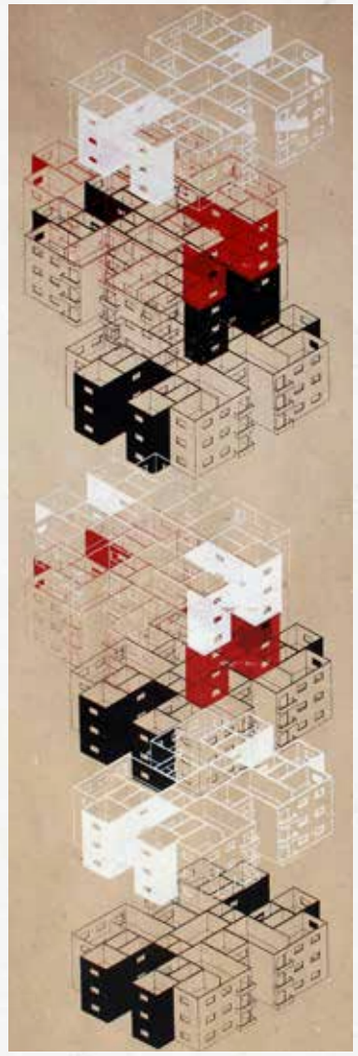
Cities without People

Places without people have a contradictory appeal. Though seemingly useless, they exude great symbolic power. Some have been abandoned because of political and economic problems such as the bursting of housing bubbles, others because of conflict or environmental disaster. In *Unruly Places* (2014), social geographer Alastair Bonnett explores such ghost towns, from small settlements to large cities.

The project embarks on a global journey to visit exemplary ghost towns, explore their history, collect political, environmental, and economic data, and investigate the reasons for their abandonment. By combining various data and graphic materials, complex images are created that reveal the characteristics of these places and their historical and political significance. The works range from research that unravels the intricate web of financial connections to collages that seamlessly weave together individual fates and the economic development of specific regions. There are also material studies that make the disappearance of ghost towns tangible. These diverse explorations tell the stories of these forgotten places, bringing their past back to life and inspiring reflection on their present and future.

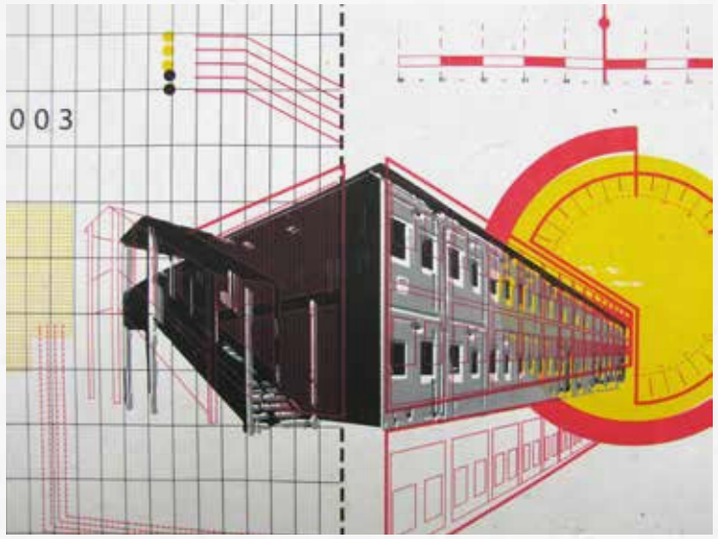
Jonas Kneisel and Leonie Köhler: *A Ghost Town in Angola*
Seven hundred and fifty brand-new, eight-story apartment buildings. Screen printing.

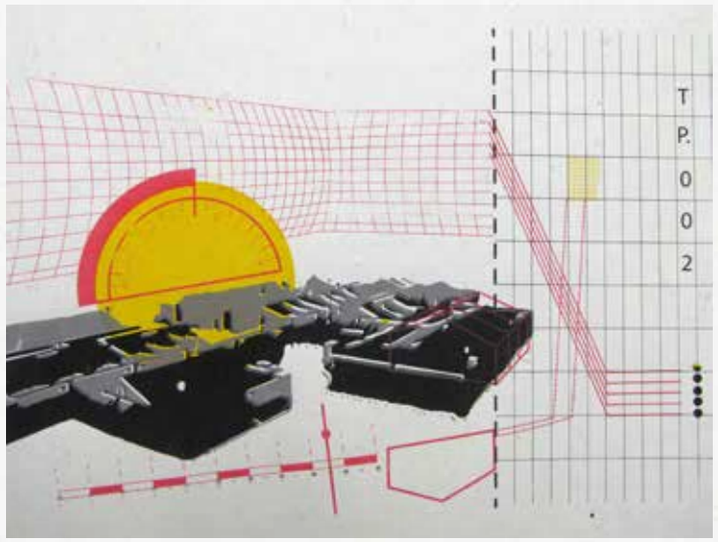


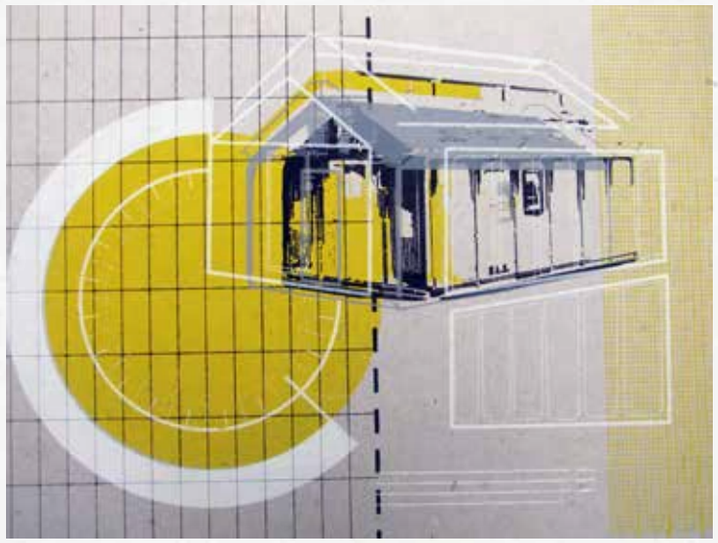


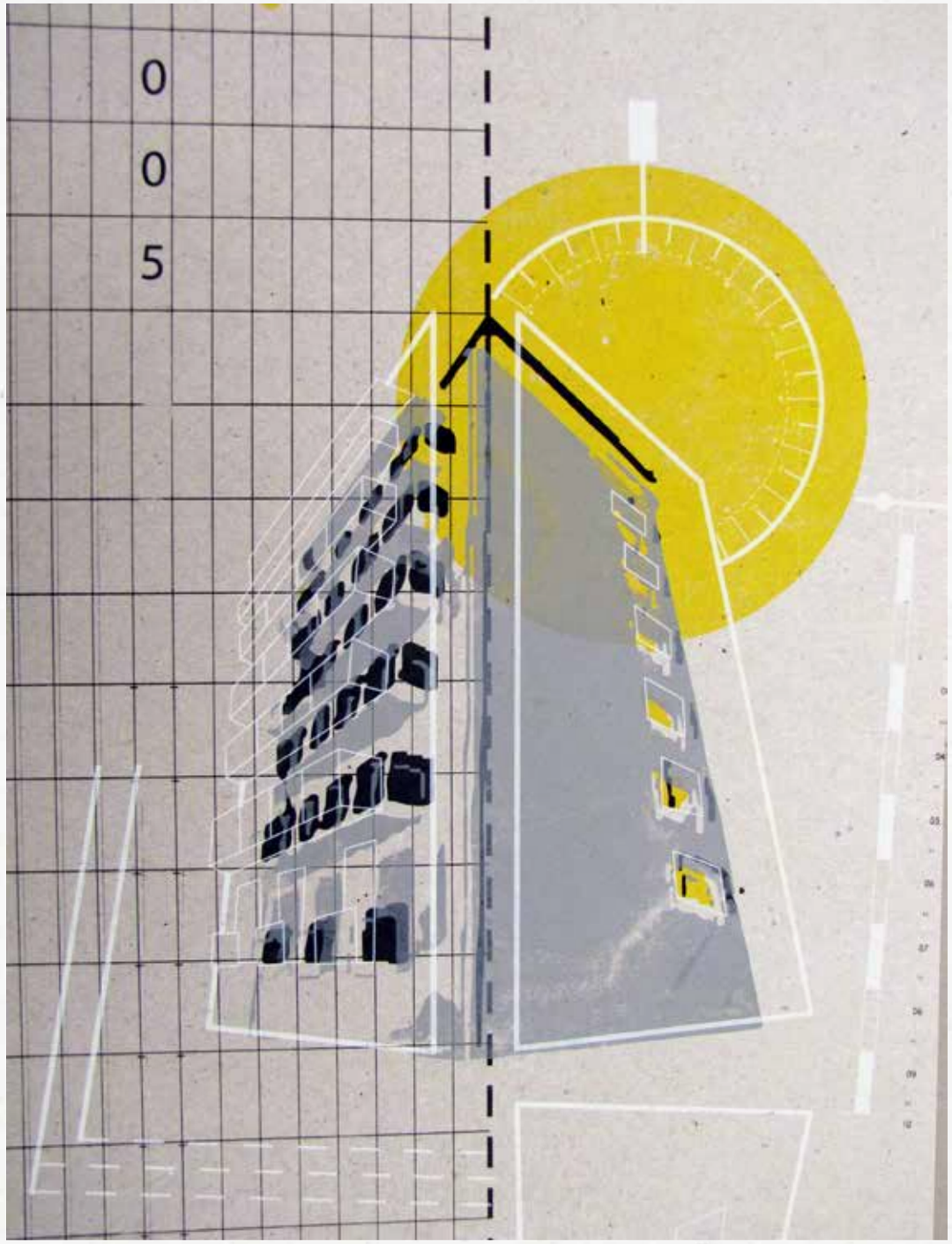
Fabian Leiwe, Steffen Rebehn, and Tom Zumdick
Immigration City Hannover

Architectures of arrival. Screen printing.









Year	2012
Participants	Aida Nejad and Robert Uhl
Text	Katharina Puhle
Led by	Katharina Puhle

Carto-Graphics

Between Informing and Influencing

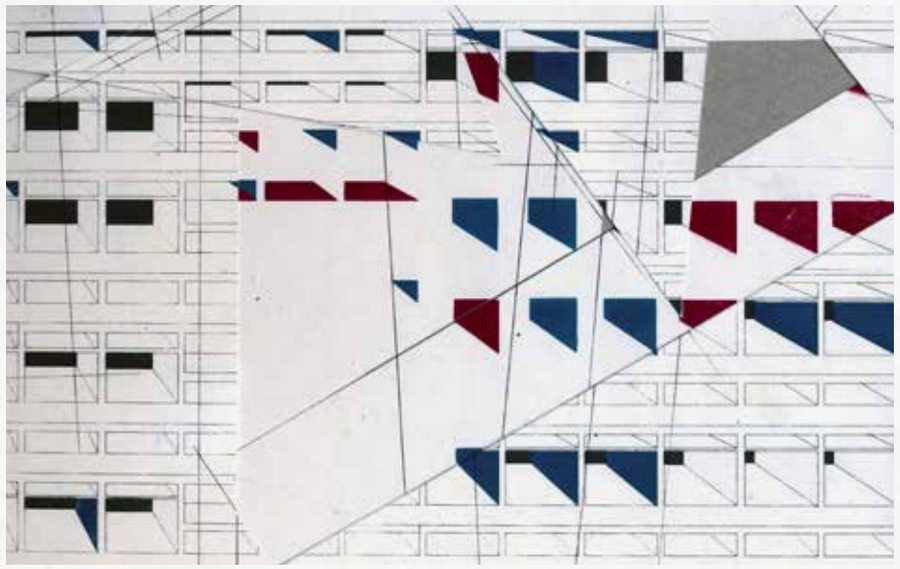
Cartography defines, communicates, and illustrates spatial information in a way that can be easily read and interpreted by as many people as possible. By seamlessly integrating different sign systems and conveying both qualitative and quantitative information, maps become a powerful medium for representing spatial objects and temporal dimensions. Maps merge movement and stillness and unite different levels of reality into a powerful analytical tool that makes the diverse relationships in space visible.

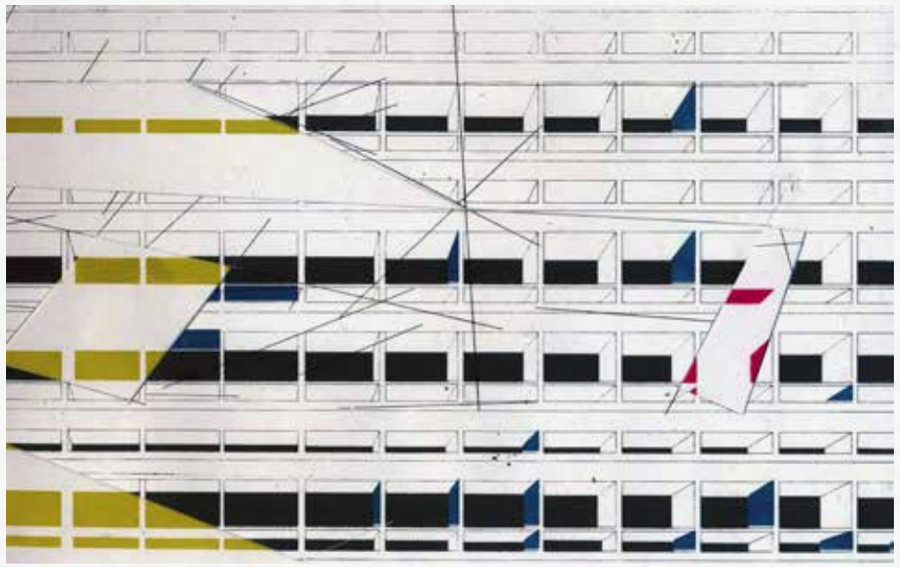
The essence of cartography lies in the art of selecting, abstracting, and interpreting available data. Sections are carefully selected, scales applied, grids drawn, and categories formed. The cartographer has the power to decide what to include and what to omit. The map is therefore inherently a domain of individual perspectives, and this project focuses on the subjective aspect of cartography. The main goal is to perceive the urban environment, interpret its subtleties, and then map it so others can read it. To achieve this, participants collect, carefully organize, and then translate data into diagrams, graphic codes, and material systems to ultimately reinvent space. This complex process involves deliberately manipulating materials by informing their surfaces or imprinting spatial objects directly into the material.

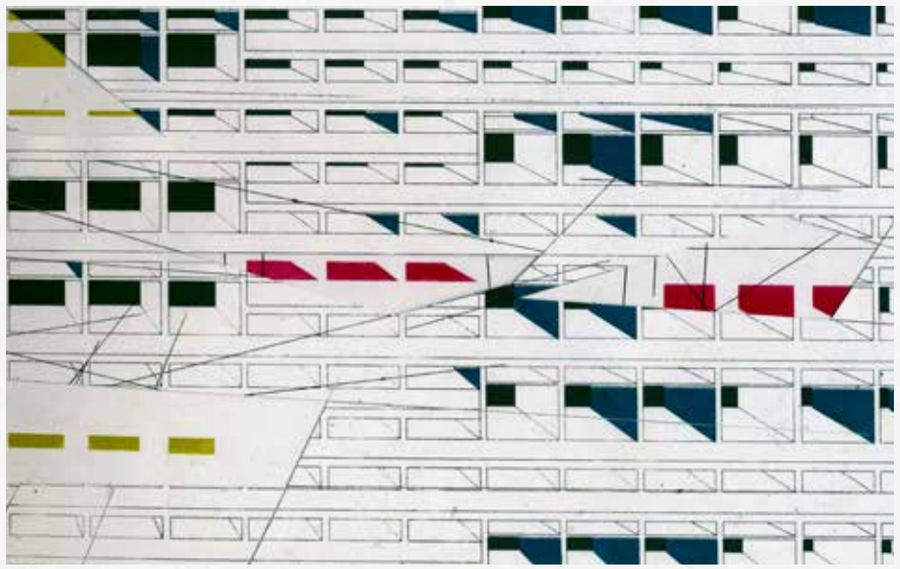
Aida Nejad: *Material Assemblages*. Paper layers and embossed printing.

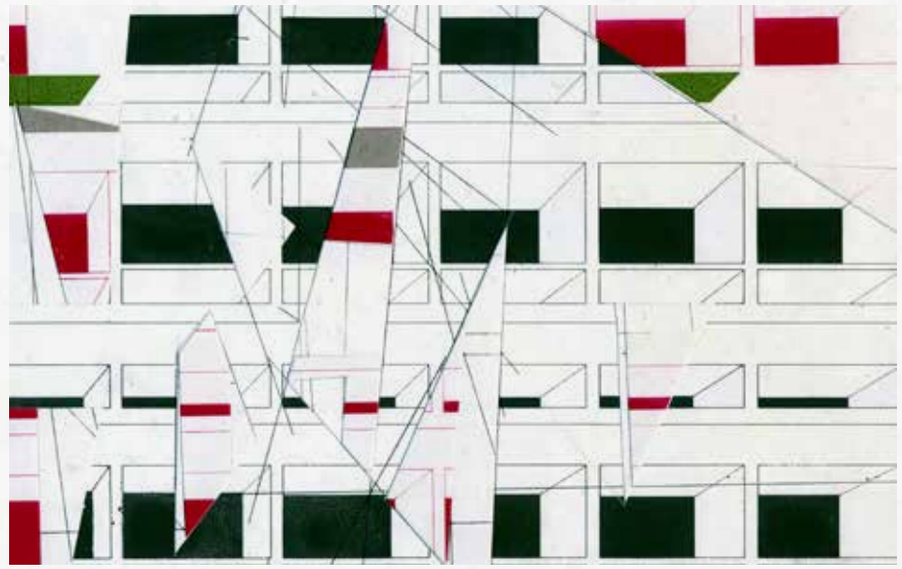
Robert Uhl
Repetition

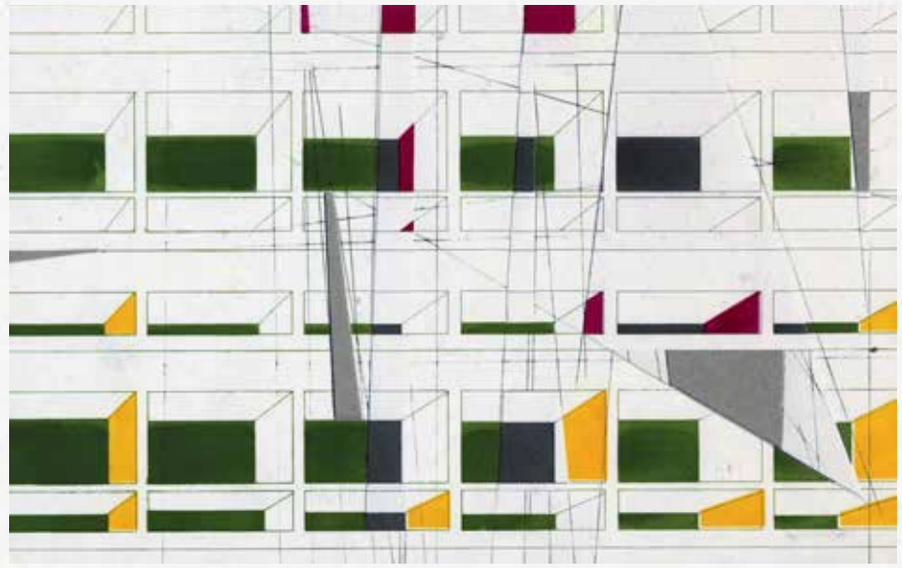
Abstract architecture plan combined with sections and isometric parts. Screen printing.

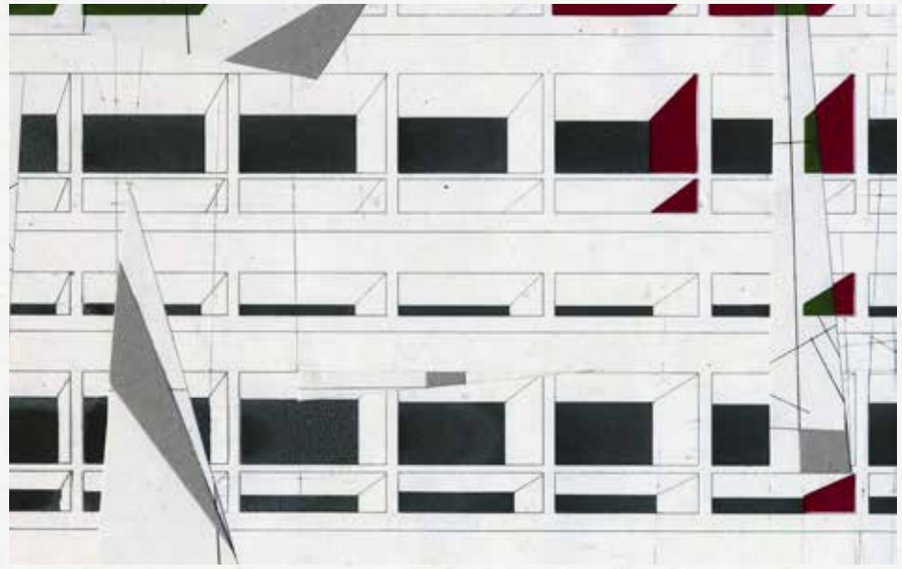












Year	2015
Participant	Felix Schippmann
Text	Katharina Puhle and Dr. Carolin Höfler
Led by	Katharina Puhle and Dr. Carolin Höfler

The Section Maker

It Will Never Be the Same

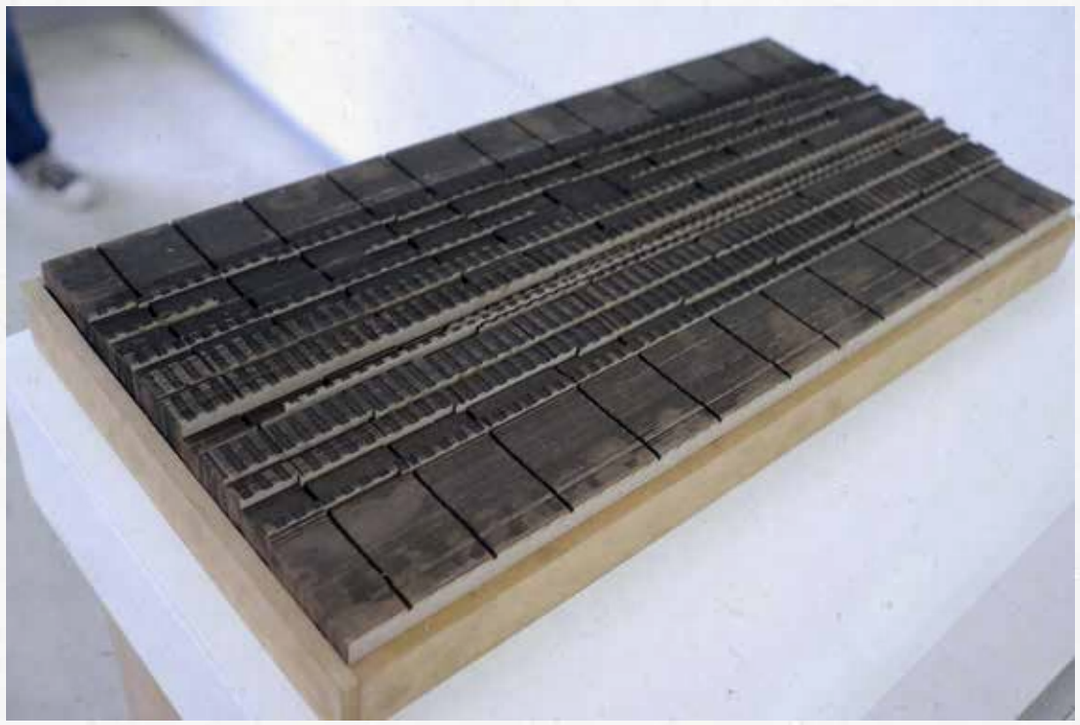
Exploring space means experiencing, capturing, and interpreting space. The project offers an insight into a capturing process that is based on sectional drawing and at the same time takes into account the viewer's perception of space in motion. On the one hand, the sectional drawing in architecture can be understood as a time-based form of representation that makes it possible to visualize spatial relationships that are only revealed to the viewer on-site through movement. On the other hand, the sectional drawing is a geometrically abstract pictorial construction that represents space without distortion—a form that the viewer does not experience in space because he or she perceives it as distorted and foreshortened.

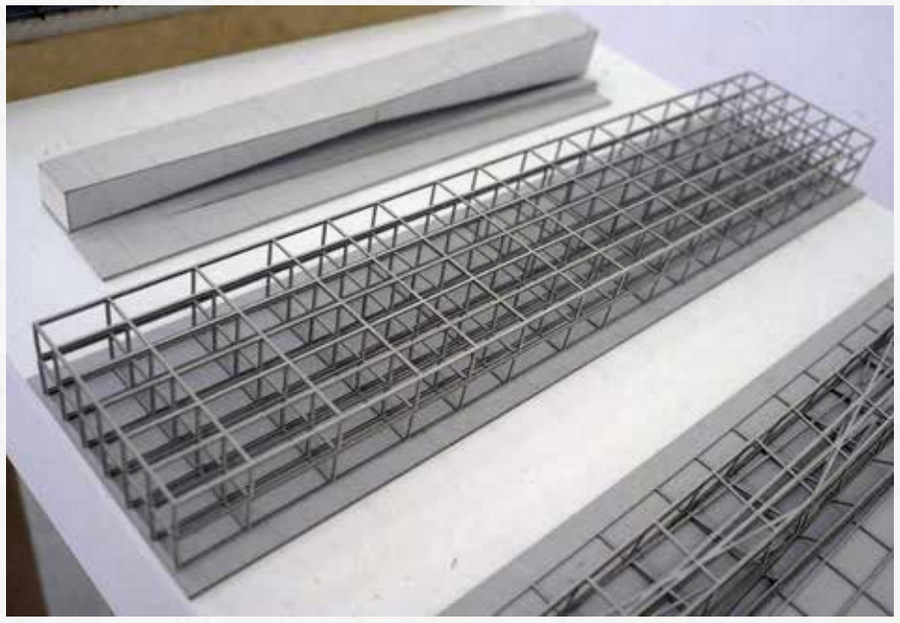
The project deals with the question of the various possibilities of sectional and perspective drawing. To use these possibilities productively, the viewer-oriented perspective of space is combined with the undistorted construction of space. To exemplify this, Felix Schippmann uses his camera to analyze two high-rise buildings built in Hamburg in the 1960s by the architect Werner Kallmorgen, which are related to each other in the urban space. From the superimposition of dimensionally accurate and perspectively distorted sectional drawings of the facade grids, he develops an independent geometric drawing system with which he creates visually and spatially complex order structures that reflect the perception of the moving viewer. Using the two-dimensional techniques of screen printing and laser cutting, he creates both graphic and haptic sectional models.

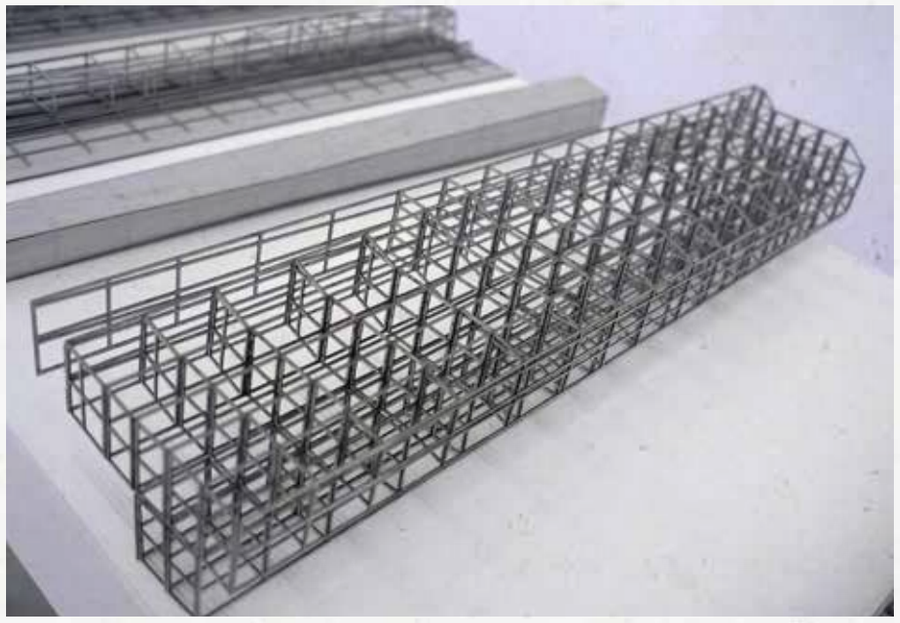
Felix Schippmann: *The Section Maker.* Screen-printed analysis of the facades of the IBM building and the Spiegel building in Hamburg, designed by Werner Kallmorgen in the 1960s.

Felix Schippmann
The Section Maker

Laser-cut models based on perspectives and sectional drawings of Kallmorgen's buildings.







Year	2013
Participants	Edgar Joaquin Dos Santos Azevedo, Malte Dirwehlis, Jaqueline Myohl, Christoph Peetz, Mathias Scheuren, Anissa Schlichting, Katharina Specht, Cedric Tapper, Marc Thiede, Dave Tkaczyk, Amir Touhidi, Robert Uhl, and Josefine Wrensch
Curated by	Prof. Matthias Karch and Dr. Carolin Höfler
With the support of	Steffen Busse, Katrin Hellbach, Katharina Specht, Dr. Philipp Reinfeld, and Oliver Störmer

Out of Control

Exhibition at the Orangelab in Berlin

»Out of control« describes a concept of protest in which demonstrators seem to disperse spontaneously and then reassemble elsewhere. In this way, the boundaries between the protest march and its surroundings are dissolved, and the monitoring of events is made systematically more difficult. In the exhibition of the same name, this form of action is paradigmatic for the development of action-oriented spatial concepts that are organized decentrally and give a central role to the »unplannable.«

The exhibition *Out of Control: Formations of Collective Spaces* deals with urban sites that have become sites of collective memory through political, cultural, and commercial mass events. Dedicated to the city as a site of mass events in public space, it examines the interactions between spatial orders and collective actions. Outstanding protest events of the 20th century (from June 17, 1953, in Berlin to January 28, 2011, in Cairo), as well as major music and sporting events (Love Parade, the Olympic Games), are reconstructed in time and space and visualized in diagrams, maps, and structural models. The transformation of urban spaces through mass events as well as the facilitation or prevention of collective action through spatial structures are examined. The reconstruction is based on eyewitness accounts, police reports, and agency images, as well as on amateur photographs, private videos, and blog entries on the Internet. The project opens up new perspectives on the events under investigation by focusing on the reciprocal relationship between the course of events and urban space.

Architectural designs at well-known public places and spaces in Berlin and Cairo explore how the characteristics of protests and celebrations can be translated into architecture. How can the concentration of activities and actors, the openness and accessibility of space, and the ecstatic state of the unplanned be implemented architecturally? How must built space be designed to enable collective action? And what role do social media play today in the constitution of real-physical spaces for action?

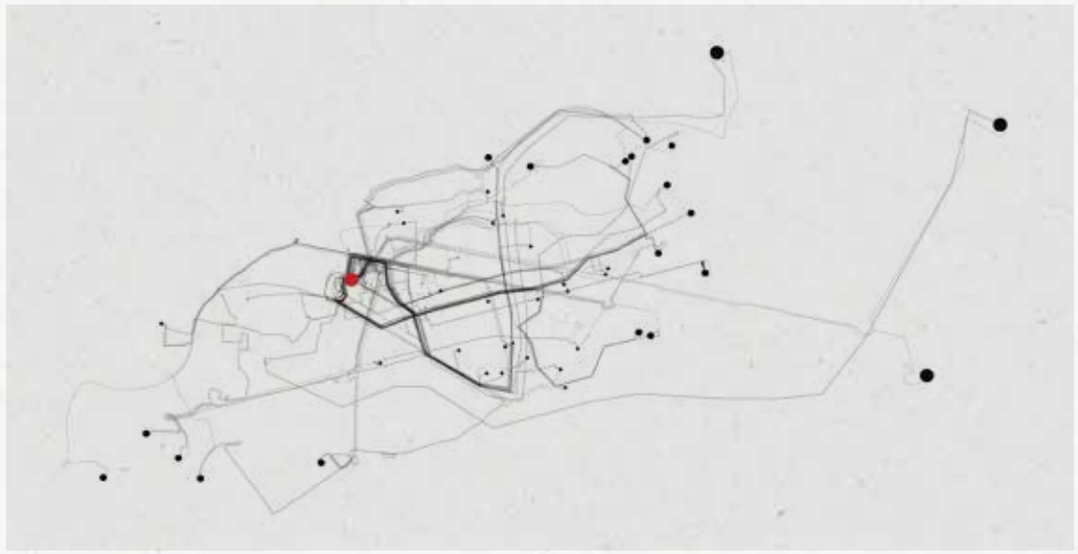
The exhibition takes place in the glass gallery of the former IBM tower on Ernst-Reuter-Platz in Berlin. In the 1960s, this space was nicknamed »the electronic brain behind glass« because it was here that the first IBM computers were presented to the public. The choice of this location for the exhibition is exemplary of the new media and technologies used to monitor and control mass events, as well as of the empowerment of civil society participants in these events.

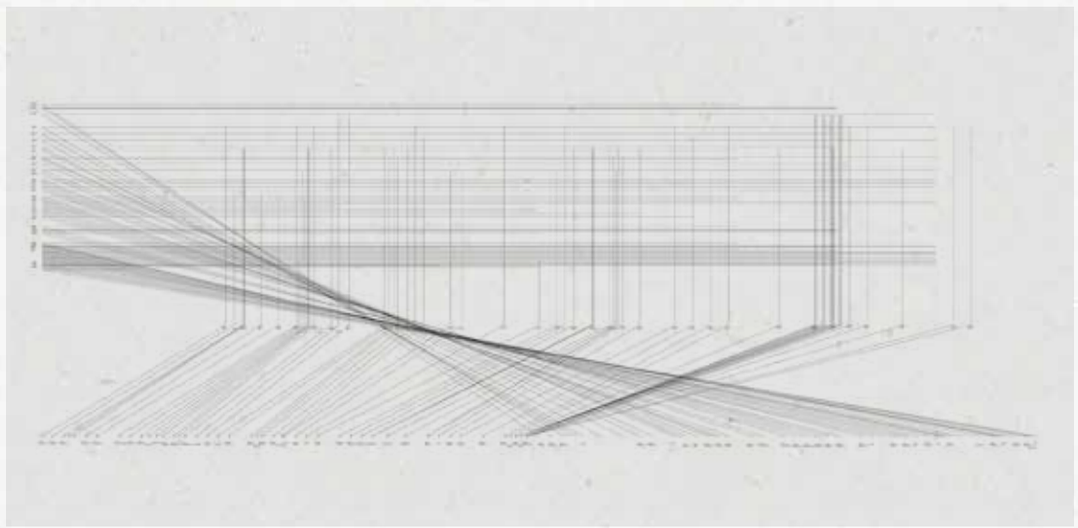
Marc Thiede
Fan Riots during the El Clásico 2012

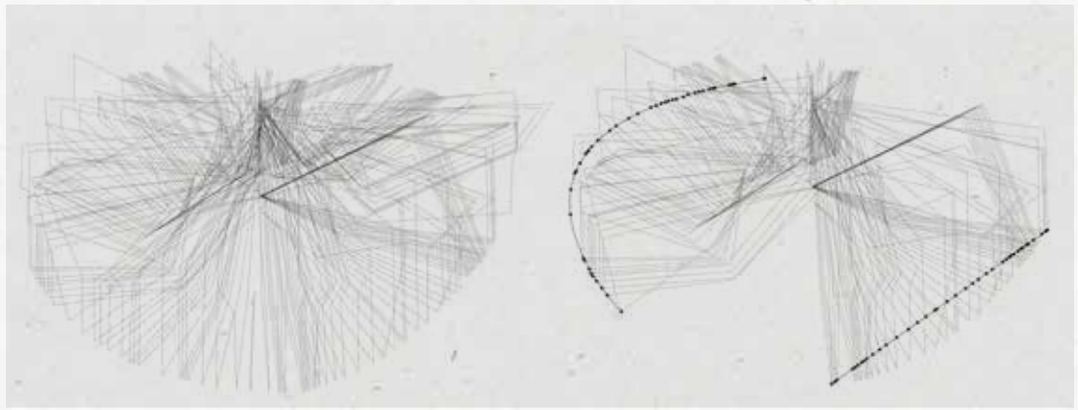
Site map of the area of conflict in Barcelona after the soccer match between FC Barcelona and Real Madrid CF in 2012.

Diagrammatic drawing of the course of the soccer match.

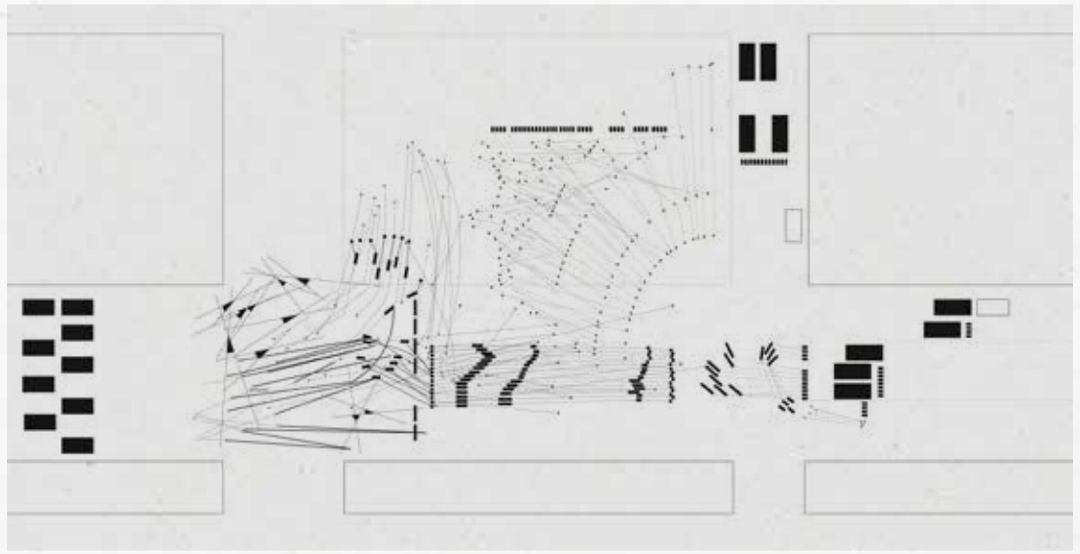
Diagrammatic drawing of the soundscape during the match.

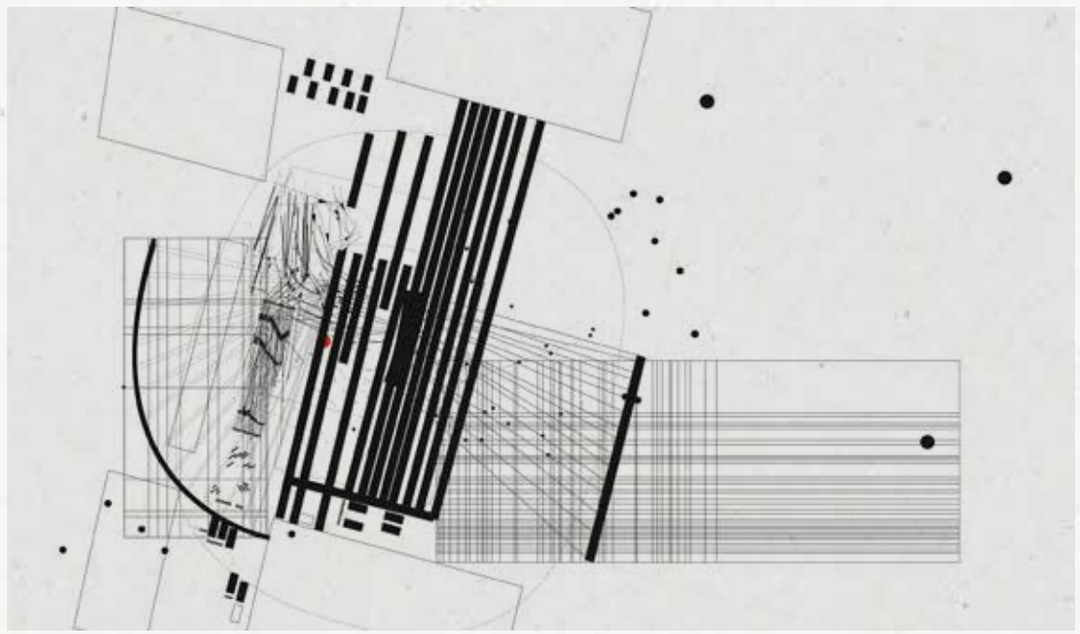






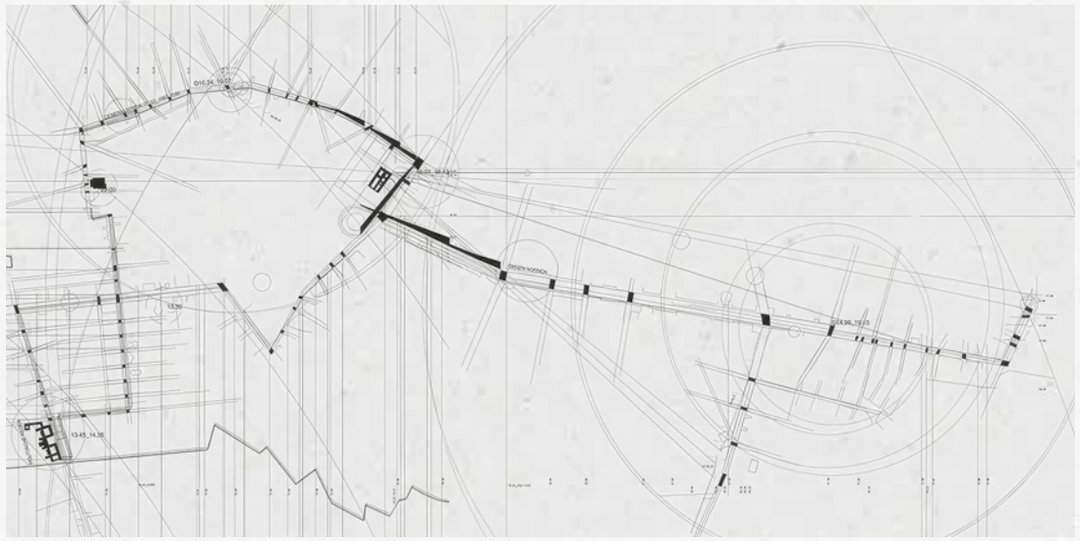
Site map diagrams of the riots in the streets after the match.





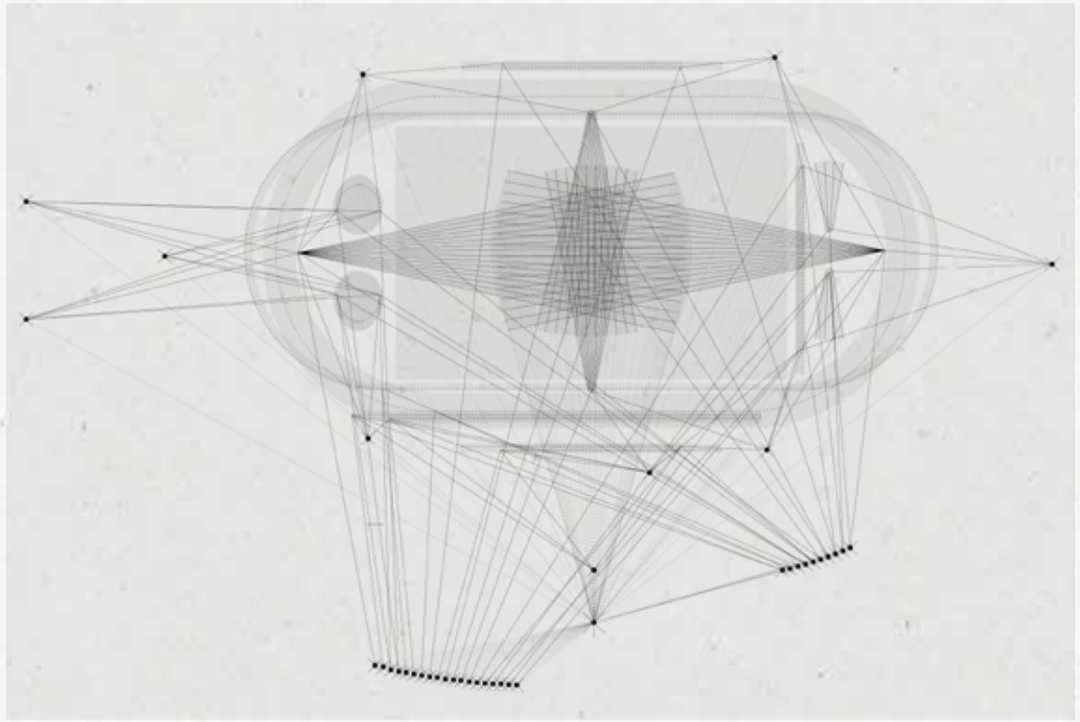
Anissa Schlichting
East German Uprising of 1953

Diagrammatic drawing of the demonstration route and events on June 16 and 17, 1953, from Lichtenberg in East Berlin (right) via Alexanderplatz (upper left) to Wilhelmstraße and the sector border to West Berlin (lower left).



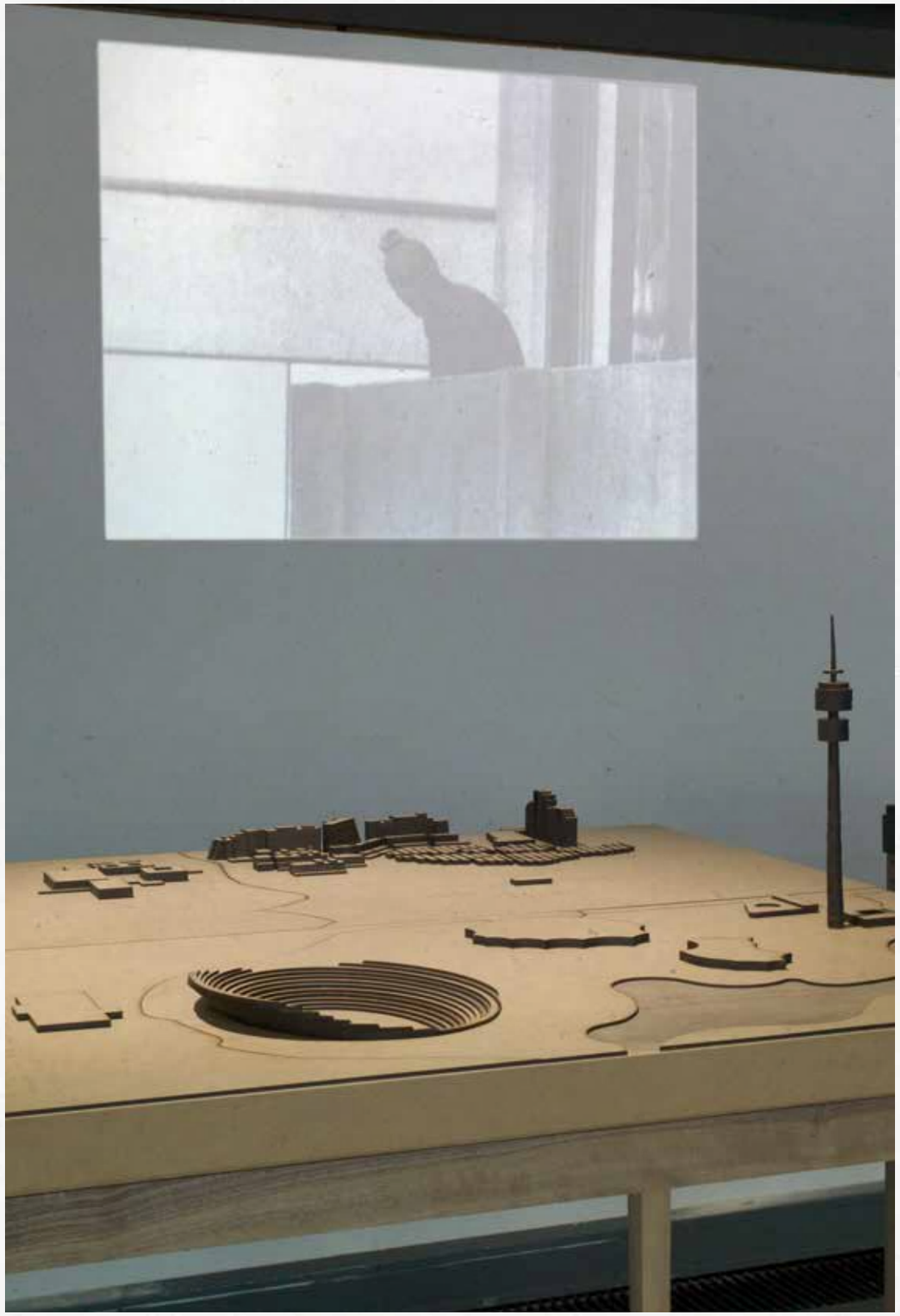
Josefine Wrensch
1936 Summer Olympics

Diagrammatic drawing of the microphones for the radio stations.



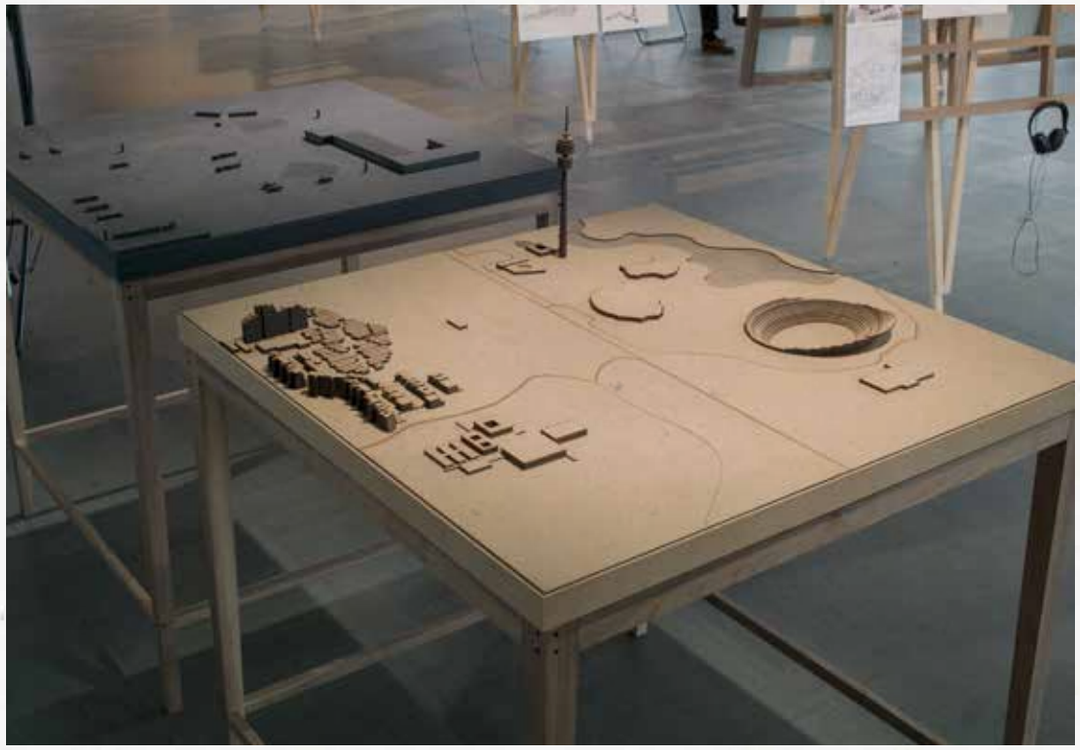
Katharina Specht
Munich Massacre 1972

Model of the hostage-taking in the Olympic Park and the Olympic Village Munich: On September 5, 1972, eight Palestinian terrorists from the group »Black September« took eleven members of the Israeli Olympic team hostage. Two hostages were murdered in one of the Israeli apartments in the Olympic Village.



Models of the Olympic Park and Village Munich and the Fürstenfeldbruck Air Base.

Model of the liberation attempt at Fürstenfeldbruck Air Base near Munich: On September 6, 1972, the hostage rescue operation by German authorities at the Fürstenfeldbruck Air Base failed. Eleven Israeli athletes and one German policeman were killed along with five terrorists. Three terrorists were wounded and captured alive.



Year	2023
Participants	Björn Oswald and Jakub Knorr
Led by	Prof. Matthias Karch and Prof. Folke Köbberling
Guest review by	Mohammad Reza Abdollahi Bidhendi and Max Justus Hoven
Photos of the ICC Berlin	Matthias Karch

Fun Palace ICC

Concepts for a Spaceship on Hold

The Internationales Congress Centrum Berlin (ICC Berlin) is one of the most striking buildings to be constructed in Germany in the last 70 years. From the outside, the ICC's bulky, hangar-like, shimmering, metallic, and introverted character may seem contradictory. The urban environment, however, consists entirely of six- to eight-lane arterial roads and highways. They surround the ICC island, giving the building no reason to interact with the outside in a transparent dialogue. Inside the building, however, visitors are immediately struck by the optimistic, cheerfully ironic staging in the style of a retro-futuristic »spaceship.« The colorful and lovingly executed concept of a »place of departure into the open« evokes a spirit of departure that Berliners have not been able to experience in this architectural quality and to such an exhilirating extent in a long time.

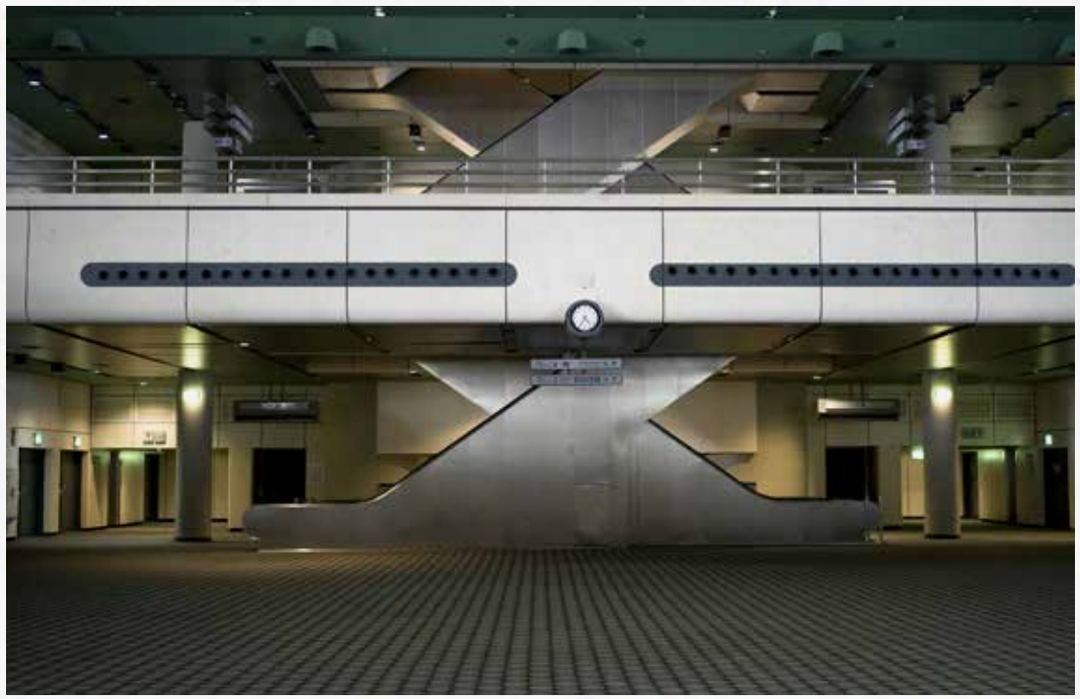
Architectural Concepts after the German Reunification in Berlin
By contrast, most of the new buildings in Berlin in recent decades seem uninspired. This applies not only to the jury's decision for the new quarter at Potsdamer Platz in 1991, which, in a high-caliber international competition with some spectacular visions for the city's architectural future, ultimately opted for a rather despondent continuation of Berlin's familiar perimeter block development. The same can be said for the historicist facade designs of Berlin's Neue Mitte. In the years following German reunification, these were devoid of charm and esprit and rejected any bold, pointed departure. Later it was the townhouse idea of the noughties, built in the clichéd »investor chic« style for high-income earners, which did not do justice to the real housing shortage and social conditions in the city. Most recently, it was the travesty of a »castle without a king,« the new Humboldt Forum, whose influential sponsor association is currently facing a debate about the right-wing politics of some of its members.

The Potential of the ICC
In the dreariness of the only moderately successful new beginning in Berlin after the fall of the Berlin Wall, the ICC is the courageous realization of a social utopian model that gave a clear vision and face to the social upheavals of the 1960s and '70s: The circulation areas are so entrancing and inviting that one is drawn—without noticing it—into an almost infinite, performative spatial continuum. Stairs and escalators literally suck visitors up to the floating plateaus and into the large halls. Associations with futuristic transportation and infrastructure systems, such as airport terminals, are omnipresent. Some of the interiors are reminiscent of epic science fiction films such as Stanley Kubrick's *2001: A Space Odyssey* (1968). The light and its changing moods also reinforce the character of a building that you enter not to find something, but to lose yourself in it.

The Sun Machine Is Coming Down
The reappropriation of the building, which had been unused since 2014, was triggered by an exhibition organized by the Berliner Festspiele in 2021. With performances, art, music, films, and spatial installations, *The Sun Machine Is Coming Down* invited visitors to explore the architectural icon in interaction with artistic works. It was a phenomenal success, and the dialogue between the 45-year-old building and contemporary artifacts demonstrated its eminent potential for radical appropriation by contemporary culture. Since this public success, the idea of an ICC as Berlin's answer to the world-famous Pompidou Center in Paris has taken root in the minds of political leaders.

Research, Program, Programming
The project begins with intensive research into the architecture of the 1960s and '70s and the relevant players at the time. In addition, the ICC building itself is examined from an architectural-historical and architectural-design perspective. This is used to develop specific scenarios for an open place of cultural communication. The aim of the project is a concept for a »Fun Palace ICC,« a place for performance, visual arts, music, film, theater, dance, artistry, virtual and augmented reality, and artificial intelligence, for scientific discourse and social negotiation of how urban society wants to live together in the future. Because of its size, the ICC is also able to manage the clash of different communities and milieus in this wild and dangerous place of arrival and departure. Combining cultural and social uses would increase public acceptance of reactivating the building and the entire site.

Model of the ICC building inside the ICC Berlin.

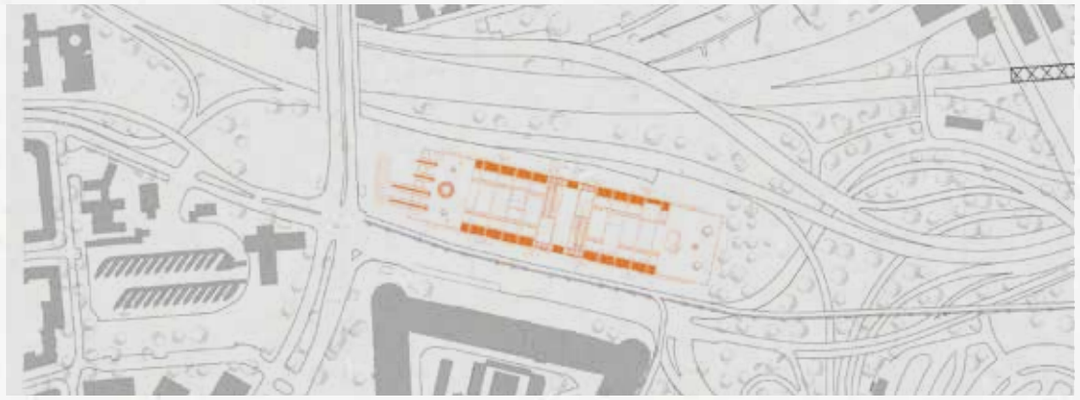


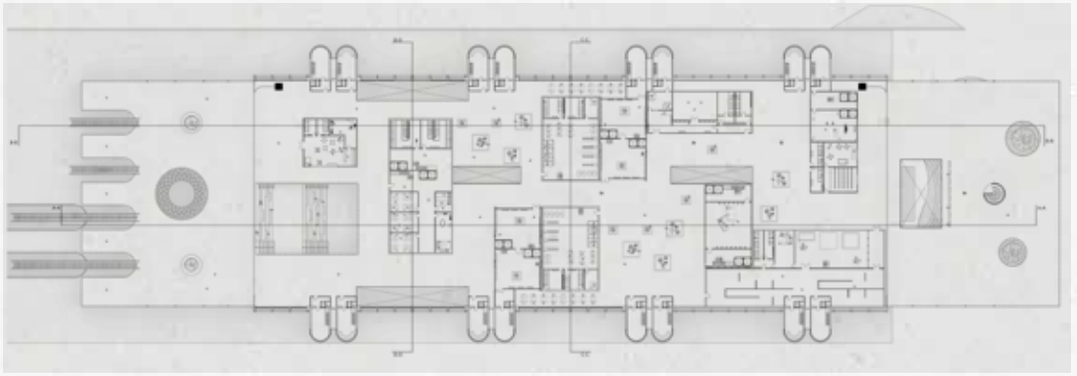
Björn Oswald
International Convergence Center

Site plan.

Elevation from the west.

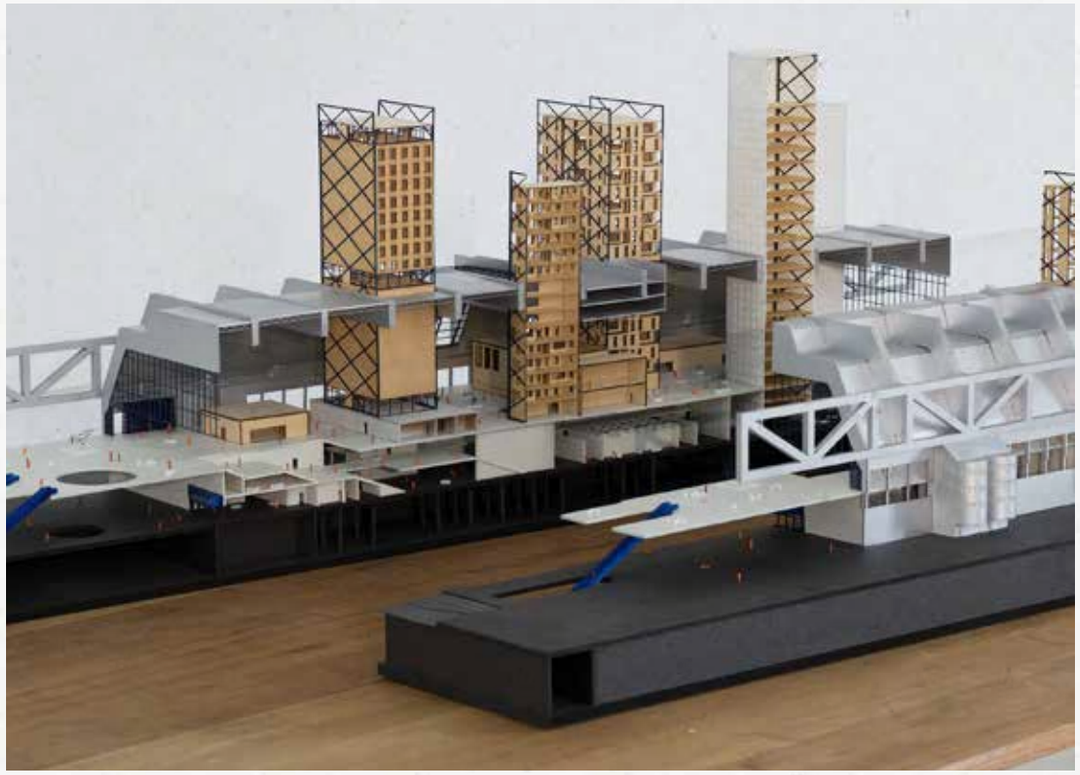
Floor plan of the public passage at level + 10 meters.





Longitudinal section from the west.

Section model.

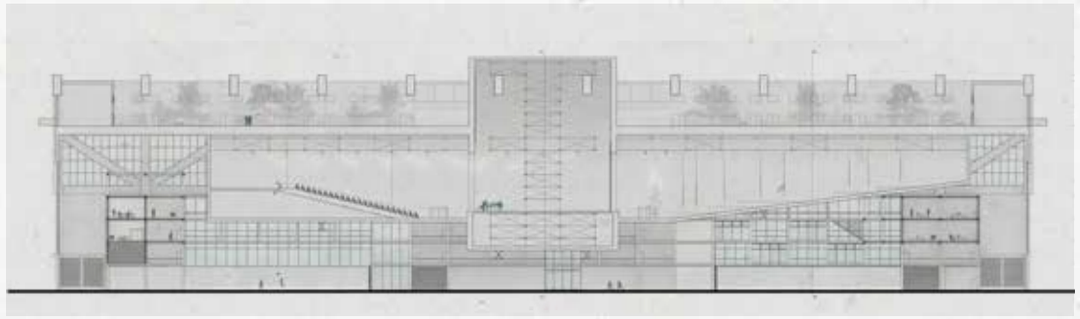


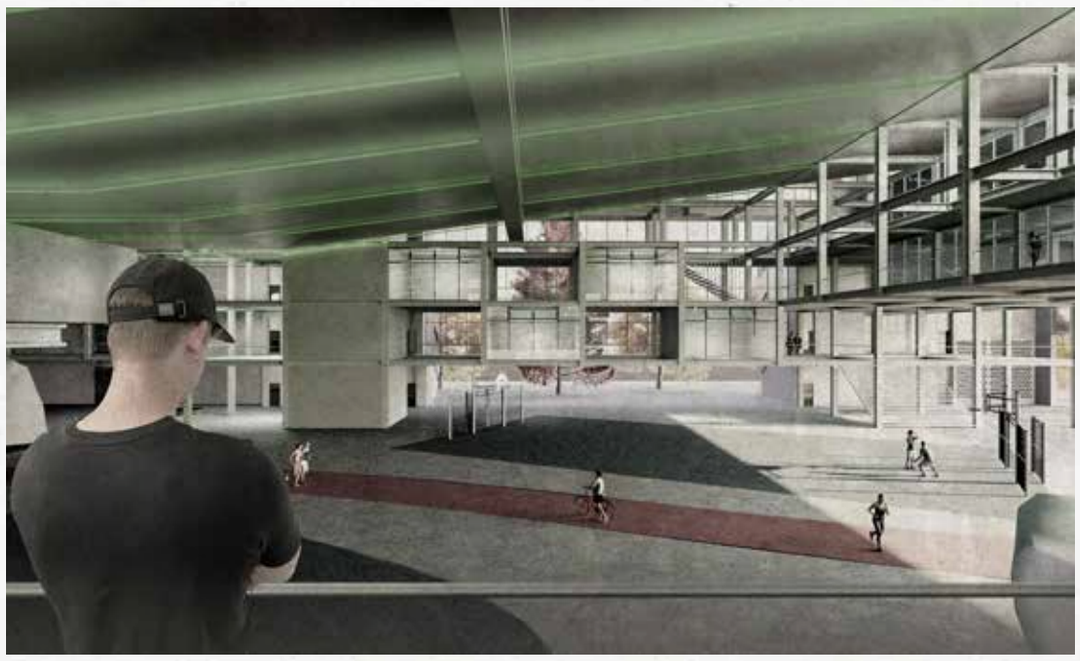
Jakub Knorr
A Great Performance Hall for Berlin

Perspective longitudinal section from the east.

Sectional model with the suspended exhibition and performance hall in the center.

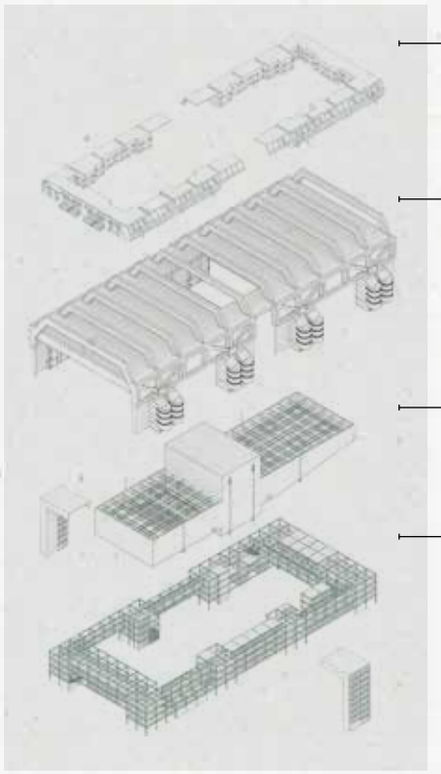
Perspective view of the sports landscape—open 24/7.

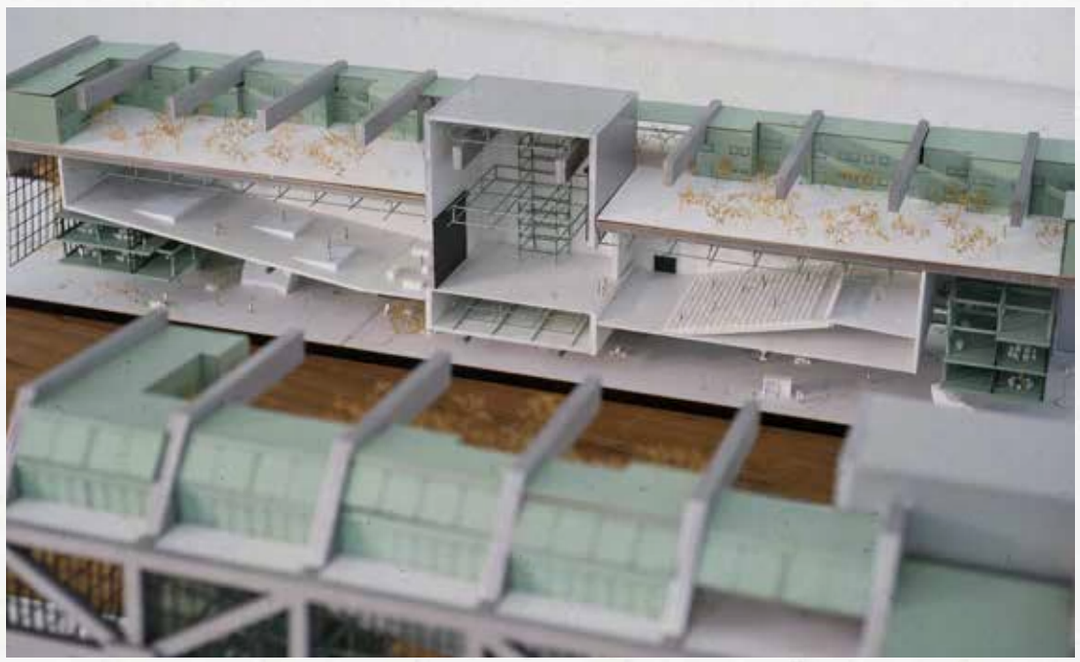




Axonometric exploded view.

Detail of the sectional model with the suspended exhibition and performance hall in the center.





Year	2014 and 2018
Participants	Elwira Brzezinska, Adrian Förster, and Iris Jander
Led by	Prof. Matthias Karch and Prof. Folke Köbberling

Avus Northern Curve

Designing an Infrastructure Landscape

The »Automobil-Verkehrs- und Übungsstraße,« known as AVUS, opened in 1921 and was used as a racetrack until 1998. Today, the AVUS makes up the northern part of Federal Highway 115. One of its most iconic places—the northern curve—has largely faded from the city's collective memory. Once a thrillingly steep curve, the site, while still in existence, has become a neglected edge of the city, serving as a truck parking lot, garbage dump, sand dump, and temporary camping ground for urban nomads and the homeless. At the northern end of the former racetrack, which was used for motorsport events until 1998, travelers to Berlin are greeted by a significant ensemble: Berlin Radio Tower, AVUS tribune, Internationales Congress Centrum Berlin, and the circular AVUS Motel.

The significance of the northern curve cannot be fully appreciated without considering its counterpart, the southern curve, which today forms part of the natural topography in Grunewald. The design gives the geometry of the northern curve a tangible form as architecture that invites a dialogue with the southern curve. The slightly sloping oval area directly in front of the northern curve is also part of the planning scenario. By mapping the movements in this mobility space and understanding its history and current informal use, the project seeks to activate the eminent potential of this space. A diverse programming strategy is planned to reactivate this exposed site. A bus station is established as a defining element. New spaces for a mix of travel and leisure activities are created amid the curving paths: a travel center, a hotel, a sports and park landscape, micro-economies, urban gardening, camping facilities, and a car repair shop.

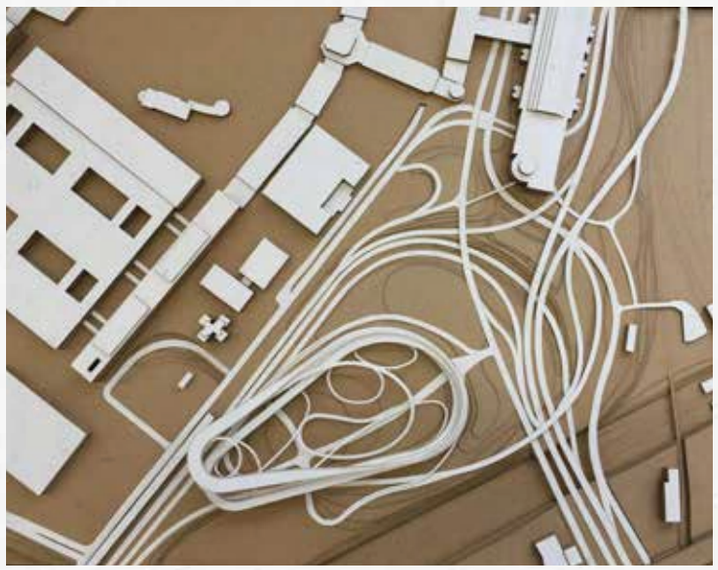
AVUS northern curve. View from the Berlin Radio Tower.

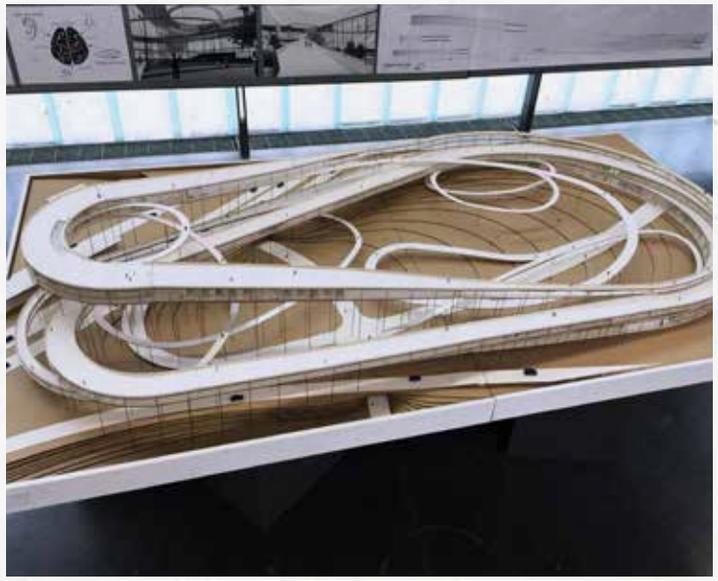
Iris Jander
Walk the Line

Site plan.

Concept model.

Final model.

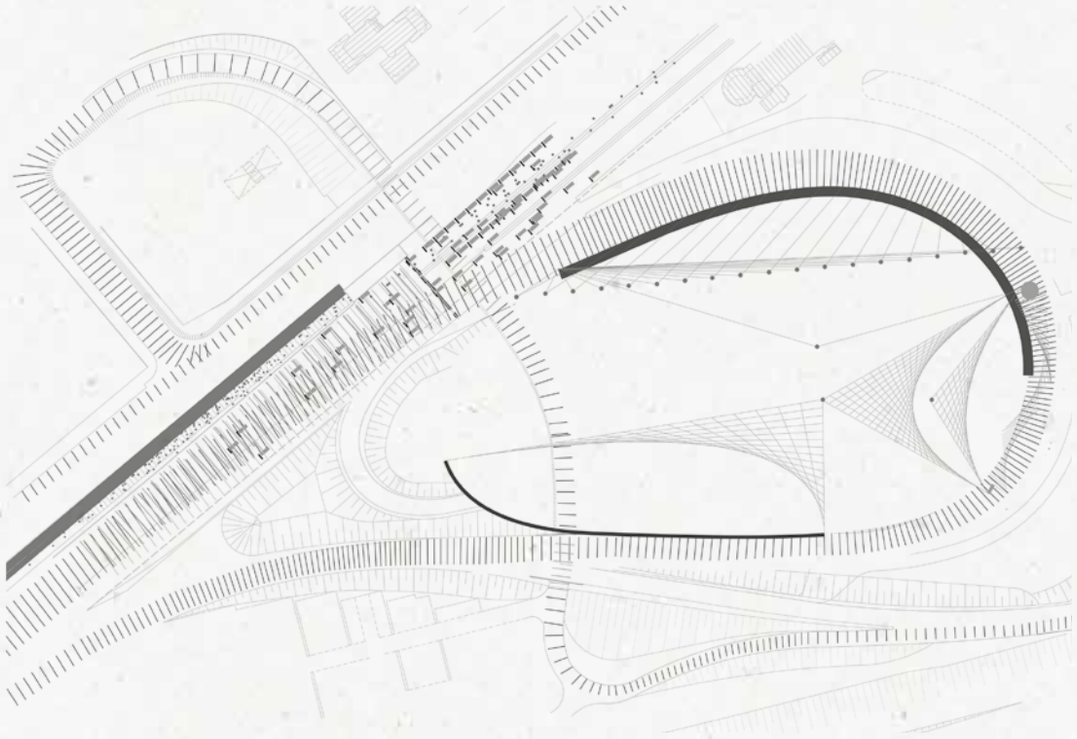


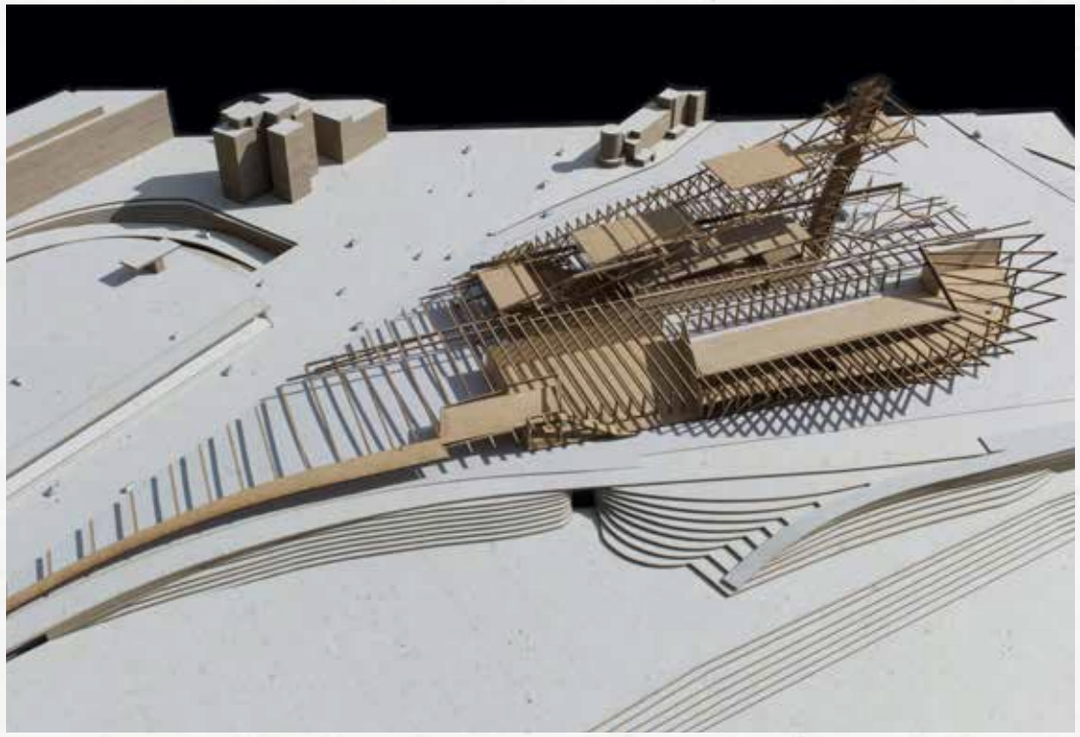


Elwira Brzezinska
Ramp to Infinity

Concept drawing.

Final model.





Adrian Förster
Cloud Hoop

Concept model.

Final model.

Reverse Modeling

On the Design Research of Social Space

»[...] thought hard, smashed, reassembled [...].«
Rainald Goetz (1986: 37. Translation: author)

Architecture is a field that requires dealing with different forms of knowledge and interpreting this knowledge in the design of social spaces: It creates situations and determines the perceptibility of bodies, things, and practices. Architecture also distributes, organizes, and controls processes and procedures.

In order to identify and make use of these different forms of architectural knowledge, four projects are presented that test a specific methodological approach developed by the architect and IMD assistant Nicolai Schlapps: so-called »reverse modeling,« a neologism derived from »reverse engineering.« Reverse engineering is a process in which the properties of a physical object are determined by a comprehensive analysis of its structure, functions, and operations. Reverse engineering is also called »backward engineering,« as reverse engineers work »backward« through the original design process, starting with the end result, disassembling the product, and performing evaluations and measurements to obtain the physical design information. In this way, information is obtained without having access to the original blueprints. Such a method is applied to modeling processes in architecture that deal with the reconstruction of existing contested public spaces and buildings in order to generate new ideas for their development. The thesis is that the morphology of a city is inextricably linked to its sociopolitical transformations. Accordingly, every urban structure is the result of a chain of undertakings, successes, and conflicts. Capturing these transformations and putting them up for discussion is the goal of the reverse modeling approach.

This integrative approach results in research-based model constructions that go far beyond the meaning and function of traditional architectural presentation models. It uses models as a tool to find new ways to pluralize and intensify approaches to urban spaces. The models pose questions; they do not provide answers. Rather, they are an expression of conjectures and processes. Together, they create a common discursive space rather than showing an image. They discover the unknown and open the space for the unspoken and the unpredictable to find new starting points for urban and social transformations of public spaces.

The steps of the reverse modeling process can be described as follows:

1. Deconstructing
Urban planning and architectural situations are broken down into their components. The components refer to the most important physical and non-physical factors that influence and shape the urban space. Everything that can be seen, heard, and felt on-site is recorded in sketches and notes. The resulting temporal notations are then overlaid with axonometric drawings and exploded models of the found architecture.

2. Analyzing
The deconstructed elements of urban situations, spaces, and architecture are analyzed in relation to their cultural, social, economic, and political contexts. Using mapping and modeling as documentation tools, the projects address not only the geography of space but also the ethnography of place.

3. Negotiating
The models are used on a trial basis as communication tools to enable and promote the participation of civil society groups. In public discussions, the sociospatial conflict potentials as well as the different interests and influences that become visible in the models are negotiated and used as a basis for possible transformations of the site.

4. Reassembling
Different perceptions, appropriations, interests, and needs are related to the built environment. Modeling practices are tested that may be relevant for negotiating the common good in the development of open cities.

Goetz, Rainald (1986): *Hirn,* Frankfurt a. M.: Suhrkamp.

Year	2015
Participants	Jonathan Bals, Nils Besler, Lisa Blotevoge, Hannah Gelhaus, Vassiliki Gliaia, Urs Granatowski, Yannik Höhne, Anja Jaekel, Ulviye Kaya, Amelie Korkisch, Eduard Kutz, Robert Leinemann, Antonia Lüttig, Christian Martens, Emilia Mittmann, Sebastian Musa, Esra Özek, Christina Pickel, Tim Reinecke, Johannes Rose, Lara Roth, Patrick Schippan, Lilian Schwegler, Calvin Schwenke, Larissa Wittig, and Yuwei Zhu
Text	Prof. Matthias Karch
Led by	Fabian Busse and Nicolai Schlapps

Reverse Modeling No. 1

Alexanderplatz and Kulturforum Berlin

The first project in the reverse modeling series focuses on two central squares in Berlin: Alexanderplatz in the eastern part of Berlin and Kulturforum in the western part. While Alexanderplatz, with its square buildings, still embodies the model of the modern socialist city of the 1970s, the Kulturforum recalls Hans Scharoun's model of the modern urban landscape of the 1950s and 1960s. In their own ways, both urban concepts represented a radical departure from the previous planning of the Nazi Reich's capital. In experimental axonometric drawings, the specific urban forms and their political and social conditions from the time of their creation to the present are documented and transformed into spatial objects through reverse modeling.

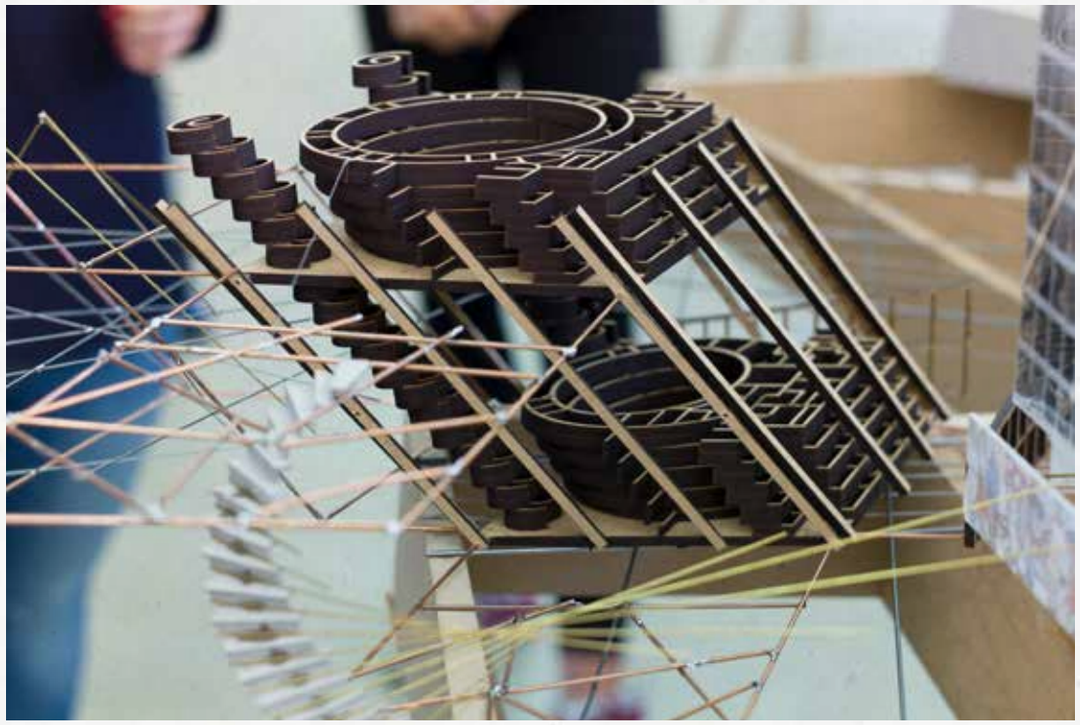
Reverse Modeling No. 1: *Alexanderplatz Berlin*
Model of the Park Inn Hotel, formerly Hotel Stadt Berlin (1967–1970, rebuilt 2005–2007). Galeria Kaufhof shopping center in the background.

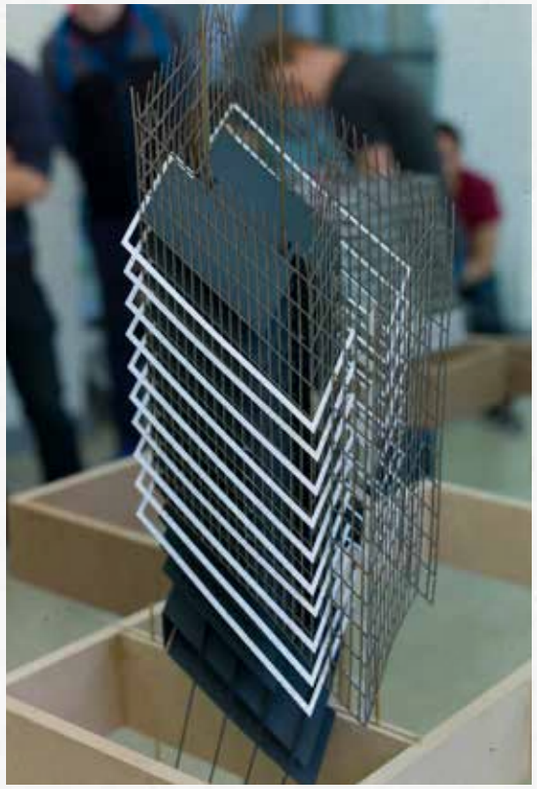
Reverse Modeling No. 1
Alexanderplatz Berlin

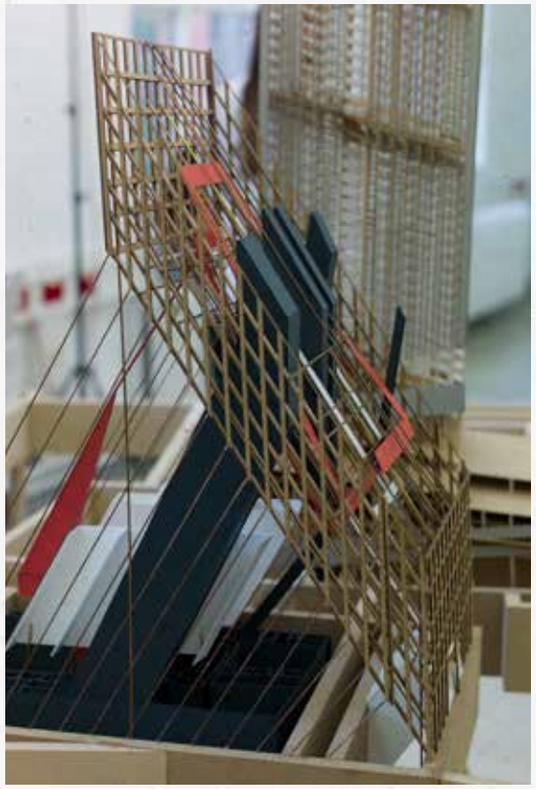
Model of the bbc—Berlin Congress Center, formerly Kongresshalle (1961–1964).

Model of the House of Travel (1969–1971).

Model of the Galeria Kaufhof shopping center (1967–1970, rebuilt 2004–2006).



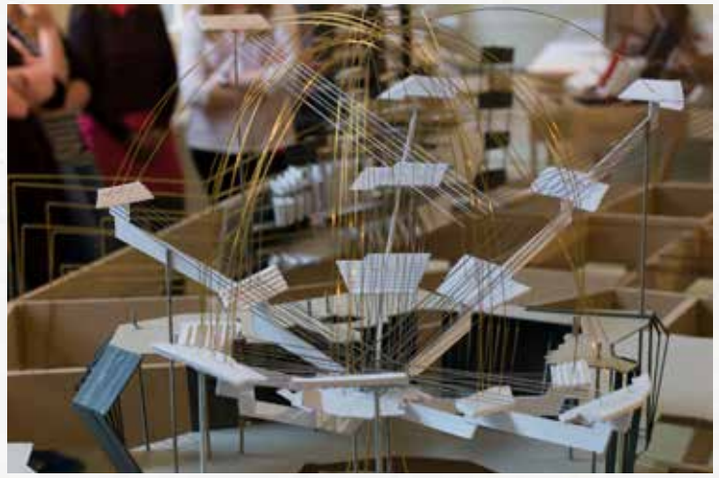


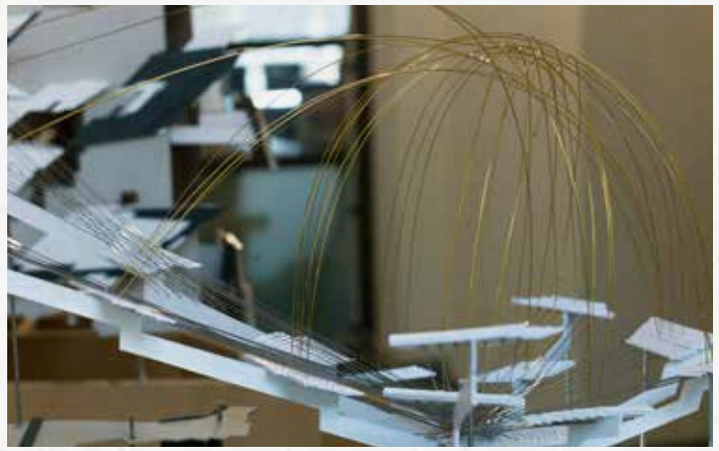


Reverse Modeling No. 1
Kulturforum Berlin

Model of the Staatsbibliothek zu Berlin, House Potsdamer Straße (1967–1978).

Model of the Berliner Philharmonie (1956–1963).





Year	2017
Participants	Diana Bao-Tran Huynh, Marisa Bergmann, Stella Betz, Tabea Büsing, Lukas Denkeler, Moritz Felzmann, Patrick Fern, Jan Funk, Jan Leonard Goldenbaum, Daniel Ilunga, Fabian Johann, Charity Lamptey, Henrike Laude, Pia Karow, Julia Kolb, Michael Müller, Max Petersen, Macha Prohl, Kirsten Remmers, Jeannine Rohrberg, Alina Schock, Friederike Schulze, Jakoba Struck, Ayat Tarik, Julia Thiebes, Maike Volkmer, Merlin Waßmann, Oona Lisbeth Welp, and Alina Woewutku
Led by	Nicolai Schlapps

Reverse Modeling No. 2

Berlin’s Infrastructure Nodes

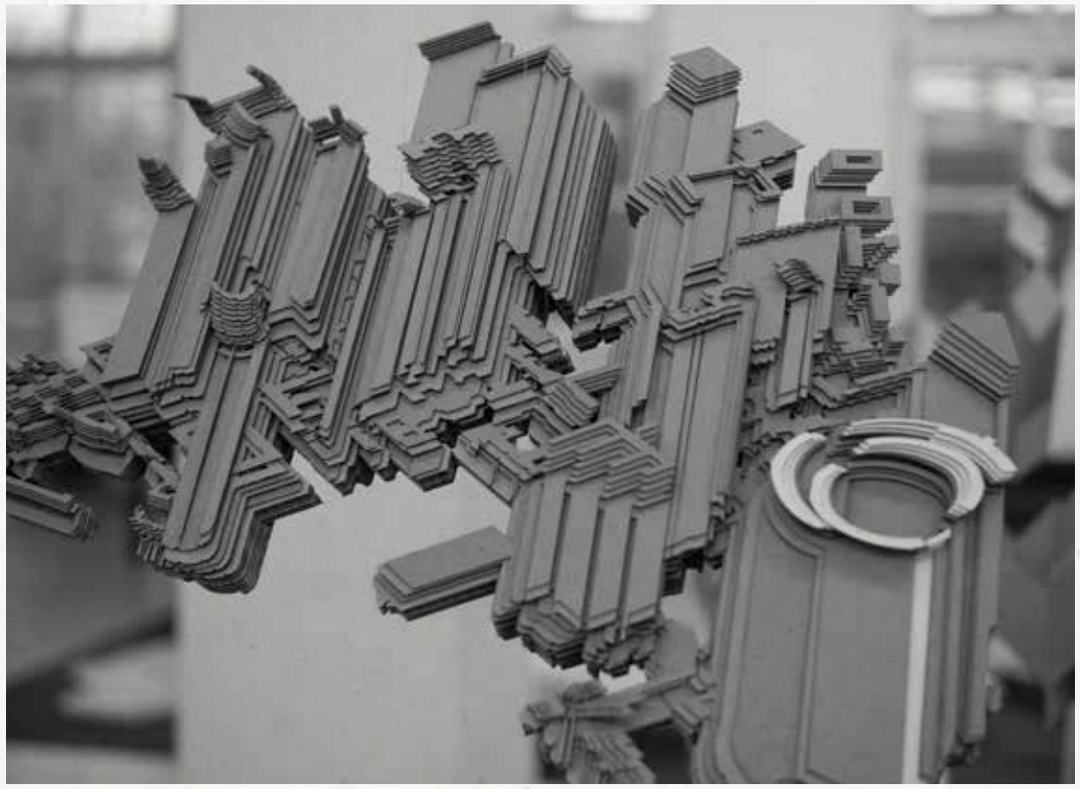
In the search for an adequate understanding of the city of Berlin, the second reverse modeling project focuses on the social and structural infrastructures that lie simultaneously above and below the city, on spaces and activities that often disappear from the view and consciousness of residents and visitors. Places such as Breitscheidplatz in the Berlin Charlottenburg district, Kottbusser Tor and Mehringplatz in Kreuzberg, and Frankfurter Tor in Friedrichshain are examined using the method of reverse modeling. These are traffic junctions created by the intersection of several main roads and dominated by numerous monolithic buildings from the 1950s to the 1970s. The selected sites are characterized by the fact that, at the time of their creation, they were (and still are) controversial in one way or another.

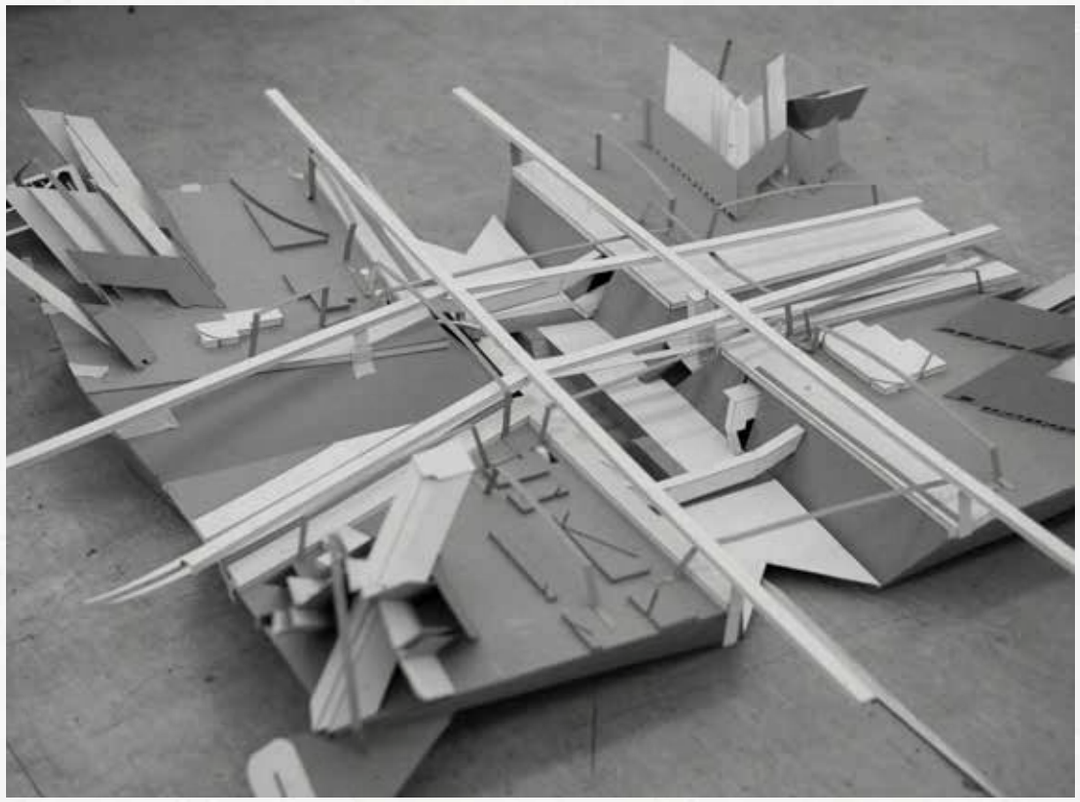
The practice of reverse modeling goes far beyond the encounter with static architecture; the resulting mapping and modeling attempts to capture the everyday dynamics that surround these infrastructural sites. They explore not only the potential left behind by unrealized ideas from past plans but also the potential of the real space created by the built buildings. They show the appropriation and intervention of space by the neighborhoods and communities that live there, shining a light on what most architectural plans leave out or ignore: the way people actually interact with and use their built environment.

Reverse Modeling No. 2: *Berlin’s Infrastructure Nodes*
Model of the Waldorf Astoria Hotel, Breitscheidplatz, Berlin Charlottenburg (2008–2012).

Model of the Mehringplatz, Berlin Kreuzberg.

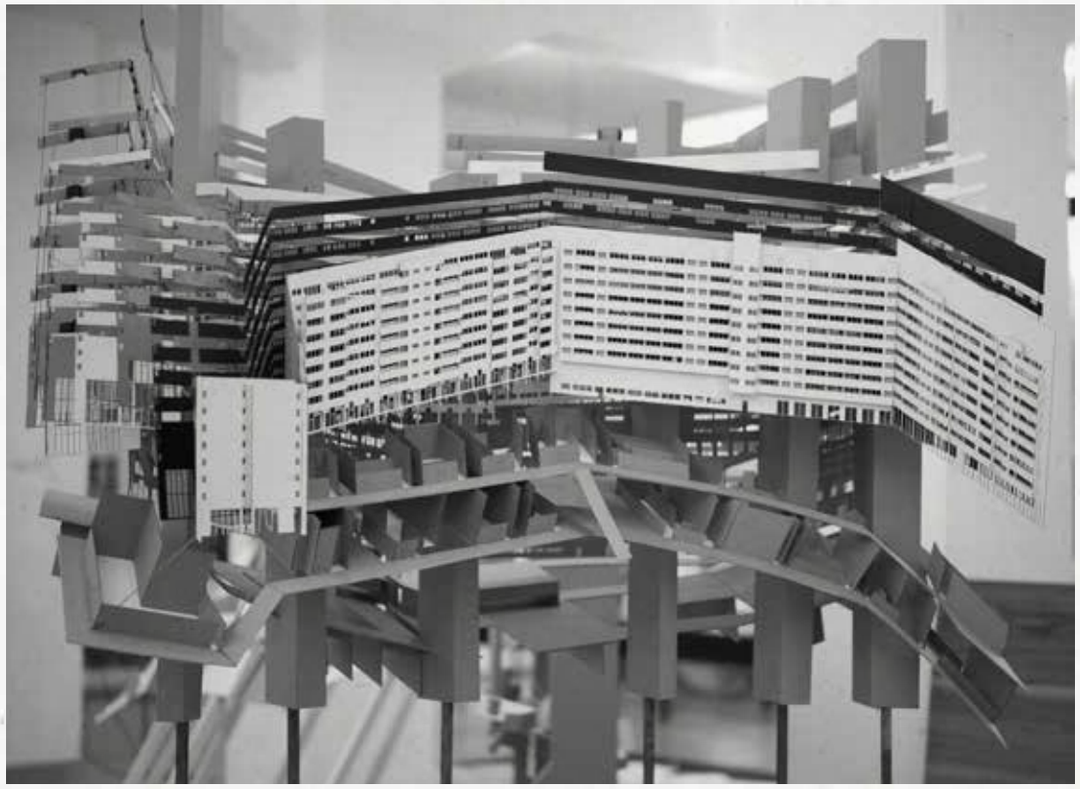
Model of the Frankfurter Tor, Berlin Friedrichshain.

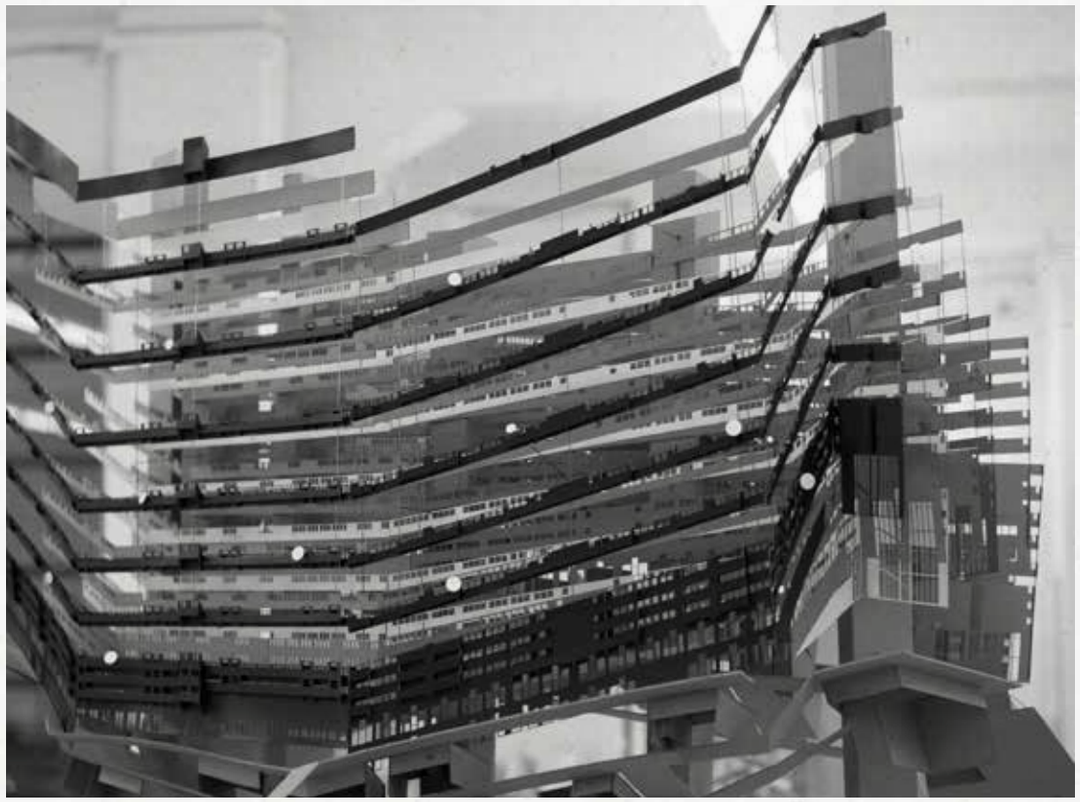




Model of the front side of the Neues Kreuzberger Zentrum, Berlin Kreuzberg (1969–1974).

Model of the back side of Neues Kreuzberger Zentrum, Berlin Kreuzberg (1969–1974).





Year	2018
Participants	Oskar Bode, Aletta Bünte, Hannah Clemens, Daniel Geistlinger, Anna Grabi, Pascal Kapitza, Ulrike Krause, Ole Starsinski, and Nikolaus Theissen
Led by	Nicolai Schlapps
With the support of	Jan Funk

Reverse Modeling No. 3

Culture Scene around the Berlin Ostbahnhof

The third reverse modeling project refers to the urban environment around the Berlin Ostbahnhof (the Berlin East railway station) in the Friedrichshain district of the former German Democratic Republic. After the fall of the Berlin Wall, the alternative culture and the occupation of wasteland and vacant infrastructure buildings developed into a club and culture scene known beyond the borders of Berlin. The project focuses on the cultural and events center »Radialsystem,« the techno club »Berghain,« and the club »Kater Blau.« The urban and social situation was researched and translated into experimental drawings and models. More than 30 years after the fall of the Berlin Wall, the empty spaces created by the division of Berlin are still present but are diminishing due to new planning and development. In particular, the large diagrammatic model of the urban space around Berghain shows the problems, opportunities, and potential of this still open and wild area, which is increasingly under pressure from office complexes and investor projects.

Reverse Modeling No. 3: *Culture Scene around the Berlin Ostbahnhof*
Model of the Berlin Ostbahnhof, Berlin Friedrichshain (1842, rebuilt several times).

Models of the Ibis Hotel and the Radialsystem cultural center (1879–1880, rebuilt 2004–2006).

Model of the techno club Berghain (1953–1954, rebuilt 2010).

Year	2020
Participants	IMD students
Text	Nicolai Schlapps
Led by	Nicolai Schlapps
Curated by	Nicolai Schlapps in cooperation with ANICOWORKING

Reverse Modeling No. 4

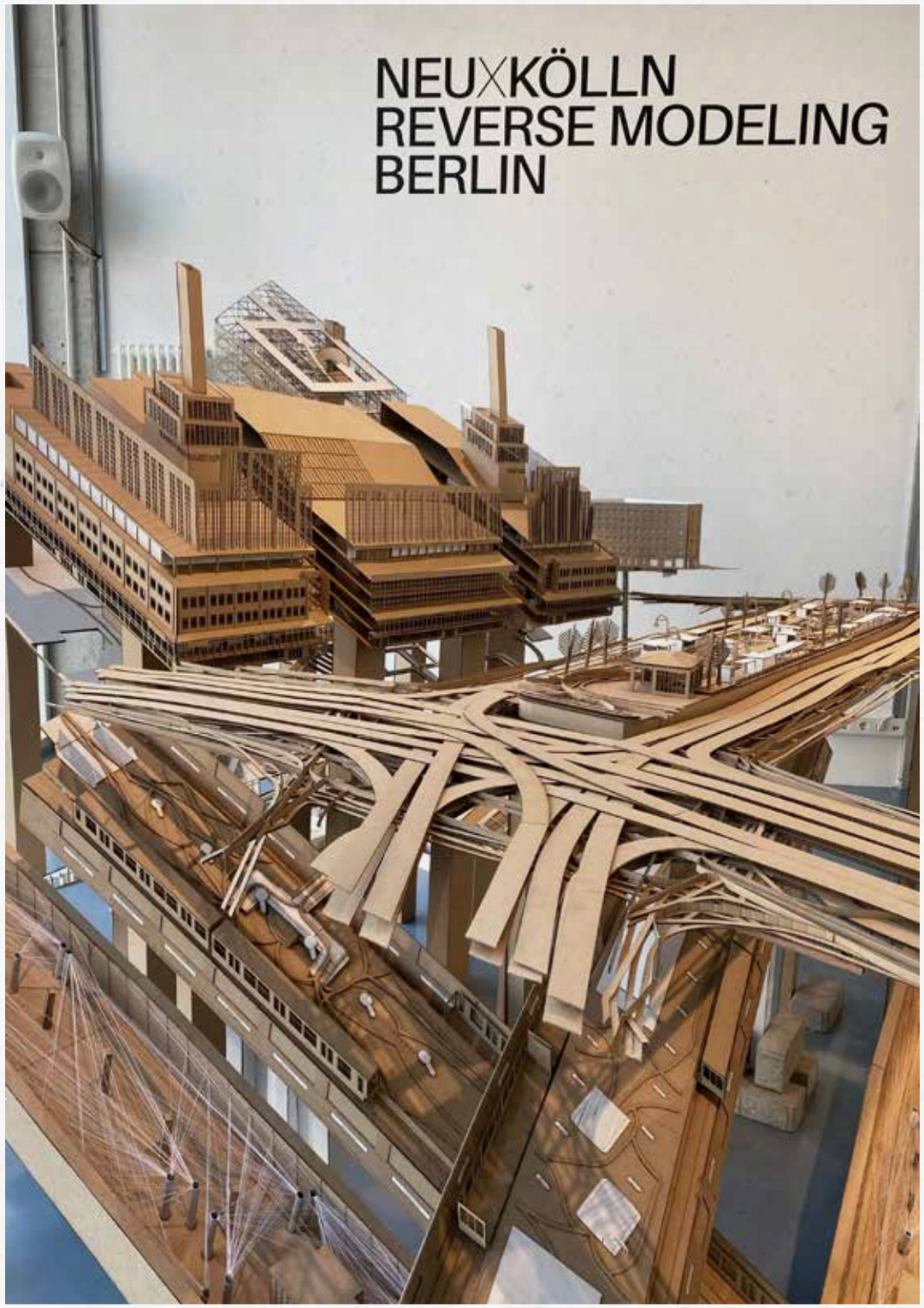
NEUXKÖLLN
Exhibition at CLB Berlin

The exhibition *NEUXKÖLLN* at CLB Berlin, an independent project space for contemporary art, cultural studies, and urbanism in the Aufbau Haus at Moritzplatz in Berlin Kreuzberg, presents student works from the fourth reverse modeling project.

In the reverse modeling process, models serve to highlight the complex relationships between urban spaces and sociocultural phenomena and to relate them to each other in a dialogical and associative way. The media and tools of architectural design and planning practice are reversed in their function: The graphic and spatial modeling of existing urban structures and situations is understood as a reversal of classical architectural communication, in which plans and models serve to anticipate the shape of future buildings and spaces.

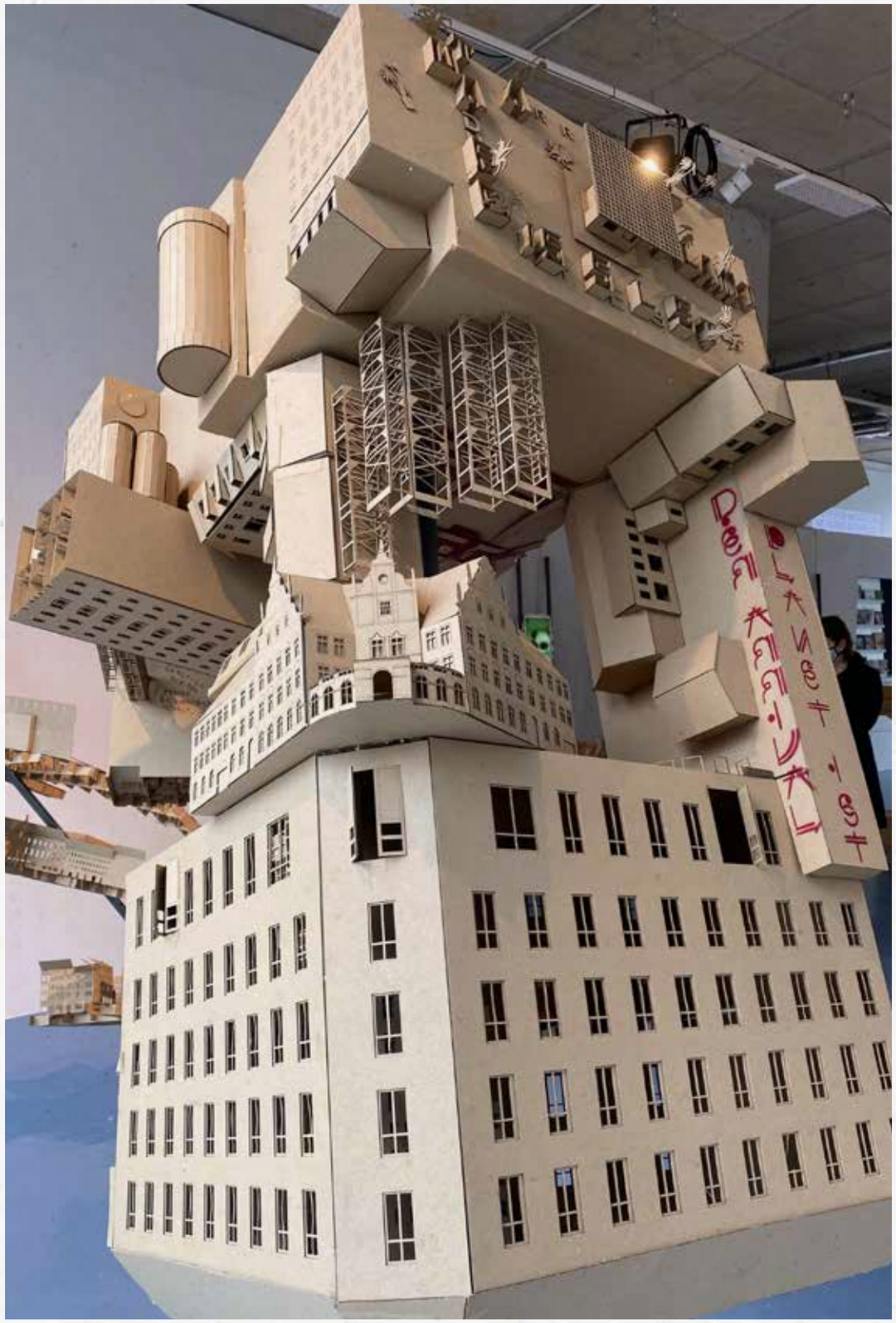
In this exhibition project, the reverse modeling approach is applied to Hermannplatz and the ever-changing Karl-Marx-Straße on the border between the Berlin districts of Neukölln and Friedrichshain-Kreuzberg. Neukölln is currently one of the most dynamic areas of gentrification in Berlin. The juxtaposition of heterogeneous lifestyles and cultures creates an urban space full of tension, conflict, and vitality. At the same time, Neukölln serves as a living and tangible laboratory situation for social coexistence, in which permanent exchange and immigration become new transcultural resources. The heterogeneity of the Neukölln district, its architecture, urban planning situations, actors, and networks are analyzed and publicly discussed on the basis of large-scale spatial models.

Reverse Modeling No. 4: *NEUXKÖLLN—Exhibition at CLB Berlin*
Model of the Hermannplatz, Berlin Neukölln.



Close-ups of the architectural collage »Arrival Planet Neukölln.« Model.

The architectural collage »Arrival Planet Neukölln.« Model.



Year	2022
Participant	Pascal Kapitza
Text	Pascal Kapitza
Led by	Prof Matthias Karch and Prof. Helga Blocksdorf

Finis Terrae

Bunker Metamorphoses on the French Atlantic Coastline

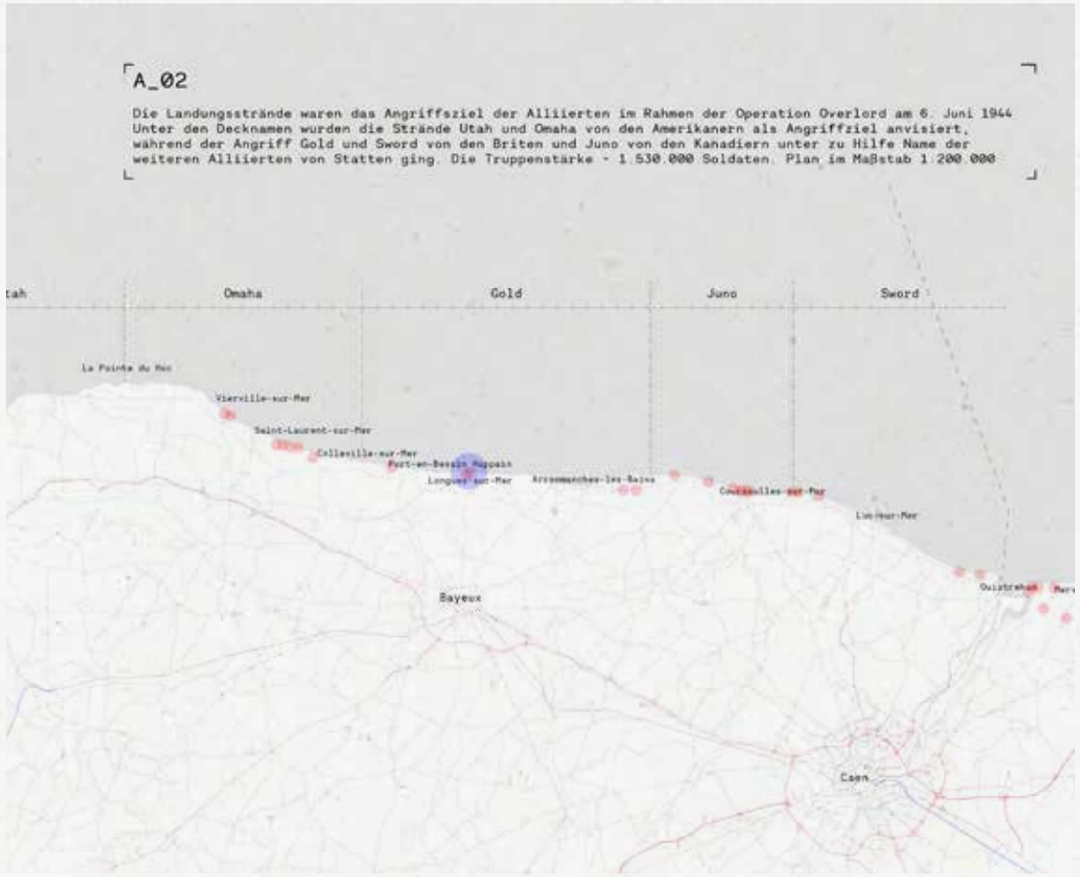
The remains of the bunkers on the French Atlantic coast await an event that will no longer happen. Built by the Nazis for the »Atlantic Wall« during World War II, they are now useless. Bunkers are extreme constructions for extreme situations. They embody an ideology of fear: With walls two meters thick, they are monolithic masses, rigid and immovable, driven by external forces and shrouded in darkness. In his study *Bunker Archeology* from 1975, the urban philosopher and cultural theorist Paul Virilio writes: »Contemplating the half-buried mass of a bunker, with its clogged ventilators and the narrow slit for the observer, is like contemplating a mirror, the reflection of our own power over death, the power of our mode of destruction, of the industry of war« (1994: 46). He continues: »The bunker has become a myth, present and absent at the same time: present as an object of disgust instead of a transparent and open civilian architecture, absent insofar as the essence of the new fortress is elsewhere, underfoot, invisible from here on in.« But even in their use during World War II, bunkers were usually not secure fortresses; they were often simply ignored or circumvented by the enemy, or they became deadly traps during air raids.

The project examines the intertwining of architecture and war by focusing on these ineffective sculptural structures on the Atlantic coast in the field of tension between presence and absence. Concepts are being developed for the future use of three pairs of bunkers on the Normandy coast, pondering how these architectural relics can play a role in public perception and how they can be experienced by the public. As camouflage structures, bunkers are often chameleons that adapt to their surroundings. Over the years, all three pairs of bunkers have become even more integrated into the surrounding landscape: Having slipped down the slopes, they are now part of stone breakwaters.

The architectural interventions form a contrast to the bunkers to draw attention to the camouflage objects and make them visible in the vast landscapes of the Atlantic coast. They take up the structures of archeological finds, wooden constructions that intervene in the destroyed bunkers and enclose them, which in their lightness take on the character of the ephemeral and yet are distinguished by structural redundancy and material solidity. In their grid-like composition and orthogonality, they contrast with the rounded and broken bunkers. They form a scaffolding that accommodates different spaces and structures: from public viewing platforms and paths for pedestrians and cyclists to archive and research spaces and a boat landing stage. At the same time, they serve as breakwaters, sound spaces for wind and water, and tide gauges. Bunkers and scaffolding alternately lead into the dark and into the light, they close off from their surroundings and open up to them, they tell of the past and offer a view of the horizon. They are absent and present at the same time.

Virilio, Paul (1975): *Bunker archéologie.* – English translation: *Bunker Archeology,* transl. by George Collins, New York: Princeton Architectural Press, 1994.

The »Atlantic Wall« in France built by Nazi Germany between 1942 and 1944.



Pascal Kapitza
Site 1: The Observatory—Atmosphere

The »Atlantic Wall« bunkers in 2023.

F_01

F_02

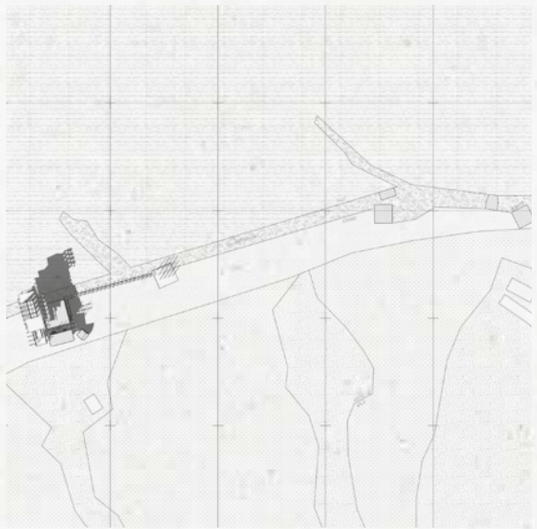
F_03

F_04

Bunker sliding down the slope.

Site plan.

Rendering and photo collage.

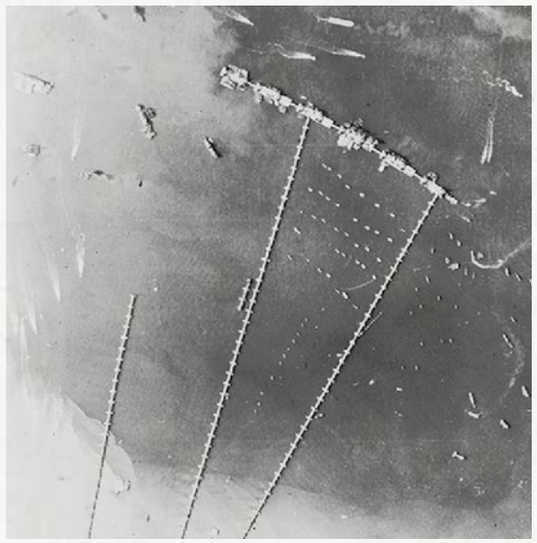


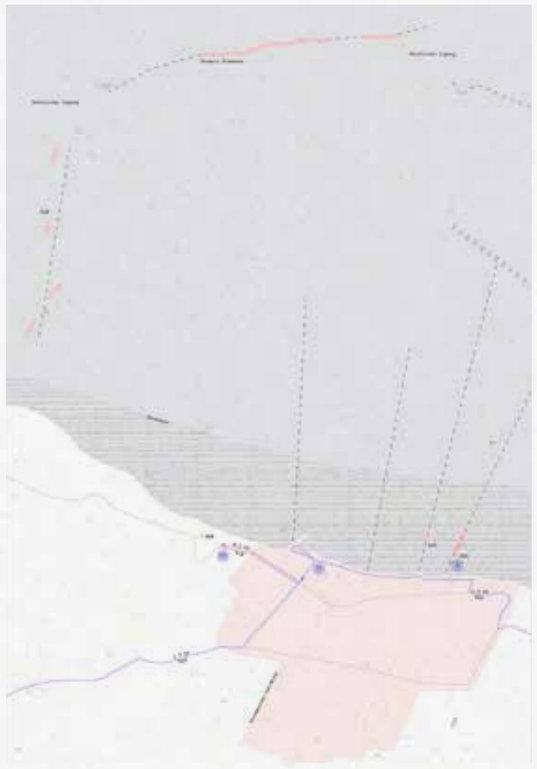
Site 2: The Landing Stage—Hydrosphere

Rendering and photo collage.

View of the Mulberry B harbor »Port Winston« at Arromanches, France, developed by the British Admiralty and War Office during World War II to facilitate the rapid unloading of cargo onto the beaches during the Allied invasion of Normandy in June 1944, designed by Ove Arup and Ronald Jenkins. Photo courtesy of the Imperial War Museums, London (rotated 90 degrees to the left).

Site plan.





Site 3: The Archive—Terrasphere

Rendering.

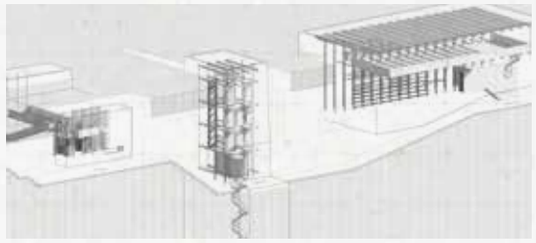
Section I.

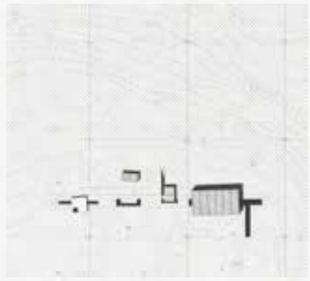
Axonometric drawing.

Floor plan.

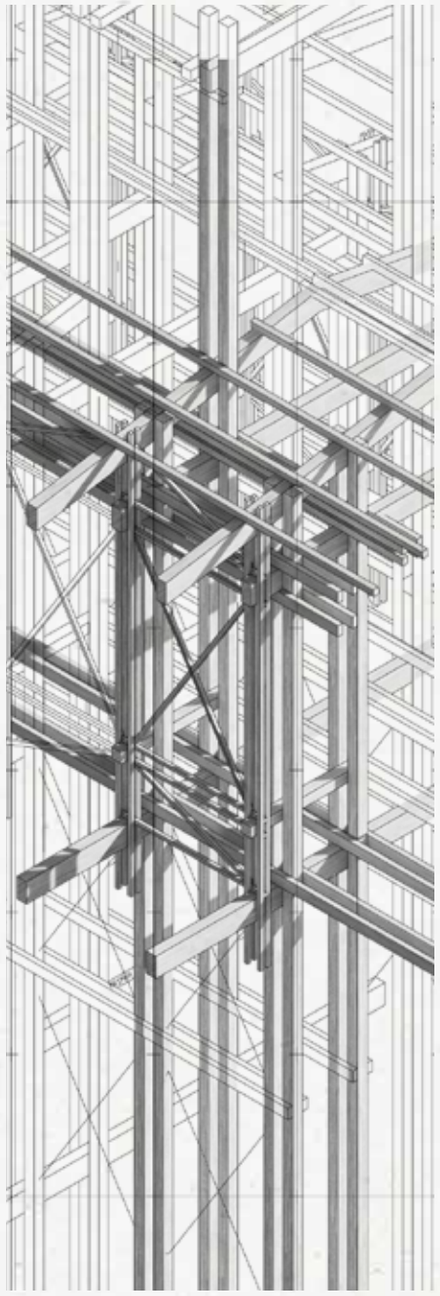
Site plan.

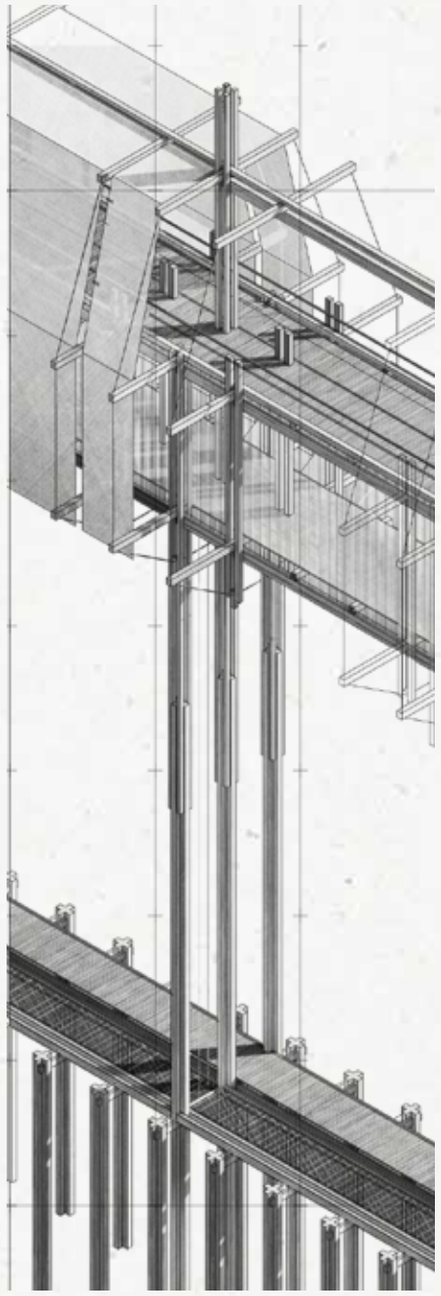
Section II.





Detail drawings of the wooden constructions for »The Observatory« and »The Landing Stage.«

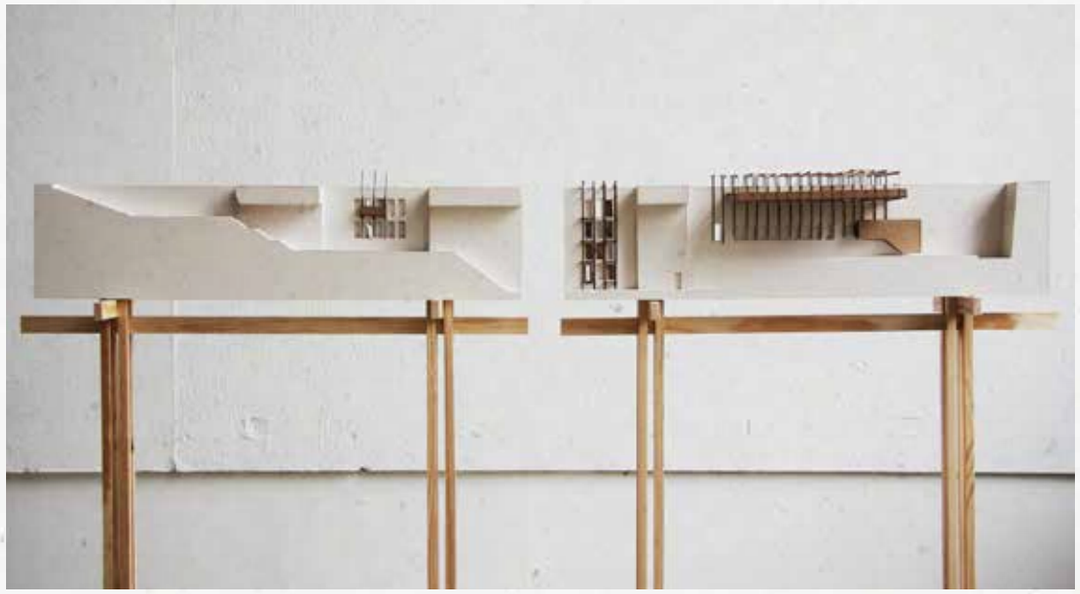




Model of »The Archive—Terrasphere.«

Model of »The Observatory—Atmosphere.«

Model of »The Landing Stage—Hydrosphere.«



Year	2022
Participant	Anja Jäkel
Text	Anja Jäkel
Led by	Prof Matthias Karch and Prof. Dr. Tatjana Schneider
Guest review by	Justus Max Hoven and Dr. Philipp Reinfeld

Calais

Dissolved Periphery

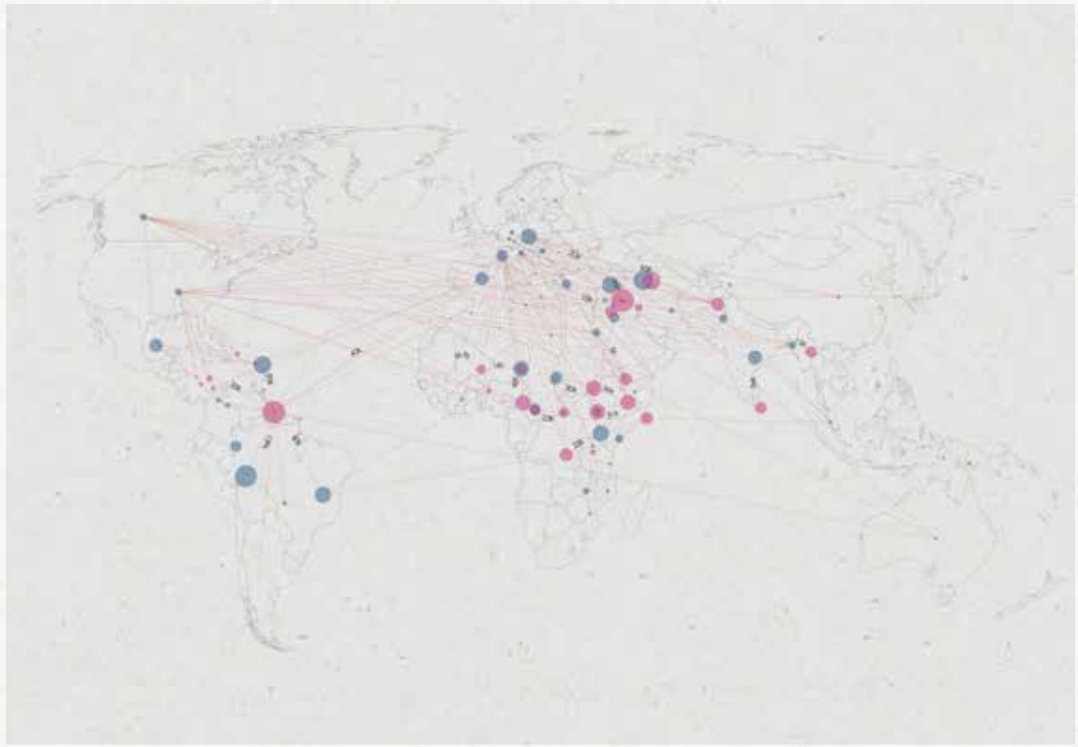
For at least 30 years, the northern French city of Calais has been one of the most important sites in the history of European migration. For most refugees fleeing to the United Kingdom, Calais is a key transit point. From here, after an arduous journey, they must overcome the hurdle of crossing the English Channel.

As a result of the Schengen Agreement and the associated external border of the Schengen Area, there are so-called »juxtaposed controls« in Calais. These controls involve moving a process that normally takes place in the country of destination to the country of departure. When the Channel Tunnel was designed as a rail tunnel, the aim was to make travel to and from the UK as easy and pleasant as possible. Border clearance was to take place when passengers boarded the train. This idea changed as more and more migrants sought to come to Britain. The country tried to keep illegal immigrants off the island by introducing parallel controls in France.

Over the years, Calais has evolved from a place of transit to a place of waiting. Several refugee camps have sprung up in and around the city. Increasing xenophobia and institutional racism are part of everyday life for local migrants. For years, migrant camps have been destroyed and pushed to the outskirts of Calais. A vicious cycle of waiting, fear, deportation, violence, hopelessness, and death seems to be the fate of those who have embarked on a difficult journey in search of hope, peace, and a better life.

The first part of this research and drawing project examines where refugees come from and how they reach Europe along the refugee routes. The second part is a study of the migrant camps in Calais and the city's treatment of refugees in recent years. The third part analyzes the events, problems, and controversies of the local situation since 2015, highlighting the consequences of the failures of the authorities and the European Union through a detailed examination of the camp situation in the urban and rural areas of Calais. The project explores how narrative maps and collages in the style of graphic novels can be used to explore the role of migrants' everyday living spaces and the different spatial structures in Calais, and, conversely, how research activities and spatial analyses are influenced by the narrative and stylistic choices of the drawings.

Anja Jäkel: *Migrants Hotspot Calais.* The main routes of migration to Europe in 2020. Diagram.

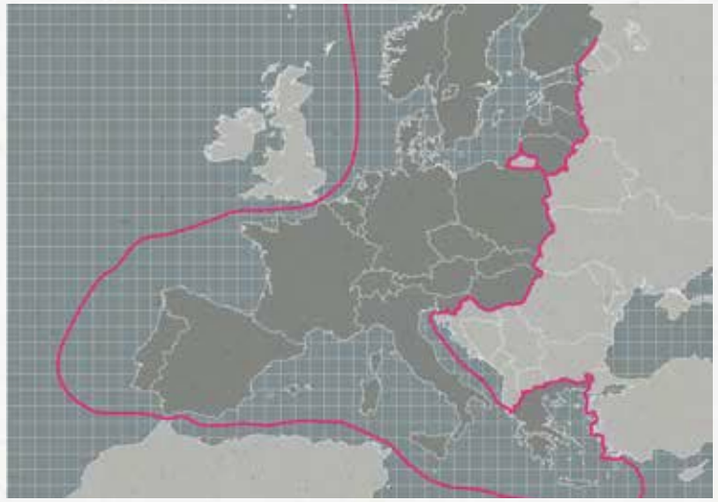


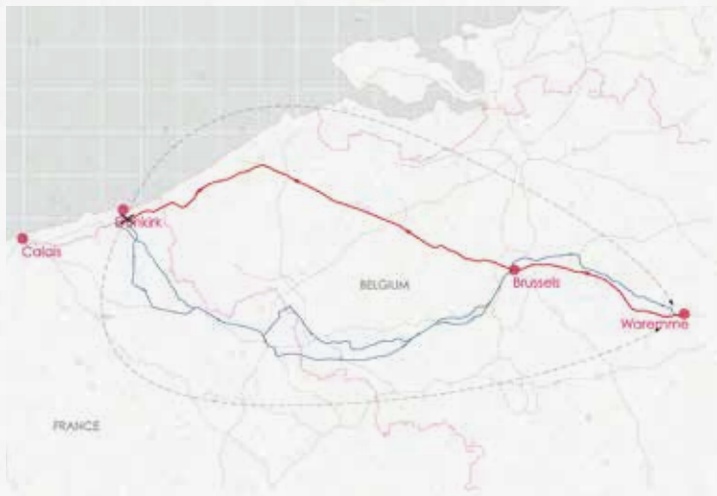
Anja Jäkel
Migrants Hotspot Calais

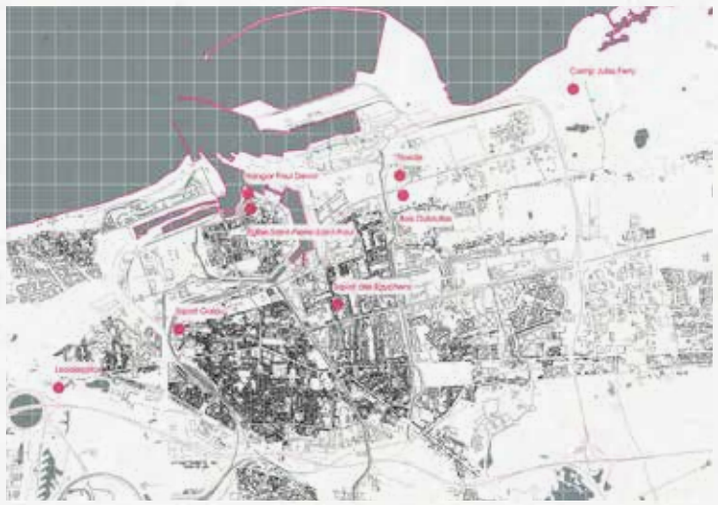
The Schengen Area's external borders.

The circulation of refugees between Waremme and Dunkirk.

The camps and jungles of Calais in 2015.





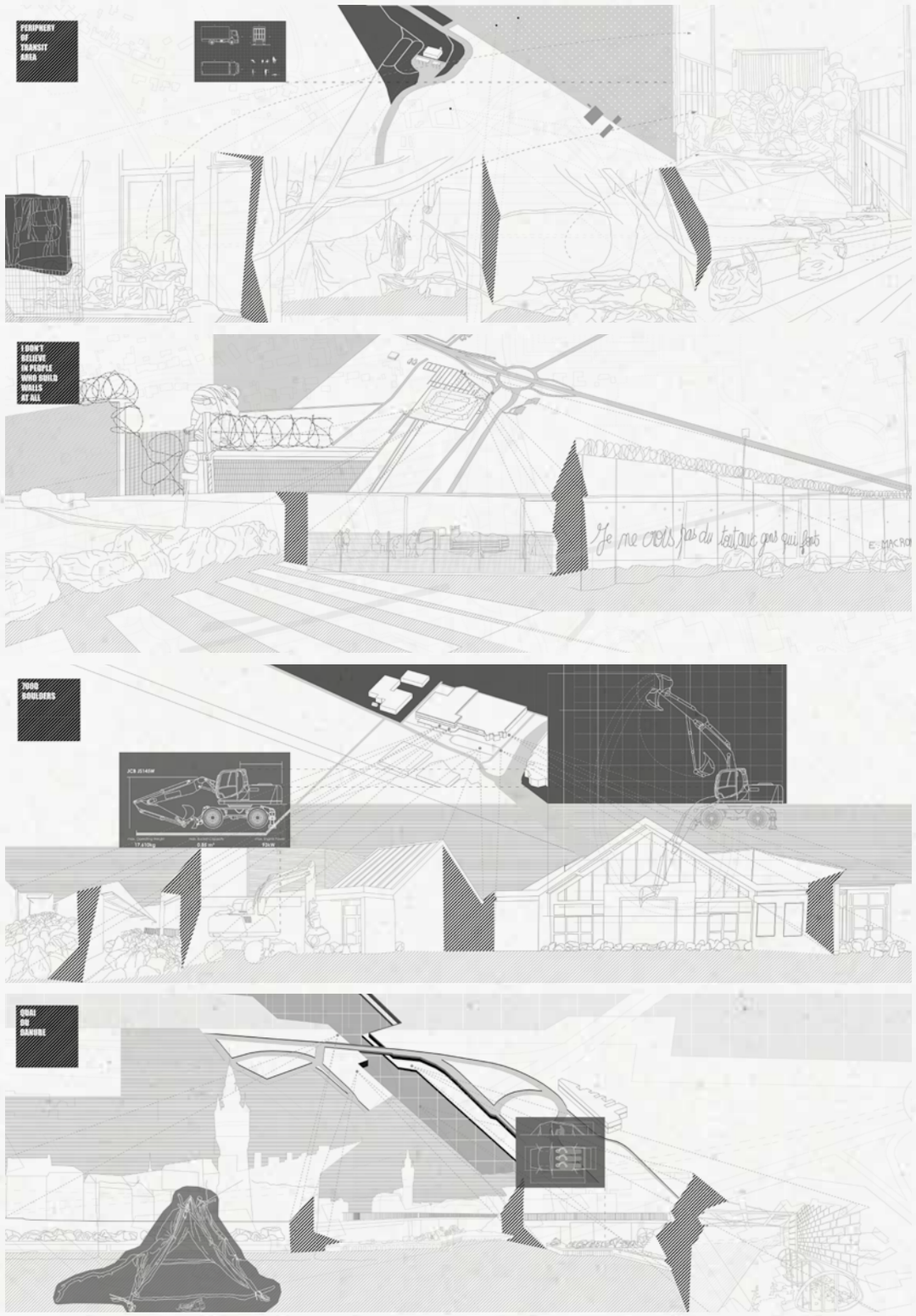


Waremme
The migrants settle in the woods near the Belgian highway E40 and the town of Waremme. They regularly try to get on trucks to cross the English Channel unnoticed. The migrants are tolerated in Belgium; there is no extreme deportation policy like in France.

Stade de l'Épopée
After the migrant camp »Calais Jungle« was dismantled in 2016, migrants set up a smaller camp near the Calais soccer stadium »Stade de l'Épopée.« The migrants live along a concrete wall that was once built to keep them off the streets. They have no access to clean water, sanitation, or food, and face daily deportations, including the confiscation and destruction of personal belongings.

Conforama
The empty building of the »Conforama« furniture store is located near the entrance to the Eurotunnel. About 80 migrants have temporarily settled under the canopy of the industrial building. In April 2021, the administration decided to block off the entire area under the canopy with a pile of massive boulders.

The Docks of Calais
In the middle of downtown Calais, near the historic city hall, migrants settled on the docks, barely visible from the streets above. To prevent further access, the city government installed bike racks under the bridges or barricaded the entrances.



Year	2018
Participants	Felix Hauptmann and Martin Hsu
Led by	Prof. Matthias Karch and Prof. Folke Köbberling
Guest review by	Lara Roth

Berlin, June 2, 1967

The Death of Benno Ohnesorg

»We are not separated from yesterday by an abyss
but rather by the changed situation.«
Yesterday Girl (Alexander Kluge, West Germany, 1966)

Protest, Violence, and Shooting

In the early afternoon of June 2, 1967, 26-year-old student Benno Ohnesorg took a white pillowcase, wrote »Autonomy for the University of Tehran« on it, and made his way to the Deutsche Oper in what was then West Berlin. Later, as he lay dying, his right hand clutched this piece of cloth. Ohnesorg wanted to demonstrate against the state visit of the then Shah of Persia, Mohammad Reza Pahlavi, who planned to see Mozart's *Magic Flute* that evening. During the riots, Ohnesorg was shot in the courtyard of a house on nearby Krumme Straße. His violent death contributed significantly to the expansion and radicalization of the West German student movement of the 1960s, culminating in the murderous attacks later carried out by the Red Army Faction. Today, his death is seen as a turning point in German post-war history, with far-reaching sociopolitical consequences evident to this day.

Revelations in 2009

The events surrounding the shooting of Ohnesorg have not been conclusively clarified to this day, but the handling of the case at the time shows a comprehensive failure of state organs that points to the precarious constitution of the then young democracy in the Federal Republic of Germany. The police chief in charge of the events surrounding the Shah's visit to Berlin had previously been a member of the Waffen-SS, the combat arm of the Nazi Party's paramilitary organization, the Schutzstaffel (SS). Karl-Heinz Kurras's superior, the head of the West Berlin Criminal Investigation Department, was also an NSDAP comrade and SA member. Newly examined film and photographic documents suggest that the police covered up the truth in subsequent investigations and trials.

More than 40 years later, in 2009, it was revealed that at the time of the events, Kurras was an informal collaborator of the East German secret police, the Stasi, and a longtime member of the Socialist Unity Party of Germany, the ruling East German Communist Party. However, the motive for Kurras' actions remains unclear. The well-known publisher and left-wing activist of 1968, Klaus Wagenbach, stated in a retrospective interview: »At the time, I called it murder. The point is that to this day I am the only one who has been punished in this case. Kurras was acquitted. But the critic of the incident was not. You really have to let that melt in your mouth: I was condemned because of the wounded honor of, as it now turns out, a trigger-happy gentleman in the service of the Stasi« (2010: 113. Translation: author).

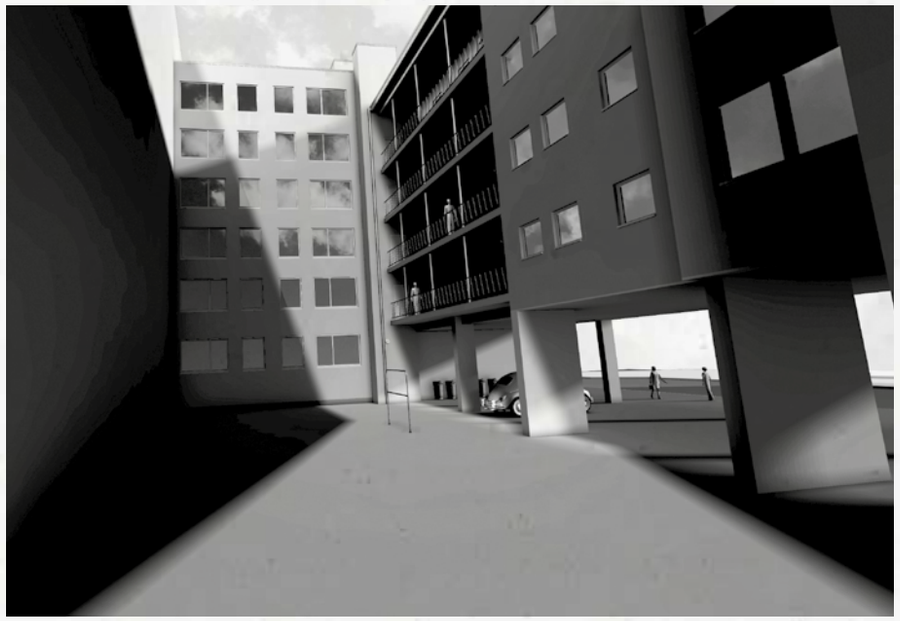
The Courtyard

There are many versions of the few minutes that took place in the backyard of the house at 66/67 Krumme Straße on June 2, 1967. The 26-meter-wide, 22-meter-deep courtyard is open to Krumme Straße because the apartment building stands on pillars. In front of it, asphalt parking spaces, eight and a half meters deep, over which the house stands on stilts; behind it, a gravel strip five meters wide. And then another eight and a half meters of lawn up to the firewall of the neighboring house, with a pole on top for beating carpets. Today, only a weathered stele on the sidewalk reminds us of the dramatic events that took place here. The place has returned to its inconspicuous ordinariness.

The project aims to bring this forgotten site back into the collective memory of the city through a spatial intervention. The intention is to stimulate understanding, discussion, and remembrance of these events. The basis for this is the reconstruction of the historical events in drawings and 3D models, which incorporate impressions of the site as well as numerous documents from police investigations, journalistic reports, and photos from the Internet. The evaluation of the documents led to the design of a memorial site that commemorates the death of Benno Ohnesorg on June 2, 1967, in West Berlin: the *Underground Labyrinth,* which represents the confusing situation of the investigation as well as the spatial situation of the crime scene.

Wagenbach, Klaus (2010): »›Weil ich eine Stinkwut hatte‹: Im Gespräch mit Susanne Beyer und Volker Hage,« in: *Der Spiegel* 26, 109–113.

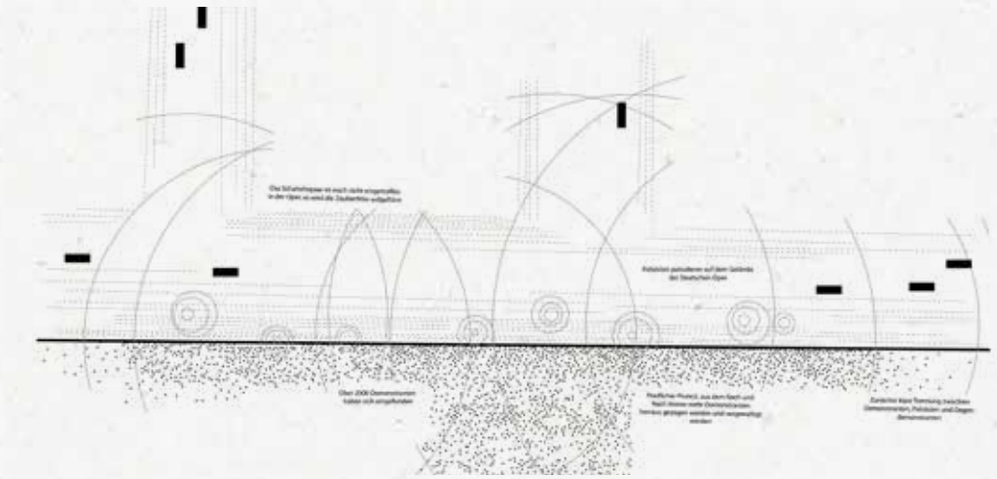
The courtyard of Krumme Straße 66/67,
where Benno Ohnesorg was shot by a policeman. Rendering.

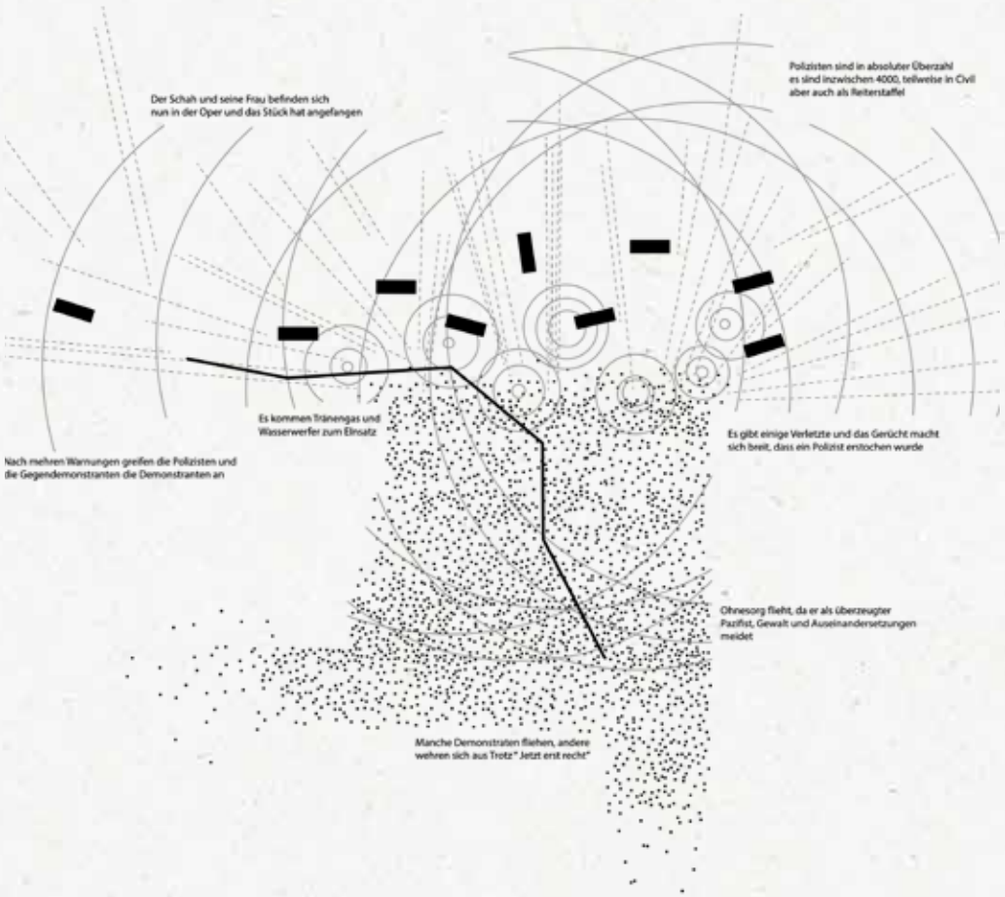


Felix Hauptmann
The Demonstration at Night

07:00 p.m. Deutsche Oper Berlin, Bismarckstraße 35.

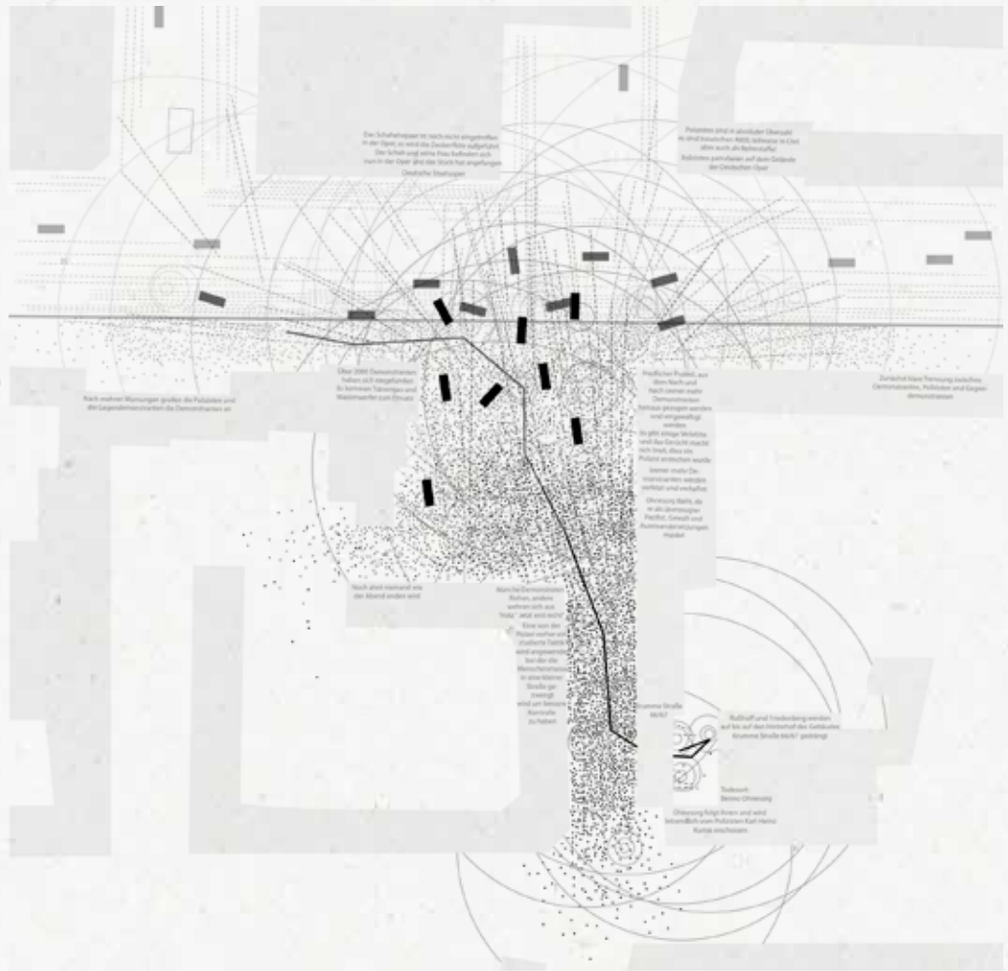
08:00 p.m. Deutsche Oper Berlin, Bismarckstraße/Krumme Straße.

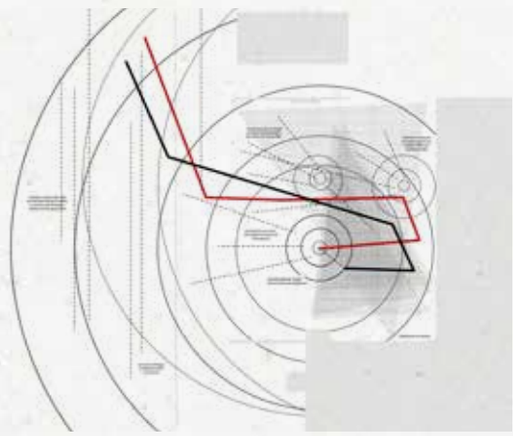




08:30 p.m. Krumme Straße.

08:30 p.m. Benno Ohnersorg's death in the courtyard of Krumme Straße 66/67.





Martin Hsu
The Underground Labyrinth

The timeline of June 2, 1967, as a city map.

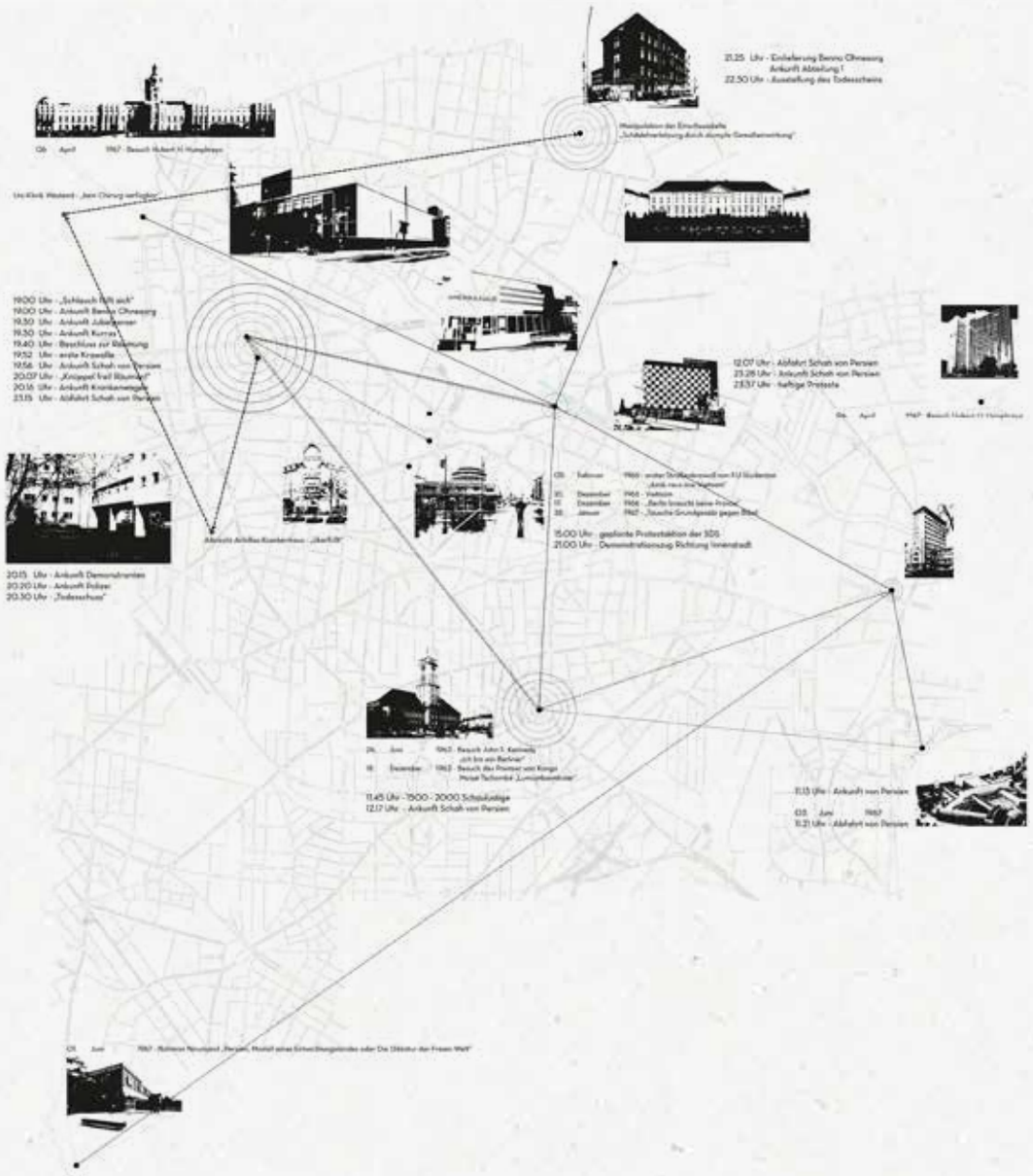


Diagram of the demonstration at night.

Ground plans.

Model.

Year	2018
Participants	Jennifer Li Kamm, Josefine Kiesewalter, Yvonne Köneke, and Jia Yuzhe
Led by	Prof. Matthias Karch and Nicolai Schlapps

Chemnitz 2018

City, Space, and Violence

Chemnitz in the German state of Saxony has gone from being a relatively unknown city to one that is making national and international headlines. The collective attention was triggered by the events of August 26, 2018, when the murder of 35-year-old Daniel Hillig during an annual city festival marked a significant turning point in the perception of democratic stability in Germany. After the stabbing, an unknown group of hooligans, right-wing extremists, and violent individuals temporarily took control of the city in a chaotic show of force. They made Hitler salutes and attacked police and counter-demonstrators during demonstrations and so-called funeral marches. Their targets were foreigners, people who looked foreign, and people who stood up for democratic values. The ill-prepared police lost part of their monopoly on the use of force. Chemnitz became synonymous with the escalation of a brutal and aggressive crowd, fueled by the so-called »concerned citizens« who actively work against peace, undermine the rule of law, and threaten democracy.

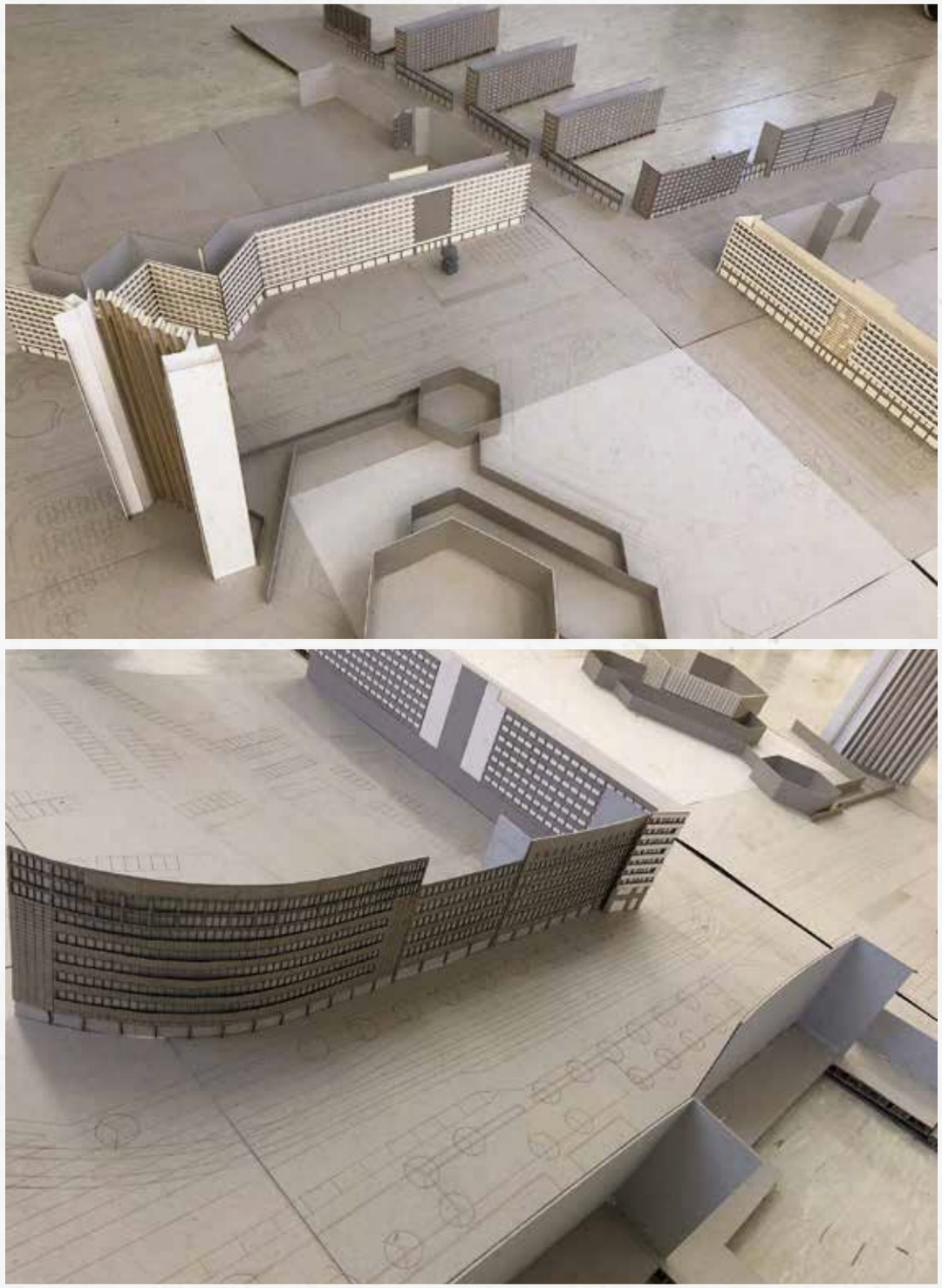
The *Chemnitz 2018* project investigates the urban space where this violent event took place. The investigation includes on-site field research, open-source research, the development of three-dimensional drawings, and the construction of digital and physical models. Within these model environments, collected photos, videos, and testimonies were located and analyzed in order to reconstruct and interpret the event. The aim was not to supplement or intervene in the places or situations, but to experimentally explore and uncover multi-layered sociospatial, cultural, and political contexts and historical backgrounds, making them visible and comprehensible.

The Karl Marx Monument in Chemnitz, 2018.

Jia Yuzhe
Karl-Marx-Junction

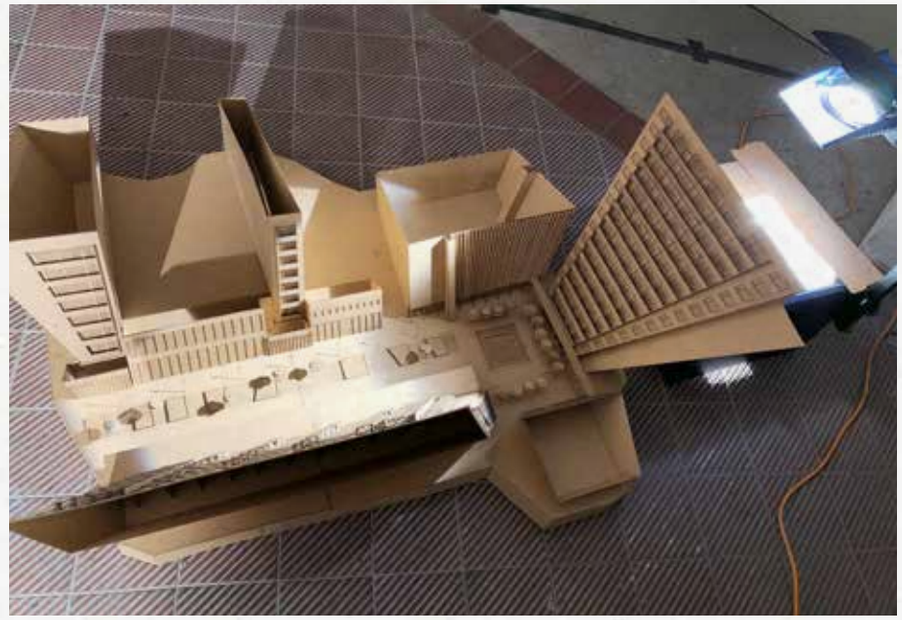
Chemnitz city center with the Karl Marx Monument. Model.

Chemnitz city center with Erich Mendelsohn's Kaufhaus Schocken on the left. The crime scene of Daniel Hillig's fatal injury. Model.



Jennifer Li Kamm, Josefine Kiesewalter, and Yvonne Köneke
Anxiety Spaces

Chemnitz city center. Models.



Year	2016
Participants	Katharina Specht and IMD students
Curated by	Prof. Matthias Karch, Katharina Specht, and Dr. Carolin Höfler
Scientific advice	Dr. Alexander Schmidt, Documentation Center Nazi Party Rally Grounds, Nuremberg
Screen printing workshop	Katharina Puhle
With the support of	Martin Angst, Daniel Büning, Steffen Busse, Benedikt Engelke, Katrin Hellbach, Victoria Hermesmann, Cihan Koc, Andrea Kondziela, Frederic Lezmi, Stefan Meyer, Dr. Philipp Reinfeld, Lara Roth, Janis Rösner, and Lara Wischnewski
Exhibition catalogue	Carolin Höfler and Matthias Karch, eds. (2016): *Marschordnungen. Das Reichsparteitagsgelände in Nürnberg. March Formations / The Nazi Party Rally Grounds in Nuremberg,* Berlin: Topography of Terror.

March Formations

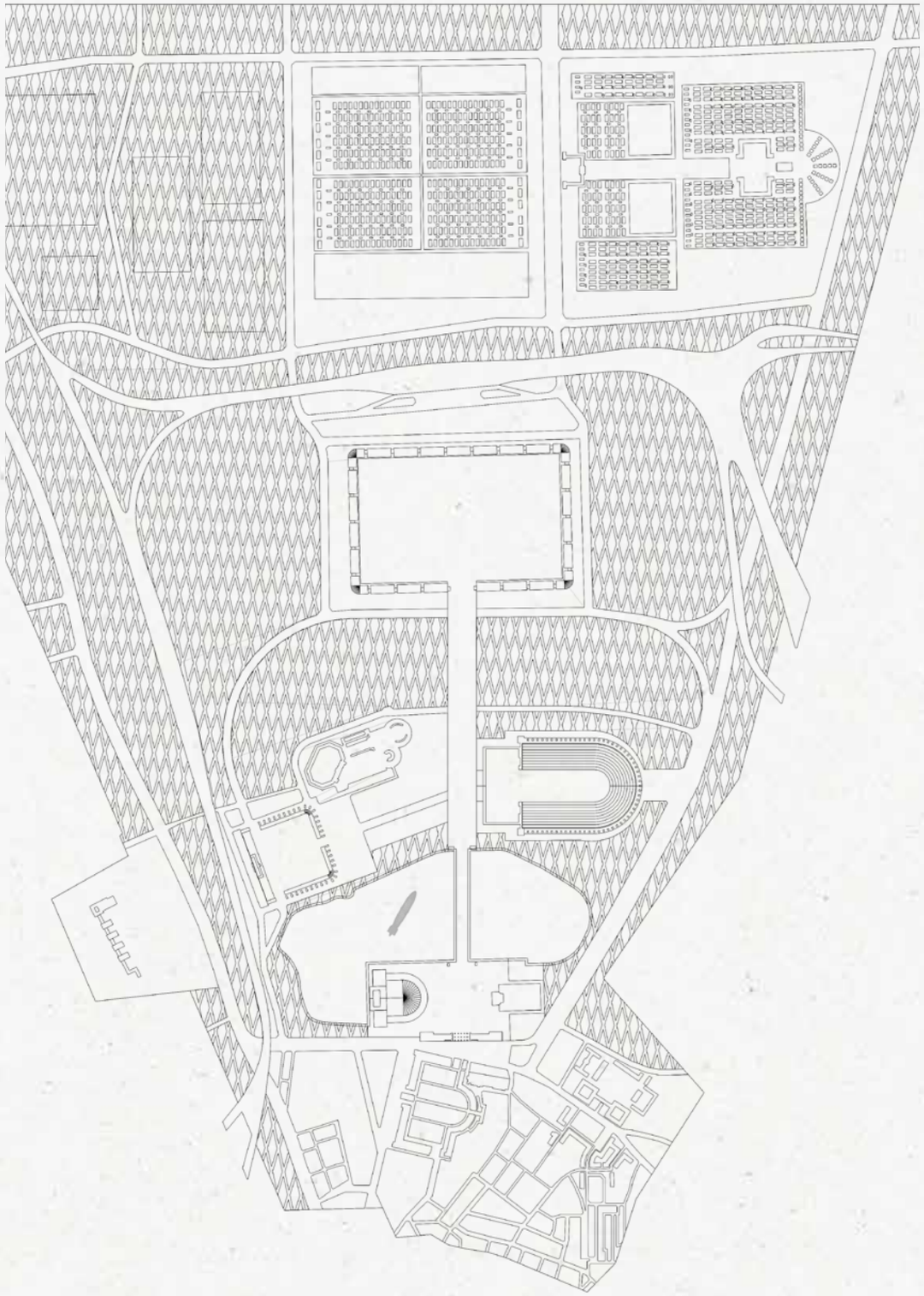
Exhibition at the Topography of Terror Documentation Center Berlin

The buildings and projects on the former Nazi Party Rally Grounds in Nuremberg are among the best-known architectural propaganda of the Nazi era. They were intended to mobilize the masses and arouse emotions in order to instrumentalize them for political and ideological purposes. The exhibition *March Formations* examines the architectural means and large-scale events that made this emotionalization possible. An analysis of the architecture and choreography of the Nuremberg rallies leads to a synthesized architectural proposal as an alternative between the historic preservation of Nazi buildings on one side and their controlled decay on the other.

In 14 stations, the exhibition focuses on the various representative architectures of the site and their political staging during the Nuremberg rallies. Historical photographs, march plans, and architectural models reconstruct the military-driven mass rituals in time and space. The images and models reveal the influence of the deployed and marching masses on the architectural design. At the same time, it becomes clear that the buildings and spaces organized the movements of the masses.

The exhibition of historical architecture and a current proposal both aim to understand this form of total propaganda reinforced by the means of buildings and movements. The design proposal, which aims to activate the Nuremberg Rally Grounds, will also be presented within the curriculum of the exhibition.

The Nazi Party Rally Grounds in Nuremberg. Site plan.



The Nazi Party Rally Grounds. Model on a scale of 1:1000, reconstructed by Matthias Karch and Katharina Specht.

**Educational Center for Remembrance.
Model: Katharina Specht.**

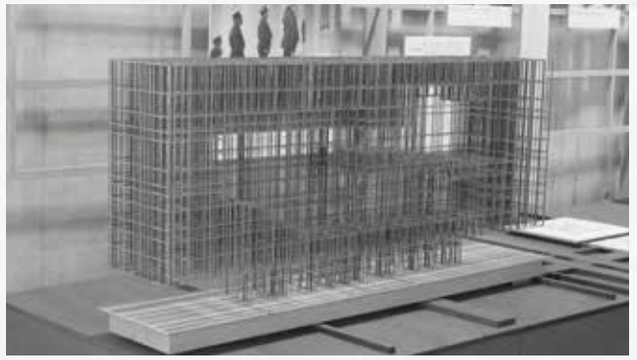
**»Formel 3 EM Norisring 2016« on the former Nazi Party Rally Grounds.
Photo: Frederic Lezmi.**

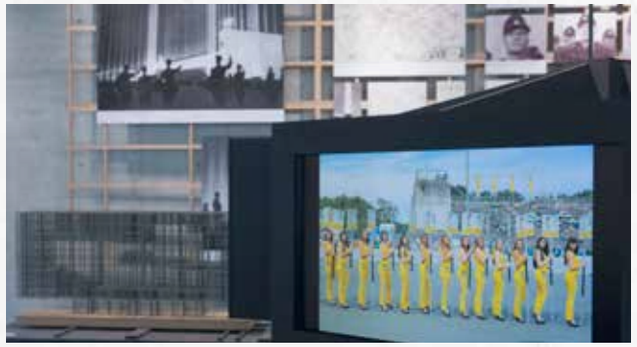
**Forced labor camps.
Reconstruction model by Katharina Specht.**

**Deutsche Post (DHL)'s public relations event on the former Nazi Party Rally Grounds.
Photo: Frederic Lezmi.**

**Center for the Documentation of Film Propaganda.
Model: Katharina Specht.**

**»Formel 3 EM Norisring 2016« on the former Nazi Party Rally Grounds.
Photo: Frederic Lezmi.**





Year	2017
Participants	Jennifer Li Kamm, Lara Roth, and Saskia Tödter
Led by	Prof. Matthias Karch and Prof. Folke Köbberling

Poetry Slam

The Space Could Also Be Different

Why are we moved by a spatial form that seems to have been produced without an author and without a goal? Because it is at the heart of an architecture that is in search of spaces that are unpredictable and previously unthinkable. When so many supposedly stable, rational, and efficiency-driven plans fail to make our cities more livable, perhaps it is time to explore alternative strategies.

This project delves into the realm of non-positivist, non-affirmative, and non-hierarchical methods that can be applied to the development of new spaces and spatial concepts. At first, introducing a »radical contingency« (non-necessity) into the design process may seem to defy the principles and rules governing spatial creation. This conceptual approach is based on the diagnosis formulated by the philosopher Armen Avanessian in connection with his theory of speculative space—»space could also be different«—and the concepts, agents, and operators we employ and allow are: randomness, probability, formation and deformation, and error—in short: »contingency« (2016: 77. Translation: author). According to Avanessian, the parameters of action no longer come from the past or the tradition of the profession: time approaches us from the future (ibid.: 78). The consequence is that such spaces can no longer be aesthetically grasped or judged, but become generators of a continuous spatial production of the unfamiliar.

The project therefore focuses on a design methodology that triggers formal and spatial processes without being able to fully control them a priori. In a series of material and spatial models, an immersive interior space is developed step by step through experimental means. The speculative design methods outlined above are applied in this context.

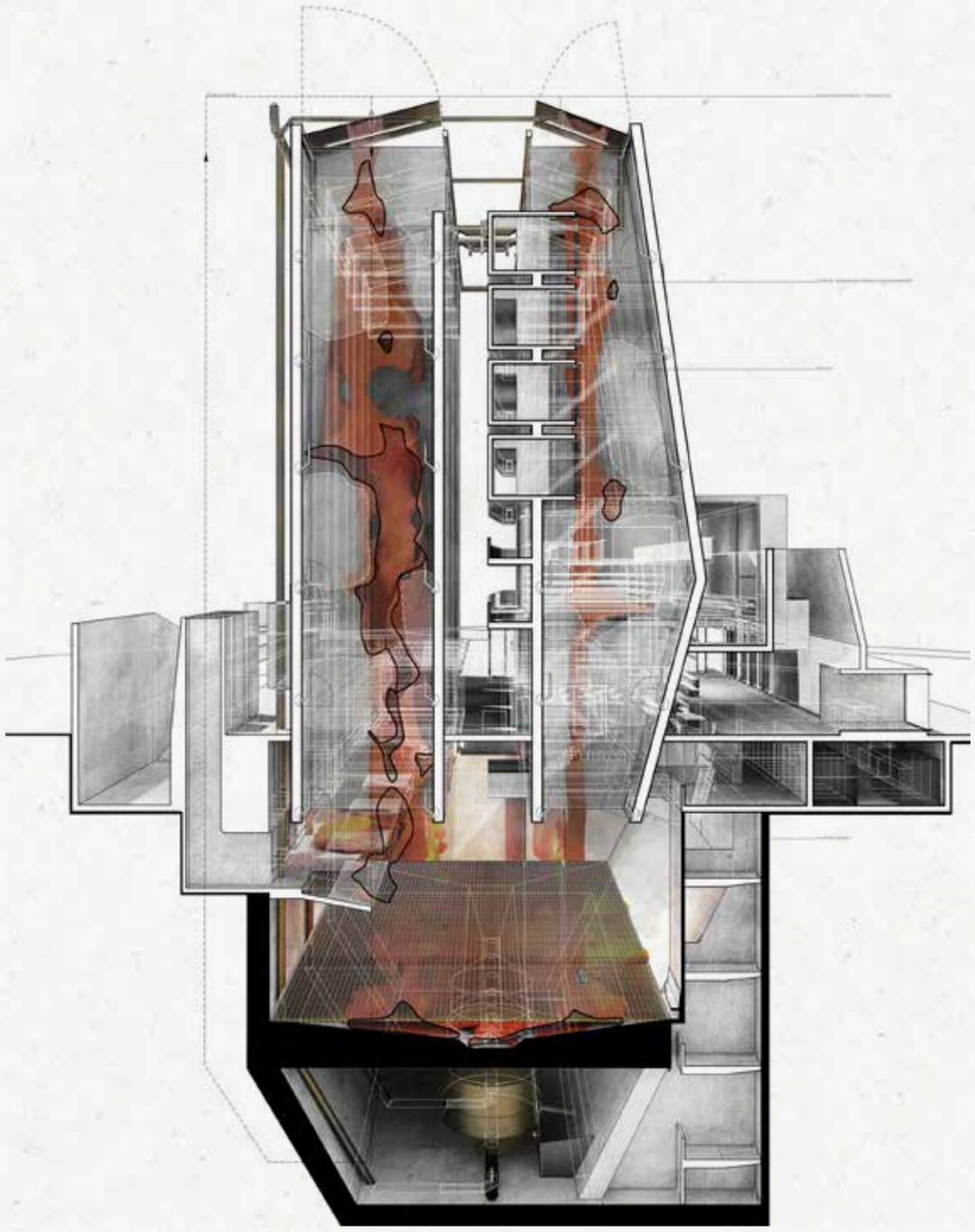
The expectation is that this approach will produce complex, highly narrative, possibly overdetermined, or enigmatically poetic interiors that resist complete logical explanation, that become their own subjects, that remain enigmas, constantly challenging their actors to find meaning within them. The design objective is to create an atmospherically dense, multi-sensual event and performance space for 400 participants, primarily centered around text and language poetry readings, dramatic readings, open discussions, poetry slams, and all future performative events that emerge due to this Dionysian space of losing control. The design location is a vacant lot in the heart of Berlin, Wilhelmstraße, at the corner of Anhalter Straße, overgrown with urban nature. It is located close to the Topography of Terror Documentation Center, an outdoor and indoor history museum about Nazi persecution and terror. The last active use of the project site was the so-called »Autodrome,« a practice area for driving without a license, operated in the 1980s by »Straps-Harry,« a well-known drag artist at the time.

Avanessian, Armen (2016): »Xenopoetik: Im Gespräch mit Christian Kerez,« in: *ARCH+: Zeitschrift für Architektur und Urbanismus* 224, 77–79.

The former Autodrome site near the Topography of Terror Documentation Center, Berlin.

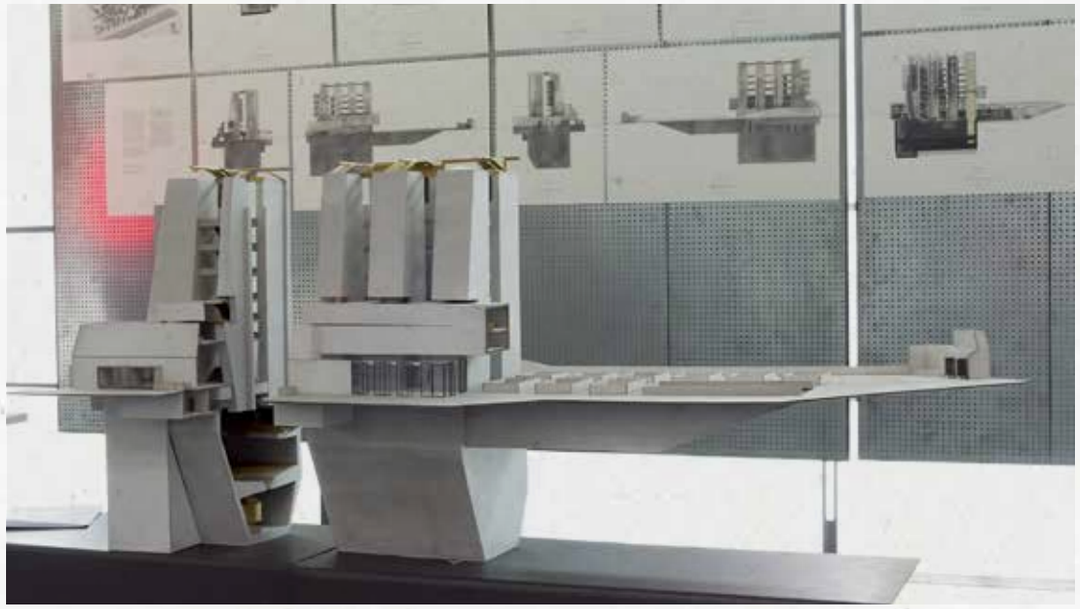
Lara Roth
Pathetic Theater

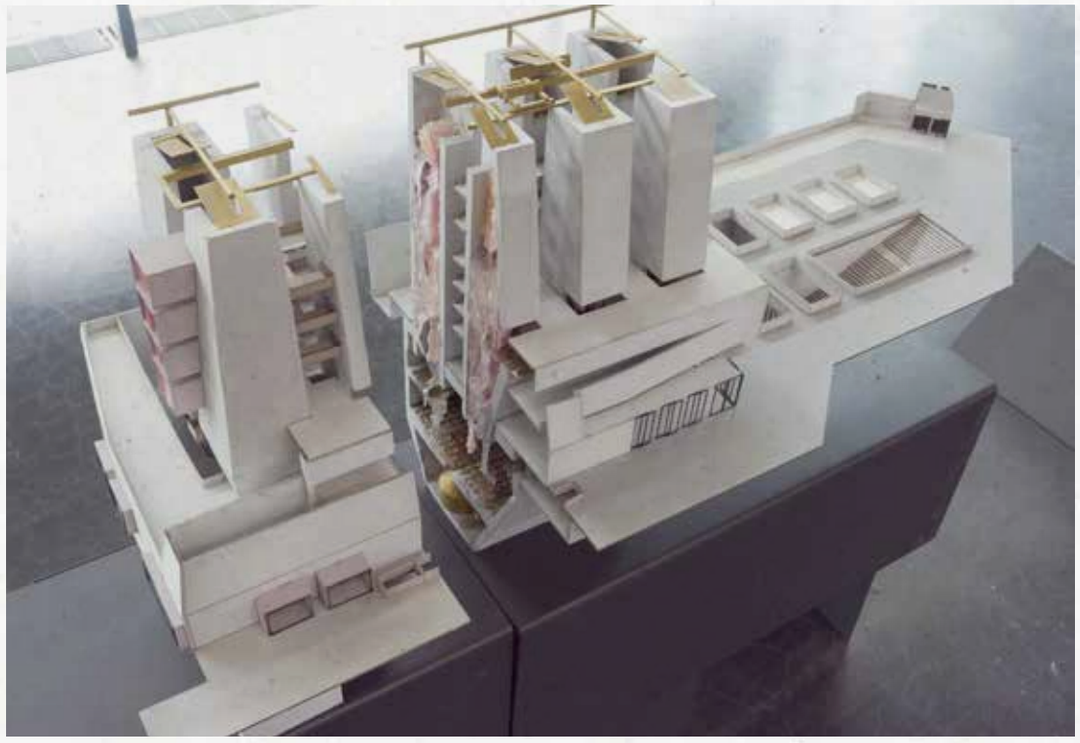
Section.



Section model.

Close-up of the section model.

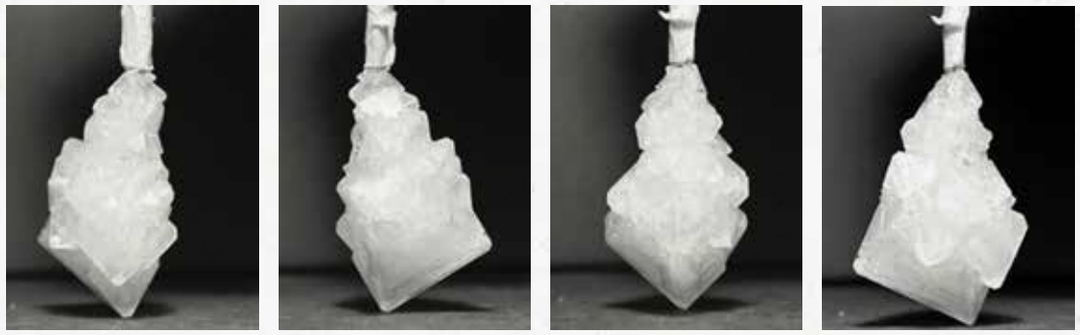


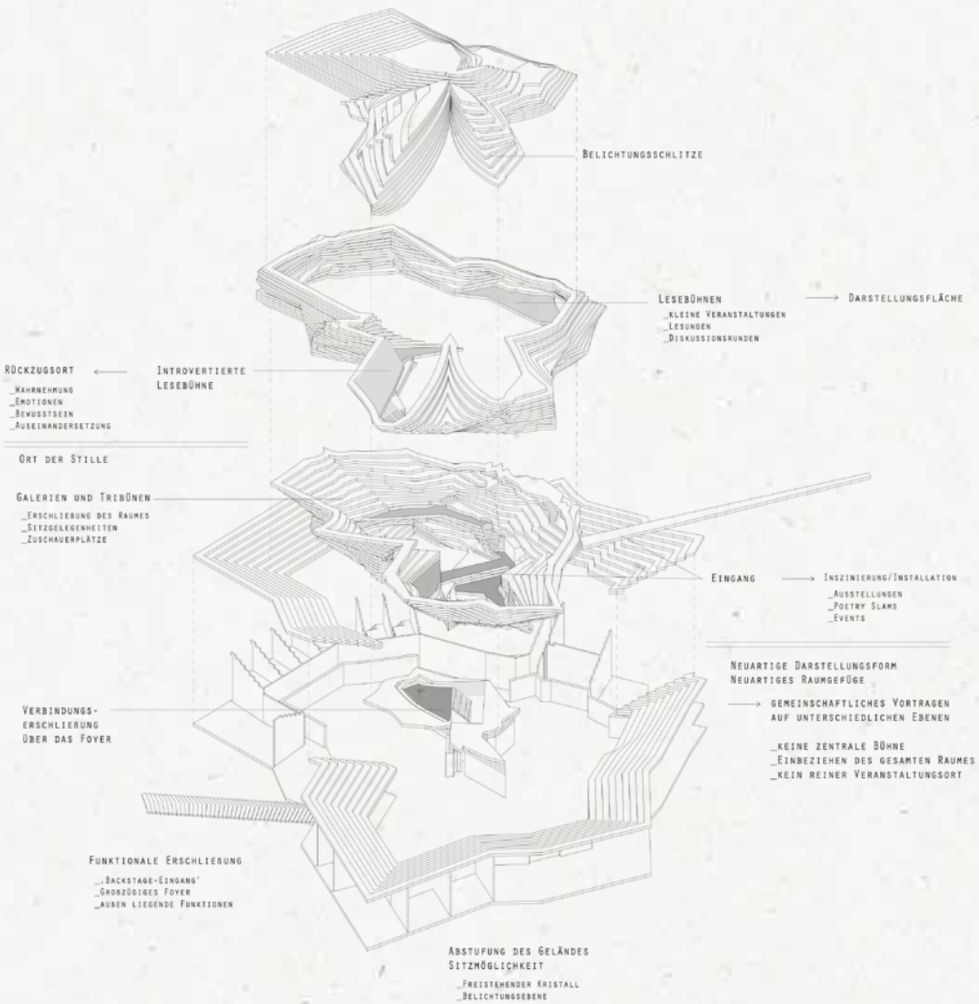


Saskia Tödter
Translucent Diamond

The growth process of a crystal over weeks.

Axonometric exploded drawing.





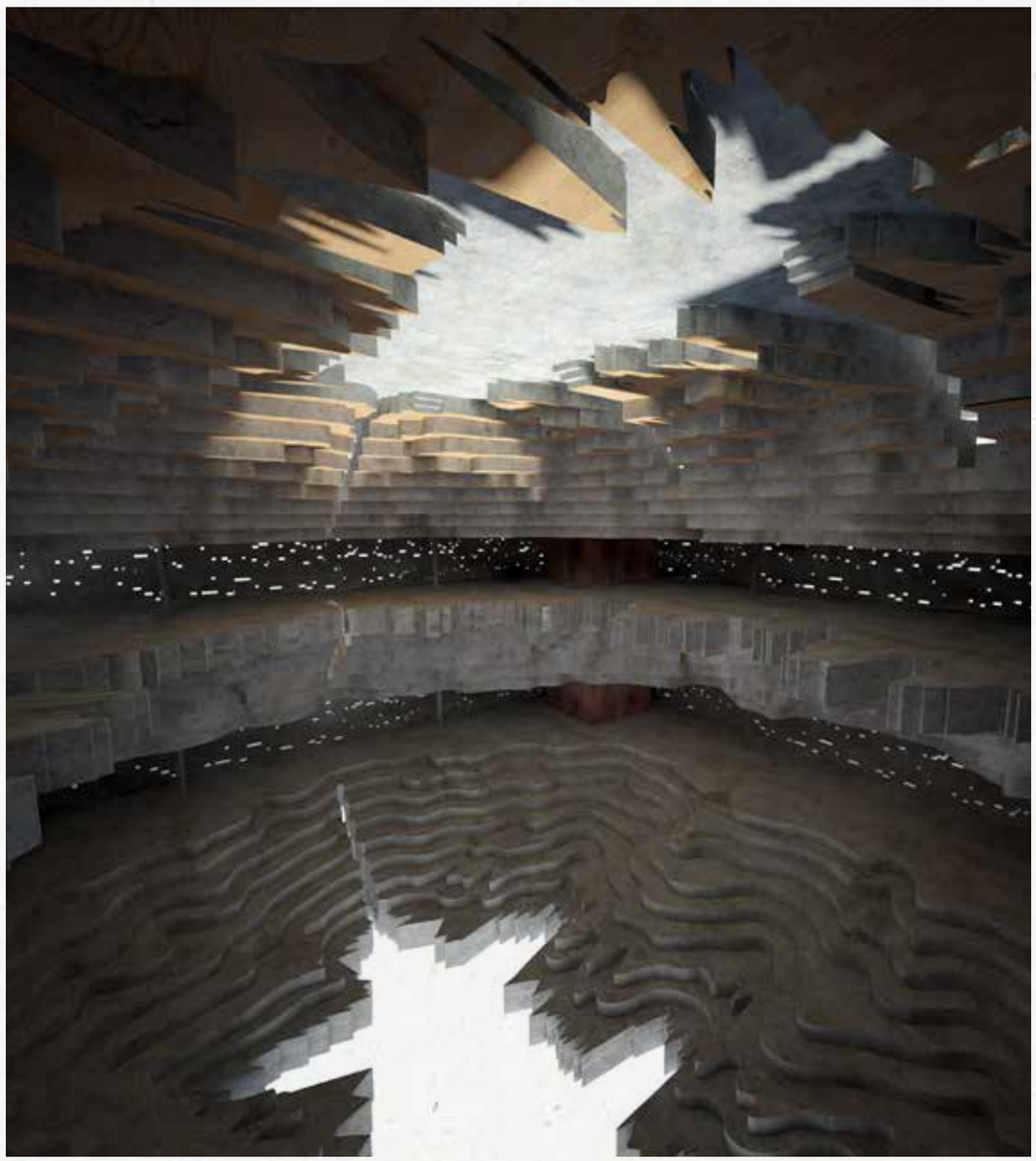
Section model.

Close-up of the section model.

Jennifer Li Kamm
Soundscapes

Sound visualization of the quote, »Our lives begin to end the day we become silent about things that matter,« attributed to Martin Luther King, Jr.

Interior view.



Soundscape section model.

Interior view.

Year	2022
Participants	Jan Düsing, Sarah Schober, and Gesa Teichert
Led by	Prof. Matthias Karch and Prof. Folke Köbberling
Guest review by	Mohammad Reza Abdollahi Bidhendi, Max Justus Hoven, Dr. Philipp Reinfeld, and Nicolai Schlapps

A Center for Photography

Zeche Zollverein Essen

»All these moments will be lost in time, like tears in the rain.«
Blade Runner **(Ridley Scott, USA, 1982)**

Photography in Germany
Photography permeates our everyday lives like almost no other medium. It is at once technology, art, and social practice in many different forms. The project deals with the design of a center for photography as a public space for the past, present, and future of photography in its analog, digital, and hybrid forms.

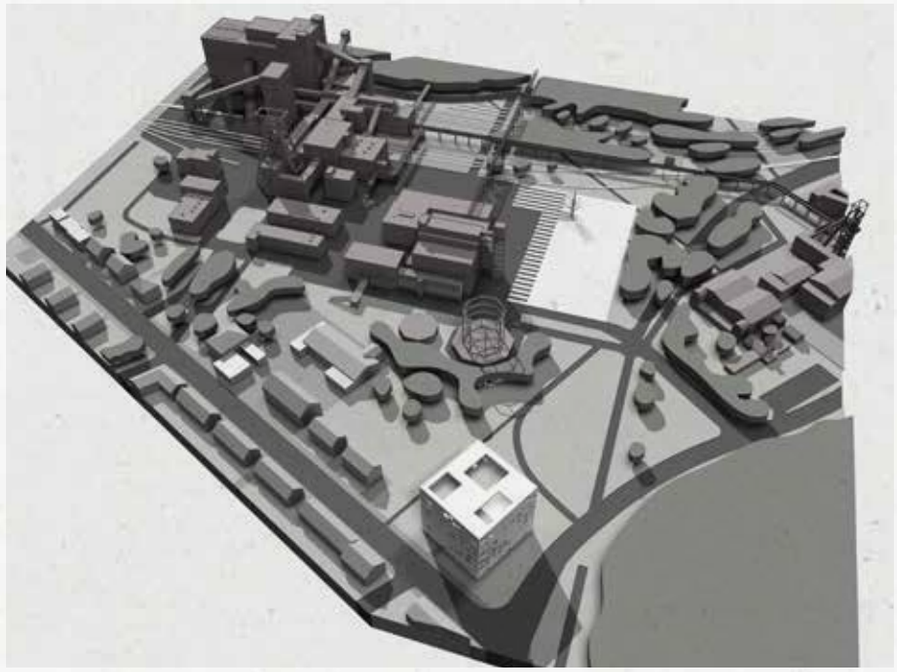
In neighboring European countries and the USA, central institutions have long been devoted exclusively to the medium of photography and its particular challenges. They take on educational tasks, cooperate with educational and cultural institutions, and research, collect, restore, and thus work sustainably and preserve for the future. Such a place is still lacking in Germany. Considering the history of photography in Germany, this is astonishing. Karl Blossfeldt, August Sander, László Moholy-Nagy—since the 1920s, these names have stood for a highly conceptual approach to the then young medium of photography in Germany. The universities in Essen and Düsseldorf, in particular, later produced world-renowned photographers such as Albert Renger-Patzsch, Otto Steinert, Hilla and Bernd Becher, Andreas Gursky, Katharina Sieverding, and Thomas Ruff. Contemporary photography in Germany is also shaped by artist-photographers such as Wolfgang Tillmans, Annette Kelm, and Thomas Demand, whose artistic influences are more likely to be found in London, Hamburg, or Berlin, and thus continue to develop independently of the renowned schools in North Rhine-Westphalia.

A German Photo Institute
A selection committee headed by the Minister of State for Culture and the Media has spoken out in favor of founding a German Photo Institute in 2019. The two possible locations of Essen and Düsseldorf have been the subject of lively discussion ever since. Similar to institutions such as the Center for Art and Media in Karlsruhe or the German Literature Archive in Marbach, the planned institute would be dedicated to collecting, preserving, and promoting German photography. All those involved share the desire to give photography and photographic art a stronger presence in Germany, maintain and safeguard its visual memory, raise its profile, and continue its legacy.

Image and Space
The design project selected the UNESCO World Heritage site Zollverein Coal Mine Industrial Complex (»Zeche Zollverein«) in Essen for the new center for photography. The spatial program includes areas for research, archiving, and restoration, as well as large and distinct exhibition spaces for both permanent and changing exhibitions of works by central figures in German photography. A library, media center, artists' studios, rooms for lectures and colloquia, café, restaurant, bar, and large roof garden for vernissages and celebrations complete the spatial concept. Central architectural aspects of the design are the exploration of the relationship between image and space, surface and depth, as well as the spatial organization of light and atmosphere in relation to the movements of the visitors and the exhibited light artworks.

Archiving and Storage
Archiving and storage have become key issues in different contexts. In addition to the archiving of photographs and the storage of image data, sustainability issues are also relevant in an environment formerly dominated by the fossil fuel industry. In the interest of sustainability, the building structures are to be made of wood, which largely avoids the CO2 emissions associated with smelting iron for steel production and burning lime for cement production. In addition, the wood used acts as a natural carbon storage, actively removing harmful CO2 from the atmosphere over the long term. The designs thus prompt a dynamic dialogue between the fossil fuel history of the Zeche Zollverein as an industrial monument and World Heritage site and the post-fossil-fuel identity of the proposed center for photography in Germany.

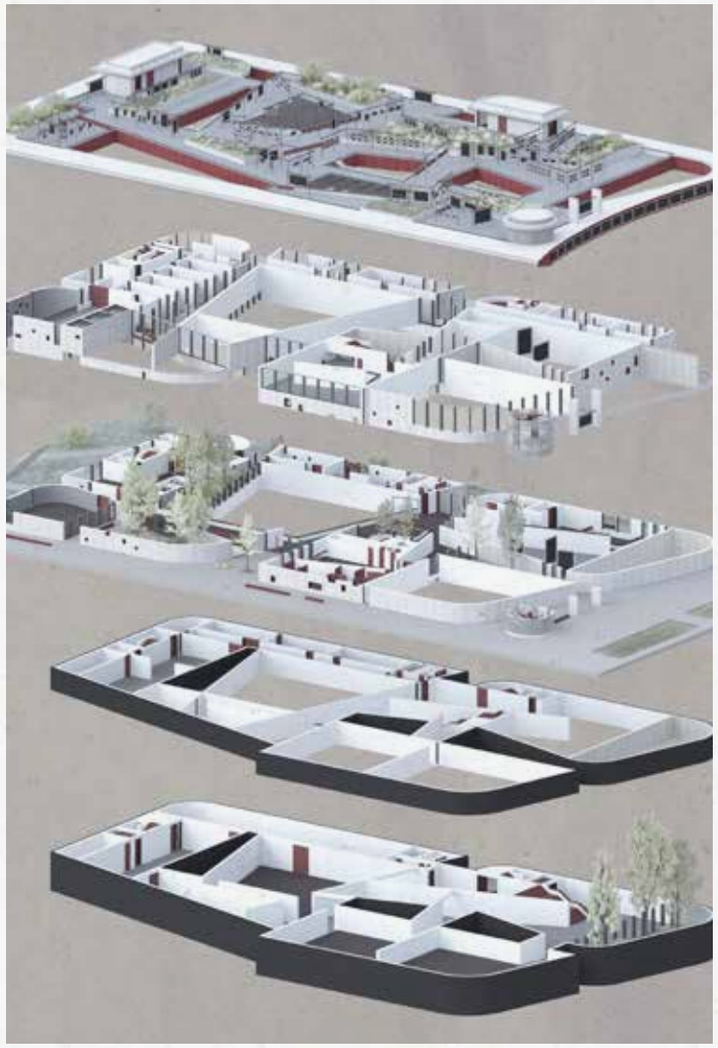
3D model of the »Zeche Zollverein« in Essen.



Jan Düsing
Deep Surface

Axonometric exploded drawing.

Model.

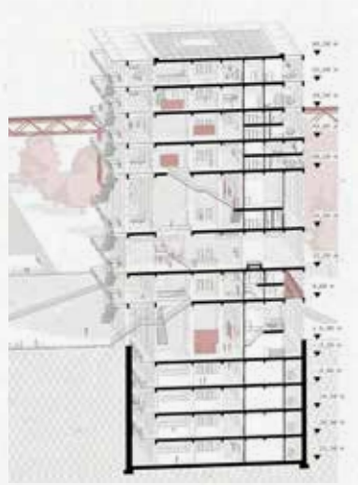


Sarah Schober and Gesa Teichert
Sunken Tower

Axonometric drawing and section.

Underground gallery. Rendering and model.

Night view. Rendering.



Year	2019
Participant	Elisa Weber
Led by	Prof. Matthias Karch and Dr. Saskia Hebert
Guest review by	Dr. Philipp Reinfeld and Nicolai Schlapps

Duisburg Harbor

At the Other End of the New Silk Road

China's Belt and Road Initiative, sometimes referred to as the »New Silk Road,« is an ambitious infrastructure project. Launched in 2013, this comprehensive development and investment initiative originally aimed to connect East Asia and Europe through physical infrastructure, primarily railways, to expand China's economic and political influence.

Somewhat surprisingly, Duisburg has emerged as the terminus of this international rail link in Germany. For this reason, the project has set itself the task of developing an after-use concept for a disused freight station in the port of Duisburg. The project aims to illuminate the Chinese New Silk Road Initiative from new and different perspectives, especially concerning the regional and local levels. It examines the organization of the material environment and presents, as a counter-concept to the economically motivated vision of the New Silk Road Initiative, an energy-neutral urban district for research on and experimentation with the recycling and reuse of materials in which the existing station buildings and port structures are preserved.

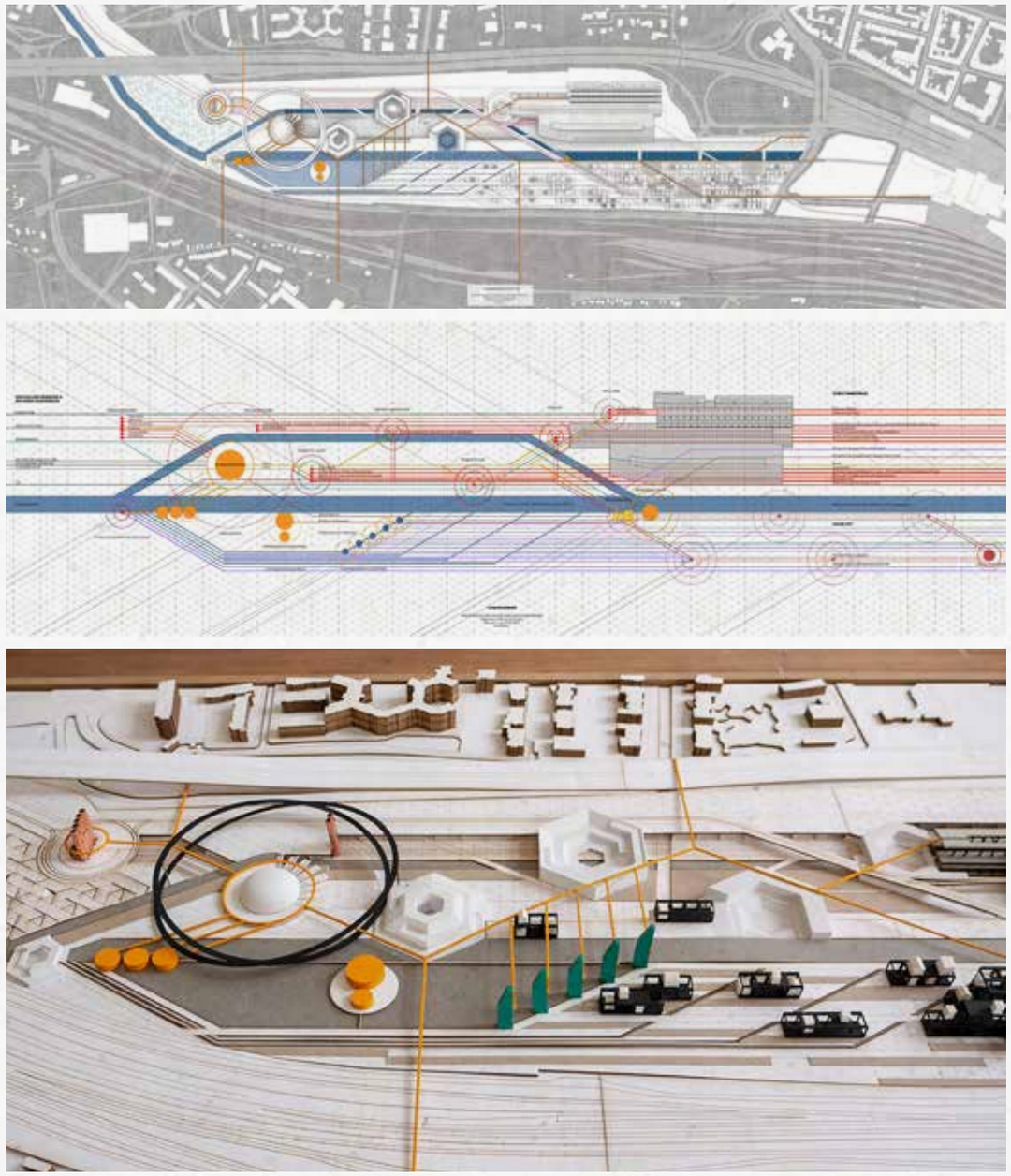
Elisa Weber: *At the Other End of the New Silk Road.* The Duisburg Harbor site.

Elisa Weber
At the Other End of the New Silk Road

Site plan.

Concept diagram.

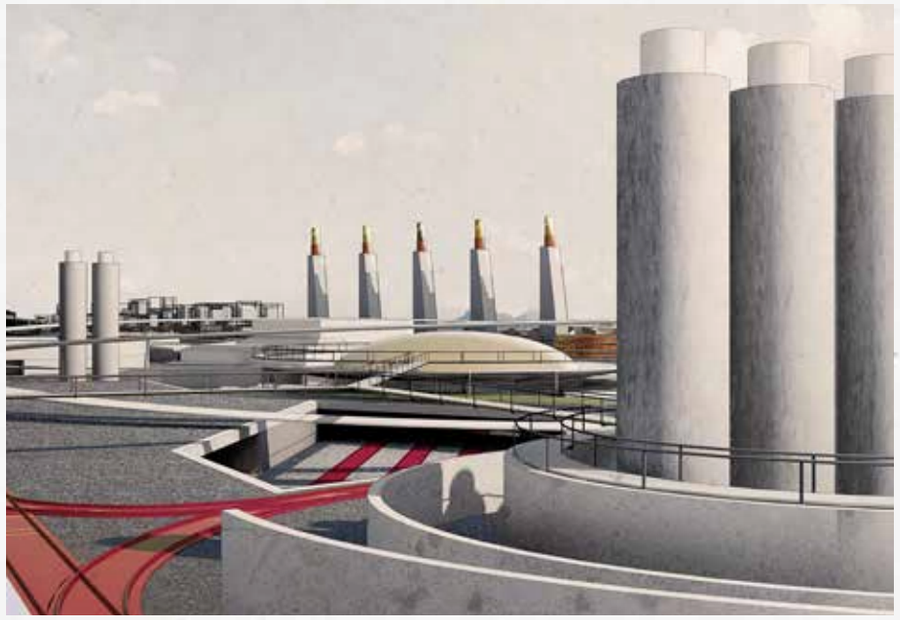
Model.

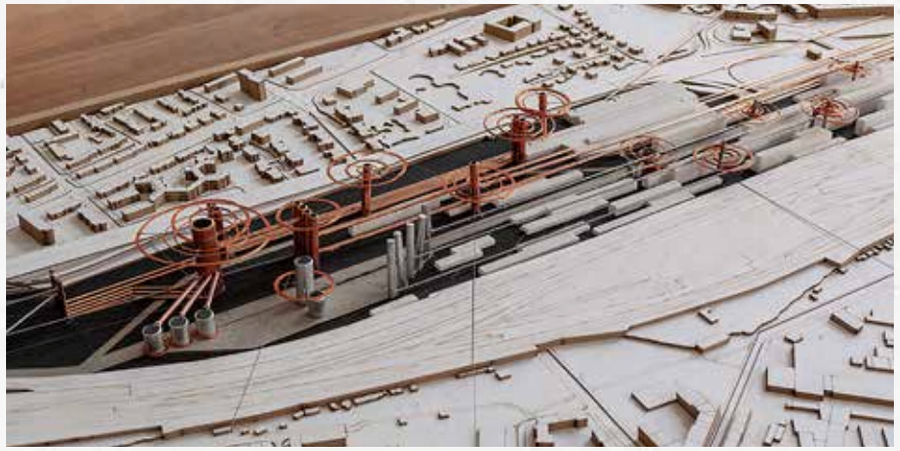


Overview perspective.

Concept model.

Final model.





Year	2010
Participant	Sascha Fink
Led by	Prof. Matthias Karch

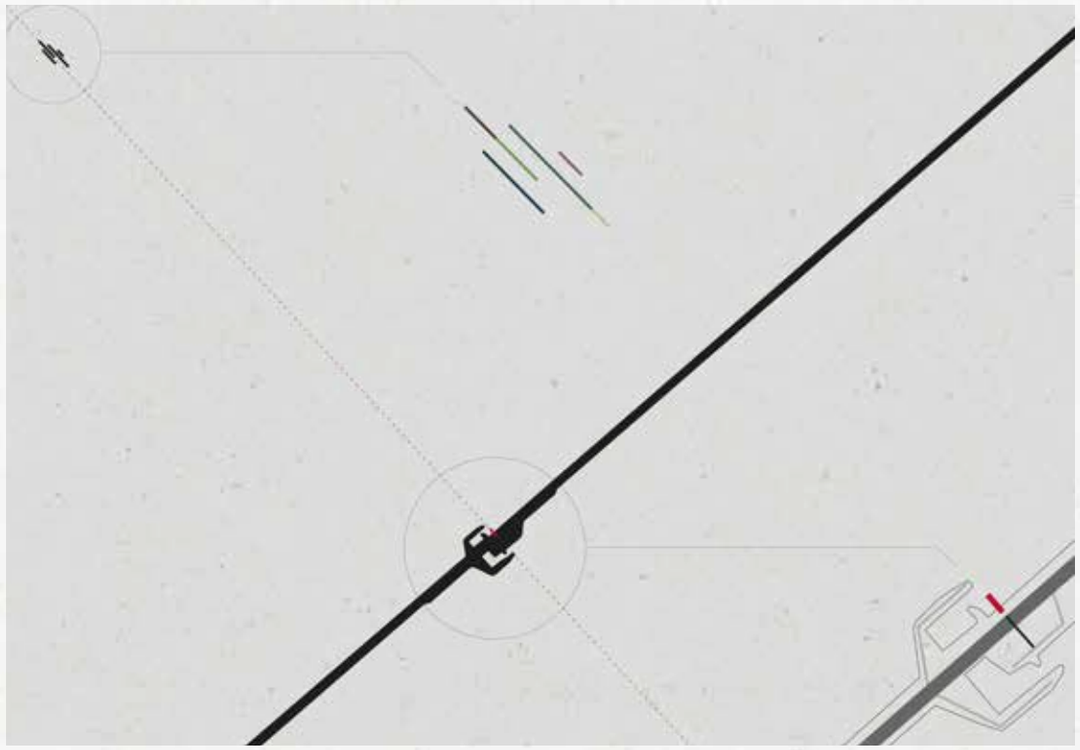
World Sustainability Center Afsluitdijk

The Possibility of an Island

The project explores how architecture can reflect the influences of wind, sun, weather phenomena, fluctuating water levels, rapid climate change, and the use of wind, solar, and hydroelectric energy. The site of this investigation is the Afsluitdijk in the Netherlands, which stands as a hydraulic barrier at the entrance to the former Zuiderzee, stretching between Den Oever in the province of Noord-Holland in the southwest and Kornwerderzand in the province of Friesland in the northeast. This monumental structure, 32 kilometers long and 90 meters wide, was completed in 1932. The dike effectively separates the freshwater lake Ijsselmeer, the former bay of the Zuiderzee, from the salt-rich Wadden Sea and the North Sea, and is a central element of the Zuiderzee Works. This ambitious infrastructure project serves a dual purpose: to protect the mainland from storm surges and to reclaim land by creating polders. A Dutch highway runs alongside the Afsluitdijk, accompanied by a rest area and a gas station at Breezanddijk, a hamlet located on an artificial island in the middle of the dam. At both ends of the dike—at Den Oever and Kornwerderzand—sluices were installed for protection against high sea water levels.

Since 2010, the Wadden Sea has held the esteemed title of a World Heritage site, prompting the Dutch government to initiate the establishment of a tidal center to familiarize itself with the unique characteristics and challenges of this region. The government plans to build an artificial island in the immediate vicinity of Breezanddijk, accessible only by boat from the Breezanddijk port. This structure, explicitly dedicated to the understanding of the natural environment of the Wadden Sea, will serve three key functions: 1) to provide international scientific researchers with a place to immerse themselves in the study of the North Sea ecosystem; 2) to serve as a focal point for visitors and enthusiasts interested in issues such as climate change and ecological balance; and 3) to provide a space for various temporary exhibitions on topics ranging from bird migration patterns to the shoaling behavior of North Sea fish. The project focuses on the development of adaptable building structures at the intersection of the dynamic forces of nature and the man-made landscape.

Sascha Fink: *World Sustainability Center Afsluitdijk.* Site plan.



Sascha Fink
World Sustainability Center Afsluitdijk

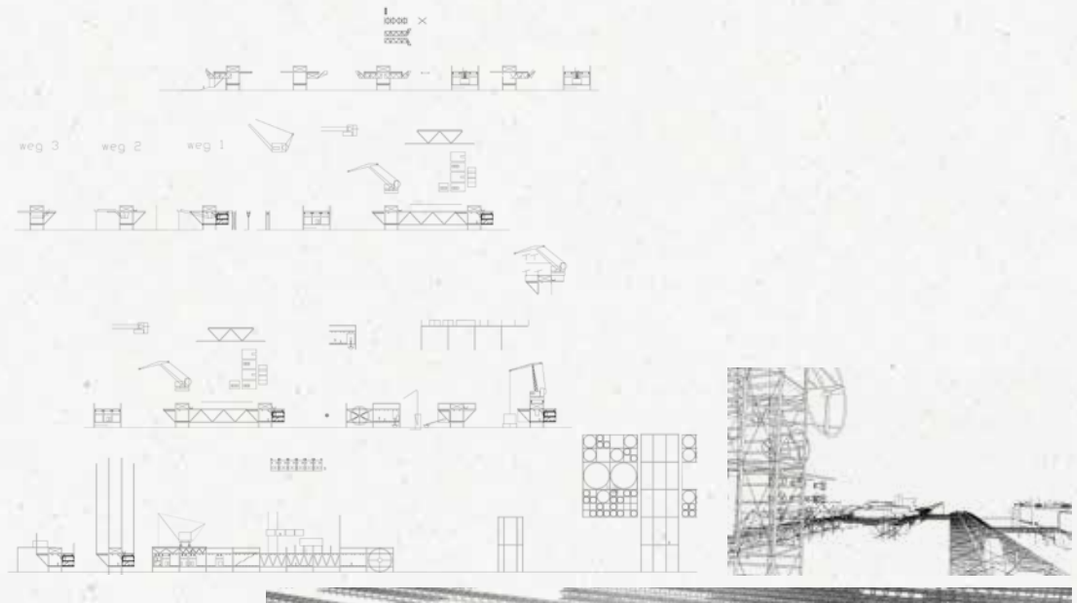
Aerial view of the Afsluitdijk.

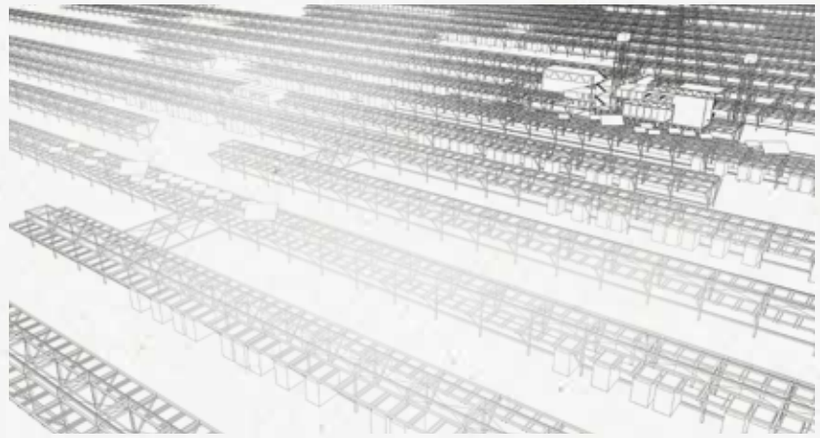
The elements of the modular island.

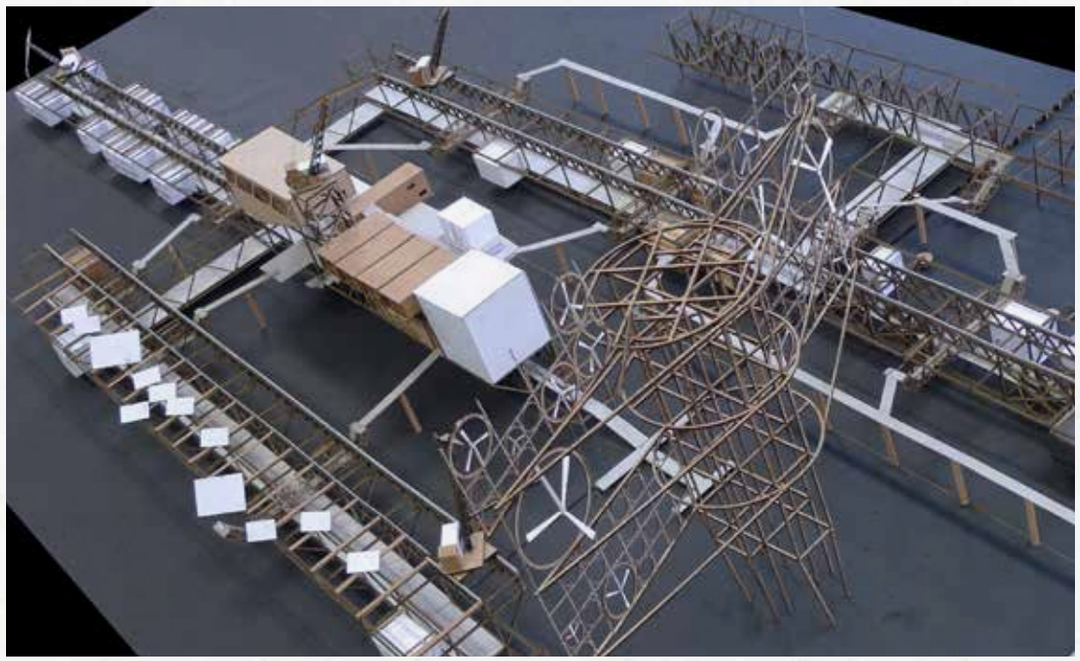
Perspective view.

Concept of the modular expansion.

Model study.







Year	2023
Participants	Alwin Förstner and Henrik Frenzel
Led by	Prof. Matthias Karch and Prof. Elisabeth Endres
Guest review by	Mohammad Reza Abdollahi Bidhendi, Dr. Philipp Reinfeld, and Nicolai Schlapps

A Participatory Data Center

A Social, Energetic, and Political Resource

The project is based on Niklas Maak's *Server Manifesto* (2022) and deals with the conception of a participatory data center. For Maak, server farms are »the most important new building typology of the twenty-first century. They are to the digital world what castles used to be in medieval times: the seat of power« (23). But unlike in the past, there are no more fortified battlements, walls, or even decorative turrets. Instead, the charm of hardware stores is spreading. Maak notes that the lack of design is entirely calculated. Data centers »are meant to be the opposite of architecture: saying nothing, betraying nothing, offering no surface for attack« (25). It is like everywhere else in society: Power structures have to be made visible before they can be equalized. According to Maak, there is, therefore, an urgent need for »a physical place where every visitor can understand and see what a digital society could do with the data it collectively generates, if it did not give it away to private corporations and platforms« (28)—a place »where education, emancipation, community, solidarity, collective experience, self-determination, and adventure would replace the now dominant obsession with comfort, efficiency, and predictability. It would turn users back into actors« (105).

The Site

The choice of location for a participatory data center on Berlin's inner-city freeway, the A 100, is a pointed one: The concept for the further expansion of the A 100, which is based on decades-old approval procedures, seems outdated. Berlin certainly does not need more traffic, as congestion is already chronic. It is conceivable that the ongoing construction of the A 100 extension will never be completed due to sustained protests from civil society, and that instead a green belt (a linear park for cyclists and pedestrians) will be created in this lowered trench.

If that does not happen, the placement of the data center is still a meaningful use of the airspace above this route. The images of soon-to-be fully electrified traffic and digital data flows would literally and metaphorically overlap, serving as a powerful symbol of the actual and virtual fluidity and mobility of our lifeworld. At the same time, the participatory data center will help to overcome the immense, even destructive fragmentation of the urban structure at this point, acting as a bridge between the districts of Neukölln and Treptow and contributing to the restructuring of this currently chaotic, neglected urban space.

The goal is a hybrid building with the following features: a data center, a library and museum of the future, and a new educational institution where the population can learn how dangerous the prevailing business model of digital capitalism is for democracy and self-determination. This public server farm could also house coding schools, exhibition spaces, research facilities, and even a center for digital sovereignty. By harnessing the enormous heat generated by the constant cooling of data, entirely new public architectures could emerge, such as libraries, sports halls, greenhouses, swimming pools, a collective living room, and domed tropical evergreen settlements.

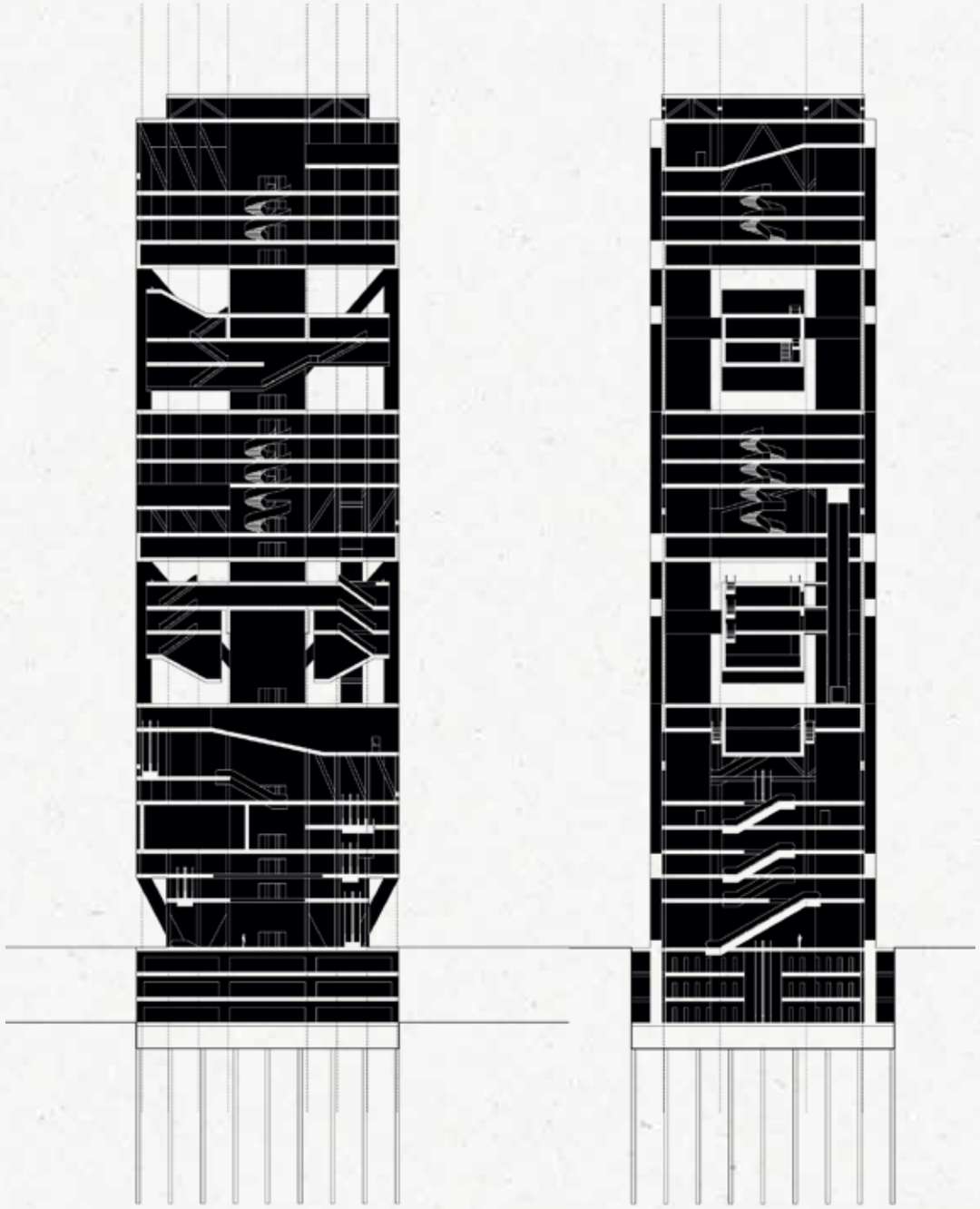
»In the age of data capitalism, such a public server farm [...] would be a symbol of civil liberty similar to the city hall that once served as a counterweight to the castle of the feudal lord. It would be a treasure trove of the digital age, in which data could be understood as a collective possession, as a ›public good.‹«
(Maak 2022: 104)

Maak, Niklas (2022): *Server Manifesto: Data Center Architecture and the Future of Democracy*, Berlin: Hatje Cantz.

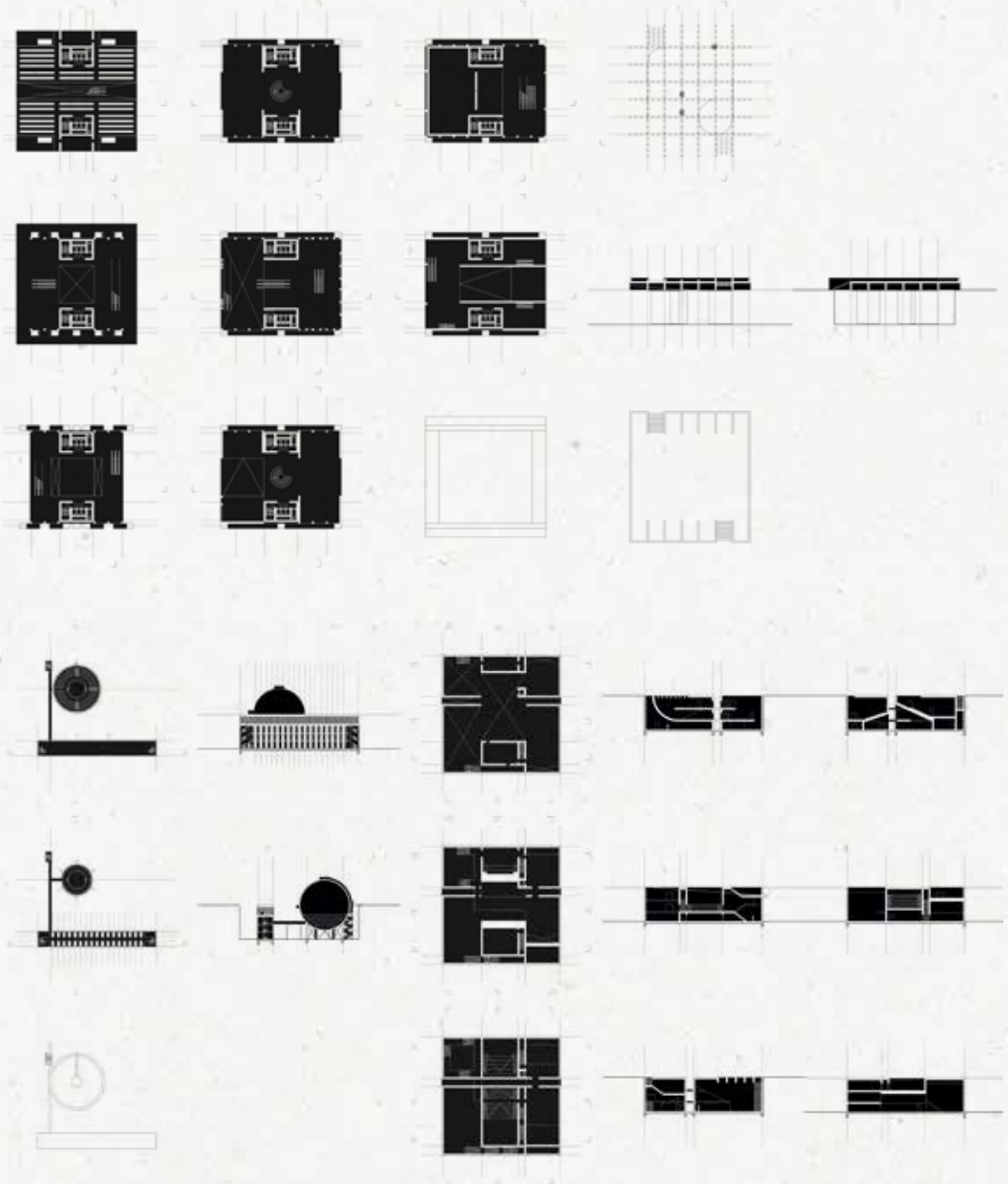
Alwin Förstner: *The Linear City.* Site model.

Alwin Förstner
The Linear City

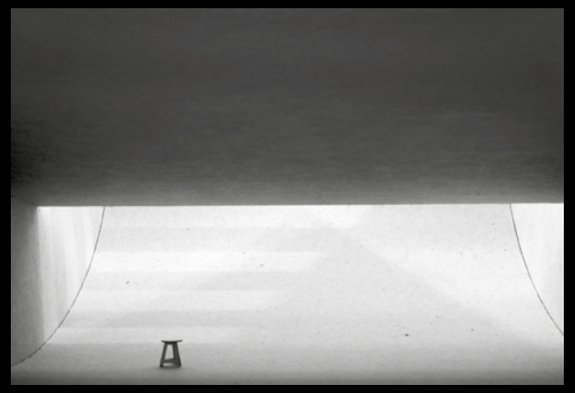
Sections through the data tower.



Floor plans and sections.



Final model.



Changing light atmospheres in the exhibition hall.

View of the Science Center from the factory.

Henrik Frenzel
Babylon Palace

Final model.

EPILOGUE

DRAWINGS IN MEMORY

Year	2015
Participant	Sebastian Latz
Text	Sebastian Latz
Led by	Katharina Puhle

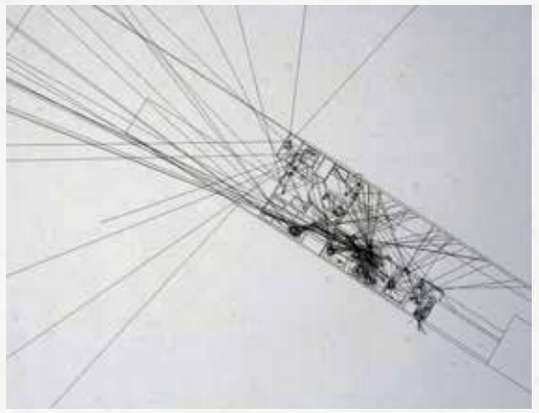
Cutting through Memory Spaces

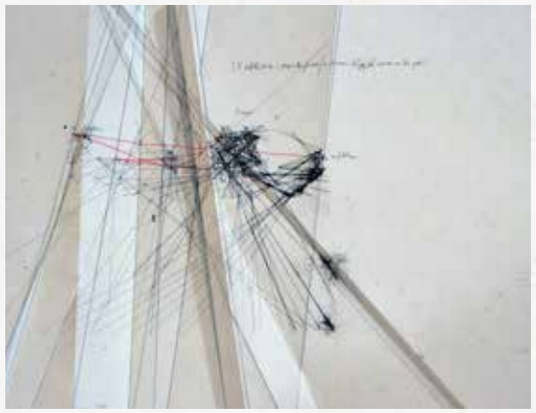
The Section Maker

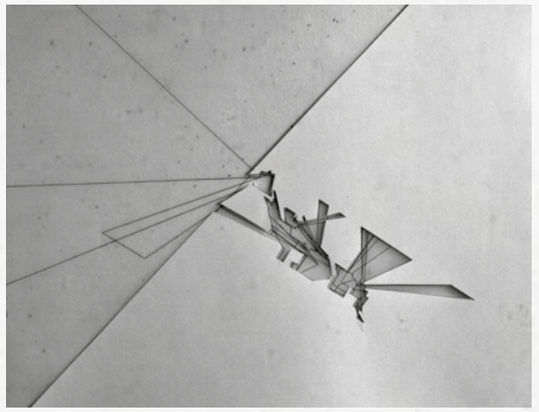
This project aims to contextualize my memories of spaces that were once an integral part of my family's daily life. It examines the living situation of my aunt, who, together with her family, has successively developed parts of the stable and barn in the familial three-sided farm for her own residential use. Based on the particular living situation in the yard—which is enclosed within the village structure—and by appropriating the existing building volumes, I have directly related the concrete situations of staying and moving through these living spaces to existing, possible, and potential views.

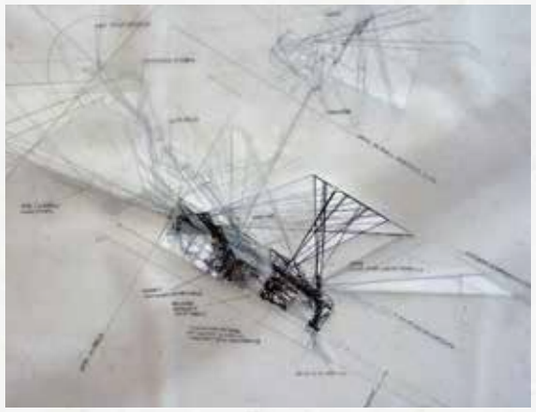
Using sections, I have studied how the view from inside the old house to the outside has changed over time as successive agricultural buildings have been converted into living spaces. The question was whether the use of the interior had adapted to the views, or whether the appropriation of the space had sought new perspectives in order to develop into a wide, unlimited view of the horizon. In the various graphics, I have tried to isolate the temporal and spatial contexts of the investigation by means of folding and overlaying different translucent papers to allow for pointed observation and interpretation.

Sebastian Latz: *The House of My Childhood.* Drawings and cuttings.









Carolin Höfler
is the professor of Design Theory and Research at Köln International School of Design of Technische Hochschule Köln. She studied Art History, Modern German Literature, and Theater & Film Studies at the Universities of Cologne and Vienna and Freie Universität Berlin, as well as Architecture at the Technische Universität Berlin. Her dissertation at the Humboldt-Universität zu Berlin dealt with the history and theory of computational design in architecture. Since 2022, she has been a member of the research training group »connecting—excluding: Cultural Dynamics Beyond Globalized Networks,« a collaboration between the University of Cologne, the Academy of Media Arts Cologne, and the TH Köln, funded by the German Research Foundation (DFG). She founded the research center »Real-Time City« at the Technische Hochschule Köln and leads the research project »Open Universities—City of Participatory Visions,« funded by the RheinEnergie Foundation. Currently, Höfler is the head of the master's program »Integrated Design Research« and Vice Dean for Research and Knowledge Transfer at the Faculty of Cultural Sciences at the TH Köln. Alongside her spatial practice, she works in the team of OZA _Studio for Architecture and Scenography in Berlin. Her research focuses on practices, concepts, and media in architecture and design, digital form, space-time models, material systems, ephemeral urbanism, documentary architecture, and forensic procedures. She is the co-editor of the publications: with Philipp Reinfeld (2022): *Mit weit geschlossenen Augen. Virtuelle Realitäten entwerfen,* Paderborn: Brill | Fink (with the essay »Bildkontakte: Über die haptische Erfahrbarkeit virtueller Räume«), and with Johanna Mehl (2023): *Attending [to] Futures: Matters of Politics in Design Education, Research, Practice,* Hamburg: adocs. Recently she published: (2023): »Raumaktualisierung. Spiele in der ephemeren Stadt,« in: Sigrid Brandt/Jörg Haspel/John Ziesemer (eds.), *Sein oder Nichtsein. Theaterbauten in der Sanierung,* Berlin: Bäßler, 193–200 and (2023): »Vom Wolkenkratzer zur Wolke: Die kalkulierten Atmosphären der Cloud-Architekturen,« in: Marco Tamborini (ed.): *Ästhetik und Technowissenschaften des 21. Jahrhunderts,* Darmstadt: wbg Academic, 201–228.

Matthias Karch
studied architecture at the Technische Universität Berlin (1976–1983), during which time he worked for the Berliner Festspiele GmbH, supervising festival productions of artists such as Peter Brook, Robert Wilson, George Tabori, and Samuel Beckett. After graduating, he worked in the Berlin office of Hans Kollhoff and Arthur Ovaska. Their team won the first IBA 84/87 competition to redesign the area around the Berlin Museum in southern Friedrichstadt. The project was realized, with Karch working primarily on the redesign of the Berlin Museum Garden. From 1987 to 1989 he studied stage design with Achim Freyer at the Hochschule der Künste, HDK Berlin, and went to the Burgtheater in Vienna as Achim Freyer's assistant to supervise the production of *Metamorphosen des Ovid.* Karch remained at the Burgtheater until 1990 as assistant to Claus Peymann. Since then, he has been working as a freelance architect, scenographer, and stage designer on a number of projects in Germany, Austria, Switzerland, and the USA. In 1995, Matthias Karch and Carolin Höfler founded the OZA _Studio for Architecture and Scenography in Berlin, which since then has been working at the interface of spatial and visual cultures, architecture, scenography, stage design, and exhibition design. In 1995, Karch was appointed professor at the Bauhaus Dessau (Anhalt University of Applied Sciences), where he taught future architects and designers in the field of »color, surface, space.« In 2003, he was appointed professor at the Department of Architecture at the Technische Universität Braunschweig. Since then, he has headed the IMD _Institute of Media and Design. The IMD is concerned with the cross-media interweaving of drafting and design processes, both analog and digital. The confrontation of architecture with parametric information is at the center of the institute's profile. Due to the progressive mediatization and digitalization of almost all areas of life, architecture must increasingly deal with the processual and staged dimensions of design. This ranges from the exploration of any form of behavior—be it political, social, or physical—to the conception of virtual and hybrid worlds.

Kassandra Nakas
is an art historian and curator. She held visiting professorships at the Ludwig Maximilians University Munich, the Berlin University of the Arts, and the State Academy of Fine Arts Karlsruhe. Her teaching at the IMD _Institute of Media and Design at the Technische Universität Braunschweig focused on interdisciplinary approaches to architectural theory: formats and strategies that explore the physical, corporeal, and social dimensions of built and designed environments, their medial negotiations and material foundations, as well as gender-theoretical aspects. Together with Philipp Reinfeld, she is the editor of the book series »Architektur der Medien | Medien der Architektur« (Architecture of Media | Media of Architecture) and of its second volume, *Bildhafte Räume, begehbare Bilder. Virtuelle Architekturen interdisziplinär* (Paderborn 2022, with the essay »Das Echo der Bilder in der Tiefe des Raums. Historische und heutige Blicke auf virtuelle Bildräume«). Other recent publications include: (2020): »SANAA's playtime: Communication and Interaction in Kazuyo Sejima's and Ryūe Nishizawa's Architectural Drawings,« in: Martin Søberg/Anna Katrine Hougaard (eds.), *The Artful Plan: Architectural Drawing Reconfigured,* Basel: Birkhäuser, 342–352; (2020): »Texts, Fictions and the Discursivity of Architecture,« in: Christophe Barlieb/Lidia Gasperoni (eds.), *Media Agency: New Approaches to Mediality in Architecture,* Bielefeld: Transcript, 52–68. Together with Julian Blunk, she organizes the interdisciplinary conference »Architecture—Film—Sound,« which took place at Karl Franzens University Graz in May 2024.

Philipp Reinfeld
is the interim professor of Experience Design in the study area »Architecture and Design« at the Stuttgart University of Applied Sciences. Until 2022 he was the »Akademischer Rat« and deputy head of the IMD _Institute of Media and Design at the Department of Architecture, Technische Universität Braunschweig. Reinfeld studied architecture at the Technische Universität Berlin (Dipl.-Ing.) and architecture and urban research at the Academy of Fine Arts Nuremberg (M. Arch.). In 2016, he gained his doctorate at the Institute for Architectural Theory and Architectural History at the University of Innsbruck. His dissertation was titled *Image-Based Architecture. Fotografie und Entwerfen* (»Image-Based Architecture: Photography and Designing«) and was published by Wilhelm Fink in 2018. From 2006 to 2008 he was an artistic assistant at the post-graduate study program for architecture and urban research at the Academy of Fine Arts Nuremberg. From 2006 to 2013 Reinfeld was a partner in the architecture practice BOOM/ERA in close project cooperation with brandlhuber+. Reinfeld is the co-editor of the publication series »Architektur der Medien | Medien der Architektur« (Architecture of Media | Media of Architecture) with Kassandra Nakas, published by Brill | Fink. At the IMD _Institute of Media and Design, he has been leading the teaching research focus »Architectural Design in Virtual Reality,« which he founded in 2016 and which was included in the Technische Universität Braunschweig's »Innovationsprogramm Gute Lehre« (»Good Teaching Innovation Program«) in 2019/20, funded by the Federal Ministry of Education and Research. He is the co-editor of the publications: with Carolin Höfler (2022): *Mit weit geschlossenen Augen. Virtuelle Realitäten entwerfen,* Paderborn: Brill | Fink, and with Kassandra Nakas (2023): *Bildhafte Räume, begehbare Bilder. Virtuelle Architekturen interdisziplinär,* Paderborn: Brill | Fink. Recently he published: (2022): »Agora Virtuell: Kollektives Entwerfen von Kommunikationsräumen in Virtual Reality,« in: Jonas Wenger/Jonas Frick (eds.): *VIGIA – Zeitschrift für Technologie und Gesellschaft* 1, 148–160; (2021): »Medienarchitektur auf der Expo 2000,« in: Karin Berkemann (ed.): *Das Ende der Moderne? Unterwegs zu einer Architekturgeschichte der 1990er Jahre,* Berlin: Urbanophil, 176–185; (2021): »This Is Real. Architektonisches Entwerfen in Virtual Reality,« in: *Cloud-Cuckoo-Land: International Journal of Architectural Theory* 25/40, 93–111.

The publication presents exemplary architectural design projects of the IMD _Institute for Media and Design at the Technische Universität Braunschweig from 2003 to 2023. We would like to thank all those involved, especially the students of the Department of Architecture, who joined us in the often uncertain design experiments and whose commitment, curiosity, talent, and concepts have made a significant contribution to the teaching and research profile of the IMD. Our special thanks go to the authors whose contributions provide important insights into the theory-building integration of teaching and research at IMD in current disciplinary, transdisciplinary, social, and political discourses. We are, of course, deeply indebted to the institute's academic team, who have been independent and indispensable sources of ideas and project supervisors, always ready to support our students. Their mostly interdisciplinary interests and qualifications have opened new horizons of thinking and action. These are, in particular: Prof. Christophe Barlieb, Mohammad Reza Abdollahi Bidhendi, Michael Botor, Daniel Büning, Manfred Fischer, Jennifer Hauger, Torsten Heine, Prof. Dr. Carolin Höfler, Caroline Høgsbro, Max Justus Hoven, Andrea Kondziela, Carolina Meirelles R. S. Menezes, Prof. Stefan Neudecker, Nicole Nickel, Katharina Puhle, Dr. Philipp Reinfeld, Lara Roth, Nicolai Schlapps, Dr. Frank Seehausen, Katharina Specht, and Lara Wischnewski.

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With regard to the completion of the publication, we would also like to thank Katrin Hellbach, who carefully researched all the relevant data and facts for this book, as well as Sofia Kouropatov for her friendly help in editing and her valuable suggestions in the final stage of preparing the publication. We would also like to thank Sorry Press, an independent publishing house located in Munich, and the designers Wiegand von Hartmann for their excellent cooperation.

The work on this publication was embedded in IMD's research in order to bring design-related architectural issues into an interdisciplinary dialogue and to bring together positions from architecture, art, media, and image theory. In the spirit of interdisciplinary exchange, we hope that this publication can provide an impetus for further engagement with the transformation of architecture and the city in the context of current political realities and ecological challenges.

March 2024

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Univ. Prof. Arch. Matthias Karch

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Katrin Hellbach

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Nicolai Schlapps, 2016–2023
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Lara Roth, 2018–2019
Lara Wischnewski, 2016–2018
Andrea Kondziela, 2015–2017
Katharina Puhle, 2007–2016
Daniel Büning, 2013–2016
Katharina Specht, 2015–2016
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Jennifer Hauger, 2003–2010
Michael Botor, 2008–2009
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Manfred Fischer, 2003–2008
Torsten Heine, 2003–2005

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Jorinde Voigt
Babette Wiezorek
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Lara Wischnewski
Wolfgang Zurborn

Guest talks

2023

Łukasz Lendziński
Was kommt nach fertig?
Łukasz Lendziński
Circularity
Dr. Philipp Reinfeld
Zwischen Körperlichkeit und Entmaterialsierung
Dr. Philipp Reinfeld
Zwischen virtuellen Welten und realen Räumen
Dr. Philipp Reinfeld
Zwischen Höhle und Weltraum

2022

Dr. Bibiana Oliveira Serpa
Designs of the Oppressed
Chase Duan (Phyo Kyaw Kyaw)
Reflections, Perspectives, and a Sense of Home
Matthias Vollmer
Schichten der Landschaft
Pablo Dornhege
Spatial Encounters—von hybridrealen Zwischenwelten und augmentierten Übergangsobjekten
Peter Volgger
Medienökologie—Ein neues ästhetisches Paradigma?
Jules Spinatsch
Geschichte einer proto-postpostgrafischen Werkgruppe
Eva Wilson
How and Where to Find a Virtual Image

2021

Rebeca Duque Estrada
Biomimetics and Robotic Fabrication
Łukasz Lendziński
Fragrance of Utopia
Wolfgang Zurborn
Nie mehr Dunkelkammer?
Łukasz Lendziński
Magic Moments
Wolfgang Zurborn
Zeigen, was ist—Konstruieren, was Bildwirklichkeit ist
Débora de Castro Leal
At the Edge of Globalization
Wolfgang Zurborn
Oberfläche und Tiefe—Das Bild im Raum
Mohammad Reza Abdollahi Bidhendi
Storytelling in Architecture
Carsten Jantzen
Cloud Modeling 2
Łukasz Lendziński
Transformator
Carsten Jantzen
Cloud Modeling 1
Łukasz Lendziński
Maker City
Łukasz Lendziński
Material First 3

2020

Dr. Marc Bonner
Architectural Probabilism
Michael Disqué
Schnöggersburg—Truppenübungsstadt
Łukasz Lendziński
Material First 2
Johannes Scholl
Immersive Exercise: The Power of VR and Social Competition

2019

Łukasz Lendziński
Material First 1
Lucas Daniel Gutierrez
New Paradigms of Digital Culture
Dr. Kassandra Nakas
»Die Architektur ist nun selbst zum Film geworden.« Film, Kunst und Raum seit den 1990er Jahren
Dr. Kassandra Nakas
Raum im Film—Film im Raum. Zur kinematografischen Organisation von Raum seit den Anfängen des Kinos
Dr. Kassandra Nakas
Raumtheorie und Körpergeschichte
Wolfgang Zurborn
Modelle der Wirklichkeit
Caroline Høgsbro
An der Grenze des Vorstellbaren
Kristoffer Gansing
Transmedia
Prof. Dr. Lasse Scherffig
Some Kind of Actual Space
Nicolai Schlapps
Models
Dr. Philipp Reinfeld
This Is Real

2018

Dr. Kassandra Nakas
Back to Pomo? Farbe, Ornament und Cartoon Style in der Gegenwartsarchitektur
Dr. Kassandra Nakas
The Age of Aquarius? Immersive Räume und die aktuelle Konjunktur des Aquariums
Prof. Dr. Georg Trogemann
Code & Material
Dr. Kassandra Nakas
Architektur und Affekt
Wolfgang Zurborn
Das Schauspiel des Authentischen
Monica Studer and Christoph van den Berg
Fliegende Frösche
Prof. Michael Beil
Redundanz als Konzept
Prof. Joachim Sauter
Poetry Is the New Black
Larissa Fassler
Walking in Place

2017

Tobias Nolte
Maschinelles Sehen und Gestalten
Katharina Beckmann
Die bauliche Geschichte der ehemaligen Abhörstation auf dem Berliner Teufelsberg
Dr. Kassandra Nakas
The »Art-Architecture Complex,« Revisited
Prof. Dr. Eike Langbehn
Räumliche Wahrnehmung und Fortbewegung in Virtual Reality
Michael Hansmeyer
Tools of Imagination
Prof. Ralf Baecker
Noise—Space—Matter
Dr. Manuel Kretzer
Materiability—The Optimist's Guide to the Anthropocene
Wolfgang Zurborn
Die Erfindung des Realen
Fabian Busse
Hybride Prozesse

2016

Hannes Hummel
Digital Artifacts
Armen Avanessian
Architektur und Akzeleration
Silvan Oesterle
ROK—Recent Projects
Silvan Linden
Rendite und Ewigkeit—Zeitkonzepte in der Architektur

2015

Wolfgang Zurborn
Street Photography Now! Collagierte Bilder
Hannes Hensel
Bunker 5001
Dr. Ralph Bärtschi
Working with the UR5
Thibault Schwartz
Working with the HAL Robotic Software

2014

Prof. Fabio Gramazio
The Robotic Touch—How Robots Change Architecture
Luka Piscorek
Working with UR5-Robots
Jörg Petri
Design and Crafts
Dr. Markus Hudert
Form and Construction
Ragunath Vasudevan
Digital Expressionism
Dr. Clemens Preisinger
Informed Geometry
Jorge Méndez with Drew Merkle
Working with nDynamics in Maya

2013

Frank Rieger
Hacking Berlin Teufelsberg
Dimitrie Stefanescu
Performance-Based Design in Rhino's Grasshopper

2011

Prof. Dr. Norbert Palz
Veränderung des architektonischen Materialbegriffs durch additive Fabrikationsverfahren
Prof. Dr. Joachim Krausse
Your Private Sky—Tensegrity-Strukturen und Raumtragwerke

2010

Prof. Dr. Joachim Krausse
Raumschiff Erde—Buckminster Fullers globale Architekturauffassung

2009

Jorinde Voigt
Proportion—Produktion von Realität
Jenny Haack
Original und Fälschung?
Jorinde Voigt
Constellation of One
Katharina Puhle
Flash

2007

Karsten Konrad
Traummodelle der Moderne

2006

Andreas Schmid
Räume der Zeichnung
Margarete Pratschke
Das Fenster als Screen

2005

Marcus Liermann
Tragverhalten—Von Hochhäusern und deren Formfindung

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2023

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2021

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Burak Tosun
Mona Trockel
Stephanie Wagner
Emilia Walbracht
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Thaddäus Wegener
Josephine Weigand
Janis Wieland
Pawel Zawislak

2020

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Feyza Arkun
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Pinar Bayankulu
Andéol Bellec
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Sönke Förster
Henrik Frenzel
Laura Fricke
Therese Fuchs
Marcel Galrao
Vytautas Galvanauskas
Daniel Gaubitz
Luzia Gödde
Sevban Gökdag
Paula Götz
Raya Gourdalo
Lennard Grastorf
Sevim Hazel Gül
Nicole Gust
Anna-Sophie Gutzmer
Laura Haegner
Kristina Hahlbohm
Dima Hammoudeh
Isabella Hans
Jana Hasselmeyer
Lena Hegerfeld
Sarah Heims
Marvin Hengsteler
Tiana Hilker
Mira Himmelrath
Jacqueline Horn
Carl Hübenthal
Fiete Jantsch
Dae Kyung Jung
Johanna Jungeblut
Kim Kaspar
Faruk Kilic
Julius Köhnlein
Leo Kraatz
Leon Krug
Leif Kruse
Inga Kuxhaus
Jiralak Laoluang
Elena Laubeck
Amar Leila
Ida Indre Lietzow
Laura Lisowsky
Fabian Lübking
Lara Lüchau
Felix Luther
Daniel Lux
Jonas Manigel
Lea Marquart
Tobias Meidlinger
Pia Melloh
Alina Mertens
Jonathan Meyer
Wiebke Meyer
Freya Meyners
Nadia Moalla
Dominika Müller
Jan Eric Naeve
Lara Neuhaus
Hong Anh Nguyen
Xue Yi Ni
Milena Nitsche
Nele-Marie Ohrdes
Linus Pätzold
Kim Perrey
Johannes Petersen
Katharina Plate
Luisa Plate
Sibel Pustu
Johannes Quirin
Kendra Rabe
Bengi Ramazanoglu
Rizan Rasho
Cecilia Redante
May Rehse
Anna Retrovski
Charlotte Rohde
Jennyfer Rohde

Mehmet Saka
Semiha Samast
Jacob Schamerloh
Tabea Schamp
Ayana Scharnhorst
Nico Schlaak
Jonathan Schmitz
Jonas Schulte
Lasse Schulz
Marvin Schulze Gronover
Simeon Schwager
Juliane Schwidun
Christian Siemssen
Carolin Silbe
Marcus Simonet
Vladlena Siumbeli
Luise Siuts
Amon Sklorz
Aleyna Solak
Laura Sommerfeld
Kira Sperling
Linus Starmann
Christine Steenken
Eric Steinbrink
Alena Stelloh
Kim-Sophie Stichnoth
Isabell Stodtmeister
Jan Strauch
Mina Su
Sarah Suttner Lopez
Nojan Taleb Nejat
Emma Pauline Thies
Büsra Topallar
Cindy Tran
Mehmet Tugrul
Burhan Üstün
Frederick van Dyck Graf von Kospoth
Ken Venancio
Isabel Vollmer
Dumitru Vozian
Kirill Wal
Alexandra Ija Waljor
Jonas Walter
Till Watzlawik
Henriette Weber
Fynn Weberling
Luca Weers
Michelle-Kristin Wehrhahn
Paul Wessel
Alina Westermann
Kea Winter
Basak Yapici
Leon Zimmermann
Leonie Zimmerningkat
Alessa Zinn
André Zurmühlen
Vanessa Zwinger

2019

Hannes Abram
Julia Adamski
Conrad Ahad
Intisar Ahmed Fadel Ali Hassanin
Ceren Akkoyun
Sümeyye Akyürek
Tamim Arab
Ibrahim Al Shoeb
Kim Bache
Maram Bashiti
Ellen Bertke
Karen Bode
Catharina Boehm
Anna Bretschneider
Henry Brüning
Lea Büsing
Sungyon Cho
Frederic Czaplenski
Edwald Dederer
Wiebke Dittmann
Dominic Dittrich
Max Dörsam
Jan Duensing
Lina Dworatzek
Hannah Eickenjäger
Alisa Feldt
Estefania Ferrà Escrivà
Evelina Frei
Johanna Friedrich
Justus Friesecke
Furkan Genc
Cleo Kristin Giesemann
Joshua Gobrecht
Aurelia Goldlücke
Henrike Gosda
Nils Grage
Carolina Groß
Paul Grosse
Adrien Haase
Frederike Hage
Henry Hapke
Patrizia Hinners
Jonas Holthuis
Nicole Hulm
Felix Iburg
Eicke Arne Janas
Vian Joli
Anna-Lena Jung
Leon Kaps
Bestan Karim
Paul Kimmel
Linda Klemm
Flora König
Timo Köppelmann
Marlene Kossack
Christina Kühn
Ida Kuschel
Clara Lang
Laura Leinert
Helena Loy
Dinah Lützen
Charlotte Mahrenholtz
Denise Matejat
Melanie Maul
Joshua Mehner
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Kyra-Chantal Möller
Toka Mohamed
Fritz Mülke
Kathleen Müller
Leander Nass
Henrike Neumann
Albert Papenhausen Fuster
Jan Erik Penning
Yasemin Pinar
Finja Plate
Merle Riemer
Allegra Roßmann
Dunia Saddiq Khaled
Marina Santelmann
Maurika Sathasivam
Kilian Schrader
Louisa Schulze-Klingemann
Konstantin Spornitz
Trümper, Nina Luise
Michaela Trautwein
Esma Türkan Esma
Bastian Urban
Aron Vietor
Maximilian Wein
Pinar Yalin
Pauline Zahn
Jingwen Zhang
Osman Zihni
Felix Zintel

2018

Clara Albert
Felix Altkemper
Linnea Altrogge
Dunia Alvanian

Adrian Ammon
Alexander Bahr
Mélusine Balke
Luiza Barbosa Martins
Erik Batzel
Nino Bergner
Jannes Beyer
Anne Catharina Bock
Carlotta Boelcke
Karolina Brandenburg
Qiaoyan Cai
Vedat Cakabay
Tugba Cakmak
Hans Christian Nicolai Carl
Haotian Chen
Can Ciftci
Lena Dandyk
Marla David
Alena Deiters
Marlon Dina
Thomas Dittrich
Valerie Dittrich
Leon Döring
Paul Oskar Dörsam
Léon Dräger
Klemens Drews
Renata Dutra Rodrigues
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Mats Ellerbusch
Justus Erb
Jonas Fangmann
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Britta Fischer
Caroline Gabka
Janik Ginter
Svea Grasztat
Sibylle Gütter
Mia Gutschalk
Jessica Hahn
Sophie-Marie Haux
Leonie Hecker
Beatrix Heider
Leon Friedrich Hengemühle
Lukas Hertwig
Jakob-Fabian Hillert
Sandra Hinrichs
Duc Anh Hoang
Mariam Hussam Saad Elghazaly
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Miles Jamal Jastram
Shijun Jiang
Rabea Jungenkrüger
Anton Kaufmann
Ioannis Kefalas
Hannah Nele Kluge
Jakub Knorr
Nick Kobert
Alexander Kok
Felix Kramer
Franziska Marie Kramer
Leon Kremer
Robin Künnecke
Luisa Lange
Marius Lauer
Quang Dung Le
Valentina Leifried
Julian Leineweber
Charlotte Liebig
Zijun Lin
Tim Lötters
Lea Löwe
Antonia Ludwig
Ting Luo
Julius Maichle
Katharina Mann
Till Maruschek
Jason Mayer
Annika Michael
Malte Nannen
Celine Hien Luong Nguyen
Duc Nguyen
Van Anh Nguyen
Büsra Öcal
Merle Oldenburg
Galip Ormanci
Fionna Orszagh
Björn Oswald
Deborah Palm
Judith Francesca Pelli
Francisco Perez
Simon Pfeffer
Jasmin Pistoor
Louisa Plenge
Marike Postel
Fanni Aurelia Rau
Keven Reimchen
Paul Reimers
Hai Ren
Phillip Roßbach
Janik Rückemann
Pia Schätzle
Nadjeschda Scharf
Stefan Schenkel
Freia Schierloh
Lukas Schivelbein
Thilo Schlinker
Jerome Schloh
Carolin Schnevoigt
Sarah Schober
Tim Schönborn
Elisabeth Schormair
Senta Schrewe
Robert Schröder
Tim-Frederic Schulze
Svea Schumacher
Mishale Louise Senft
Elmas Senol
Tjark Spille
Heiko Stielau
Antonia Stöcker
Daniel Sucka
Artur Sulimin
Tobias Thiel
Zhenan Tian
Janin Töpperwein
Ayse Tosun
Fabian Uliczka
Marleen Van de Valk
Janna Vollrath
Antonia Elisabeth von Arnim
Kira Wagner
Viktor Waldleben
Julius Wehrkamp
Sophie Wenderoth
Dominic Wenkel
Fabian Wohlgemuth
Thore Wübben
Da Xu
Melis Yildiz
Guangyuan Yu
Carlos Zamora González
Dong Zhang
Andreas Zimmerling
Nele Zimmermann
Niklas Zmuda Trzebiatowski

2017

Rajan Abdulla
Yamen Abou Abdallah
Jana auf der Landwehr
Qusay Awad
Anita Bauer
Jennifer Baus
Okan Beceren
Julia Beck
Fidelius Bezzenberger
Oskar Bode
Pascal Böttcher
Luisa Buchholz
Aletta Bünte

Leon Jakob Buttmann
Sarah Isabella Canehl
Bilal Cevik
Hannah Clemens
Burcu Daglayan
Lynn Dörk
Sarah Durke
Alina Eikermann
Lukas Eilers
Recep Can Eroglu
Vanessa Fahrenholz
Julia Fehling
Maximilian Feise
Daniel Geistlinger
Niklas Gieseke
Nele Görtzen
Anna Grabi
Mirjam Grünwald
Yaxiong Guo
Christian Hallecker
Luisa Hartmann
Felix Hauptmann
Jiawei He
Peter Heidermann
Merle Heins
Marielena Florianne Hickmann
Leon Ivo Hillebrandt
Franziska Himmelreich
Jonas Höltke
Antonia Hoffmeier
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Yang Hu
Eda Ipram
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Kristina Karamyschew
Lara Kellner
Duygu Kinaci
Fynn Kleen
Moritz Klingberg
Marius Klingebiel
Aleksandra Komina
Dogukan-Hazal Korkmazer
Ulrike Krause
Florent Kuqi
Bircan Kurt
Patrizia Lake
Anna Elisabeth Latte
Nina Lehrum
Anna Frederike Lembke
Bingying Liu
Elin Lohe
Andre Mangad
Jennifer Mayer
Anna-Katharina Meier
Lukas Meyer
Lukas Molter
Jana Friederike Naeve
Vanessa Nickel
Lennart Nöhren
Philip Nünning
Yasemin Özdemir
Jan Carsten Lukas Ohm
Angelina Pötz
Tatjana Popov
David Radivojevic
Armena Redzepi
Katharina Anna Rohrbach
Britta Schallock
Simon Scharnweber
Marina Schlimme
Regina Schmidt
Katharina Schneider
Philip Schreiner
Laura Schröter
Valentina Sehner
Judith Christiane Stadtmann
Till-Konstantin Stanke
Ole Starsinski
Adrian Stein
Julian Tesche
Nikolaus Theissen
Nele Tramp
Amelie Traupe
Felix Turtur
Leon Vöckler
Lisa Wachenschwan
Tianyi Wang
Sabrina Weber
Marisa Wieczorek
Shengmin Yang
Yin Zheng

2016

Irem Nur Akcam
Burak Alptekin
Firas Alhalabi
Joachim Bauer
Diana Bao-Tran Huynh
Caspar Baron
Marisa Bergmann
Valentin Bernhardi
Stella Betz
Vanessa Bohm
Christin Bolling
Adrian Borchers
Sina Bratrich
Tabea Büsing
Lukas Denkeler
May Julia Dieckmann
Isabel Dohle
Alexander Dolp
Esra Ertual
Patrick Ernst
Moritz Felzmann
Patrick Fern
Georg Flotho
Christopher Freier
Jan Funk
Nadine Gabler
Felix Gehrke
Juri Gödel
Martyna Goik
Maximilian Goetze
Jan Leonard Goldenbaum
Julius Göttsche
Anneken Groß
Laurenz Günter
Sophie Helten
Leonie Luise Hohmann
Daniel Ilunga
Fabian Johann
Arne Kablitz
Damla Kalem
Jan Kaminski
Felix Kanellopoulos
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Ansgar Kellner
Nora Maria Knappe
Julia Kolb
Louis Körbächer
Charity Lamptey
Henrike Laude
Malte Laumert
Veit Lauterberg
Vito Maximilian Lürßen
Tanja Mähler
Jaroslaw Makarchuk
Kirsten Melles
Oleg Morozov
Jan Jasper Mosebach
Didem Mutlu
Michael Müller
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Giovanni Battista Nobile
Kim Ohlrogge
Max Petersen
Merlin Poschmann
Macha Prohl
Kirsten Remmers

Carolin Renno
Jeannine Rohrberg
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Alina Schock
Yannick Schröder
Simon Schröter
Konstantin Schulz
Friederike Schulze
Leonie Schulze
Hajo Seevers
Corinna Siegmund
Jannik Siems
Jakoba Struck
Yuejia Sun
Abir Taoube
Ayat Tarik
Julia Thiebes
Maike Volkmer
Marvin Wagner
Merlin Waßmann
Henriette Weber
Laura Weber
Oona Lisbeth Welp
Torge Wilhelmi
Alina Woewutko
Josephine Zienow

2015

Hewa Ahmad
Eljas Allafian
Marina Amadori
Antigoni Antonopoulou
Hava Gizem Artar
Nils Aschemann
Jana Asmus
Veit Auch
David Baar
Jonathan Bals
Norman Baron
Baschira Baschir
Ardijan Beciri
Pauline Becker
Derya Bektas
Nils Besler
Britta Biehn
Lise Blotevogel
Sebastian Bock
Marriët Simone Boutez
Konstantin Brandt
Dimittri Braun
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Theresa Marie Bublitz
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Jihane Chelly
Christian Chlust
Margarita Damer
Jule Marie Dersch
Gulishan Ebrahim
Maximilian Franck
Elvira Frolow
Hannah Gelhaus
Sophie May Germer
Vassiliki Gliaia
Jessica Golombek
Urs Granatowski
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Paul Hartwig
Marlon Hecher
Sophia Heinen
Victoria Hermesmann
Svea Hinzmann
Konstantin Hirsch
Jan Hoffmann
Yannik Höhne
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Mario Junghans
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Chantal Karadag
Dilan Kaya
Ulviye Kaya
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Yvonne Köneke
Eduard Kutz
Jonna Kulik
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Robert Leinemann
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Pascal Lumme
Antonia Lüttig
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Anahita Meshkini
Julia Metzger
Emilia Mittmann
Amir Mirza
Annika Möbs
Erwin Kent Molenkamp
Sebastian Musa
Charlotte Namuth
Philipp Nass
Sönke Nähr
Lars Neuendorf
Tim Nehring
Bui Van Anh Nguyen
Quynh Huong Ngo
Ha My Nguyen
Jehona Nuhija
Ricardo Nobis
Ferdinand Oeffner
Esra Özek
Lotta Petersen
Christina Pickel
Alina Podworny
Patrick Puke
Sofia Ramos Marin
Carsten Rautenberg
Marit Reimer
Tim Reinecke
Tilman Rickmers
Fynn Riepe
Lara Roth
Julia Roth
Johannes Rose
Marcel Ruth
Raphael Moritz Ruß
Antje Sager
Jan Schellhorn
Patrick Schippan
Robin Schliephake
Melanie Schlüter
Fabian Schmoll-Klute
Nicole Schneider
Benedikt Schröder
Tilman Schumacher
Lilian Schweigler
Calvin-Todd Schwenke
Claudia Skora
Richard Spenst
Lisa Sperlich
Johanna Freiin Spies von Büllesheim
Janek Maria Sprenger
Jeaninne-Michéle Stenzel
Dmytro Svitlov
Judith Sweers
Elisa Thänert
Saskia Tödter
Theresa Tschapke
Ayse Isil Tunc
Laura Unger
Catharina van der Heyde
Vanessa Wanfahrt
Clemens Wiese

Lukas Wichmann
Marienne Wissmann
Larissa Wittig
Philip Wolf
Ewald Wozke
Surenur Yakin
Merve Yerlikaya
Jingchun Zhao
Kevin Ziarkiewicz
Patrick Zimmermann
Jan-Philipp Zöllner
Philipp Sinan Zwing

2014

Jonatan Anders
Annika Andritzki
Baransu Azsari
Michael Batelka
Mehdi Bateni
Philipp Baudissin
Philip Becker
Swantje Behrens
Felix Berger
Elena Bernstein
Louisa Biston
Janine Bothe
Till Büscher
Christina Bratsioti
Katja Brakowski
Maximilian Tassilo Brockhoff Lingke
Anna Laura Brüggemann
Christian Claaßen
Nezaket Demir
Lennard Dietrich
Robin Dörrie
Benno Elfenbüttel
Lilli Engel
Yvonne Goertz
Esra Görmez
Joschua Gosslar
Julian Griese
Miriam Haack
Ida Hasenfuß
Lamise Hamad
Teresa Heinzl
Janna Lea Hinzpeter
Inna Holzhausen
Martin Hsu
Büsra Inci
Sven Jonischkies
Sophieanna Jungewelter
Gardoon Jwamer
Charline Kalsow
Fikret Kaplanoglu
Jenny Kari
Constantin Kiesel
Henry Kirchberger
Merve Kizil
Jonas Kneisel
Lasse Knoop
Anna Nora Kopper
Nicole Köhler
Léonie Marlene Köhler
Maria Kousatalis
Mona Kraienhorst
Sara Aylin Kücükali
Sven-Hagen Kühling
Rebekka Kühn
Philipp Lambrecht
Hai Thuy Le
Fabian Leiwe
Jibang Li
Amrei Renée Lis
Anna Carolin Lüerßen
Jessica Lu
Tiffany Luu
Caroline Maaß
Mevlüde Mahmutoglu
Lisa Maier
Raphael Marterer
Till Mathiasen
Stavros Michaelides
Ruben Maximilian Michaelis
Sara Möller
Tamim Moustafa
Jennifer Müller
Patrick Naumann
Alina Neumann
Fabian Nowak
Johannes Oechsler
Pia-Sophie Oldhafer
Esra Oruc
Caroline Ossowski
Lyo Pavlik
Frederik Pätzmann
Steffen Rebehn
Philipp Rennen
Yoko Rödel
Aline Römmich
Frederic Rustige
Esma Sahin
Lisa Schäfer
Natalie Schmidt
Christina Schneider
Mara Lena Schönborn
Florian Schwanbeck
Gesa Lisanne Schwebig
Fabian Schwindling
Anahita Shoja
Benno Sievers
Marie Skruodies
Victoria Strel
Jan-Hendrik Tegtmeyer
Stefan Tuchen
Florian Trau
Aslihan Uzlu
Laureen Vincent
Viktoria Vogel
Tabea Voit
Timo Vortisch
Anastasia Waelder
Elisa Weber
Kerstin Weiß
Gloria Wendeler
Lena Werkmeister
Anja Widderich
Ananda Wiegandt
Ronja Wilkens
Torsten Wollny
Lena Mareike Wünsch
Tom Zumdick

2013

Jennifer Carstens
Pia Czarnotta
Lisa Köhler
Anna Maria Kriegel
Ann-Kathrin Lepke
Evangelia-Lucy Manikati
Lea-Sophia Pichler

2012

Lone Andresen
Martin Philipp Angst
Meryem Bas
Anne Bauermeister
Laura Beckmann
Gerriet Behrens
Anna Marlen Berger
Gordon Blanke
Vivien Bögelsack
Bonnie Bölsche
Angela Christoph
Tabea Cohrs
Karen Cordova
Gianna Degen
Johannes Dimiropoulos
Sercan Döndü
David Döring

Roxana Dumitru
Frederike Ebert
Karsten Eckert
Mona Ehlers
Carolin Eichelberger
Dennis Enzmann
Lea-Christin Gabriel
Tjark Gall
Konstanze Geyer
Marcus Gläsener
Büsra Gökmen
Nadine Grabiger
Jan Moritz Griebel
Leon Grote
Vera Hehemann
Hannah Alexandra Hemsing
Michèle Claire Hengstmann
Saskia Hofbauer
Max Justus Hoven
Alexandra Jäger
Iris Jander
Aneta Jórzak
Ulrich Kaag
Fabian Kannenberg
Carla Kern
Alexander Keuchel
Paul Kiek
Tobias Klose
Andreas Klosson
Maren Knaack
Anja Knäbe
Julia Maria Sophie Knieß
Cihan Koc
Daniela Krause
Ahmed Kria
Jakob Kroegeler
Jan Krütgen
Ferhat Kürekci
Christopher Kuriyama
Niklas Labuhn
Lucius Ladleif
Philip Lemanski
Marcelo Leunig Ambrozio
Anna-Lisa Lignow
Chih-Yuan Lin
Nicole Lisson
Kim Annarella Magnussen
Anton Marcus
Lars Hendrik Matthes
Magnus Menze
Haluk Mertkan
Markus Mönch
Anca Mosut
Linda Münch
Christian Nicefor
Markus Nicolai
Janine Nottenkämper
Tabea Oltmanns
Regin Ott
Julia Paul
Jannis Petereit
Leif Christian Petersen
Florian Pfister
Bonny Reinbeck
Katja Reinecke
Benjamin Ritz
Kim Ronowski
Vanessa Ruhlandt
Nezahat Sarikaya
Christian Thorbjörn Schad
Emilie Schmidt
Anne Schmitz
Henrik Schoop
Povilas Sileikis
Fabrizio Silvano
Rosalie Sperber
Lukas Steude
Tobias Storz
Louisa Sophia Strehlau
Antonia Suthoff
Vincent Marius Szur
Lorenz Teege
Jana Thalmann
Birka Thode
Jakob Simon Tuszynski
Franziska Vogtland
Serj Josef Voskian
Silke Weise
Linda Maria Wenschauer
Christian Wensel
Gerrit Westermann
Julia Windeler
Lara Wischnewski
Reuven Zweigel

2011

Martina Abbas
Firat Baris
Johannes Bathen
Yannis Beier
Aljosa Marko Bjelotomic
Romina-Dilara Bockhop
Annika Borup
Yonan Boutros
Philipp Brummer
Kathleen Brunke
Daniel Busch
Kerstin Bücker
Claudia Czelnik
Charlotte Delille
Denise Dietz
Jacqueline Dimmich
Aline Dockhorn
Johannes Ludwig Ehlert
Patricia Elsner
Friederich Endreß
Benedikt Engelke
Christel Erdmenger Gutierrez
Firat-Delil Ertegi
Mareike Fomferra
Dinah Fray
Zanna Ganeba
Lotta Gärtner
Chiara Hélène Gasser
Mirkan Genc
Britta Gleiß
Arne Glomb
Ann Kathrin Goldkamp
Theresa Gänsler
Niklas Graage
Tatjana Greb
Till Griesemann
Gülsen Labbad
Friedemann Hack
Wiebke Hagen
Lisa Hageroth
Sina Hartung
Cindy Heilmann
Torben Heintsch
Nicole Hengesbach
Kerstin Herbst
Patrice Herterich
Janna Hiersemann
Jörn Hilker
Jan Hoyer
Andreas Huhn
Sulafa Isa
Natalie Kauscher
Sema Kaya
Silke Keihe
Daniel Kemna
Sylvia Kessler
Björn Kienel
Isabel Kolster
Hilal Kocak
Harun Kolgu
Lars Philip Koop
Mats Karl Koppe
Nadine Krakowiak
Julian Krijom
Roman Kuhn

Nina Lacin
Sarah Anna Lambert
Janina Lammers
Laura-Marie Lams
Hannah Lassak
Lisa Leiter
Florian Liedtke
Dennis Lewin Lorenz
Fabian Lorenz
Nicole Loska
Sven Marcus
Annika Marischen
Arne Meyer
Janek Meyer
Alexander Mihok
Darja Möhlmann
Lena Katharina Moser
Theresa Münnich
Patricia Nicklas
Laura Nixon
Sebastian Ortmann
Kristina Öhlmann
Jelena Anna Patzelt
Julia Petersamer
Dominique Pietrzyk
Heiko Pohl
Tobias Puhlmann
Philipp Reiter
Sophia Ros
Janis Rösner
Niklas Samblebe
Nils Sasse
Paulin Sensmeier
Christian Sindt
Annika Szurowsk
Sarah Schinkel
Simon Schmeußer
Anika Schmidt
Stefan Testasecca
Yvonne Maria Thul
Chantal Tillot
Dave Tkaczyk
Amir Touhidi
Alina Vogel
Thies Wacker
Sarina Warmbrunn
Ann-Christin Westemeyer
Denise Westphal
Christine Wöhner
Niklas Wöste
Jascha Wronka
Alexander Wulf
Andreas Zimmermann
Qi Zhou
Sara Zorlu

2010

Simone Michaela Josephine Andretzky
Lena Asselmeyer
Alexandra Baack
Andre Beck
Florian Berkenkamp
Alexander Bouchner
Karolina Brunner
Martha Katharina Budz
Jennifer Anna Christiansen
David Czepek
Andreas Dieckmann
Tra Anh Dinh Dung
Philipp Sebastian Dreyer
Danny Fahr
Melanie Falke
Sebastian Feldmann
Laura Freiling
Franziska Frisch
Andreas Gaida
Sahra Andrea Michaela Gehrke
Larissa Sophia Geilen
Kevin Gerbode
Christopher Götz von Olenhusen
Manel Guerrouat
Nura Haider
Jasper Hasselbach
Anna Katharina Hepp
Annemarie Hoffmeister
Lina-Kim Holste
Louisa Höppner
Insa Horn
Christian Jensen
Annika Jopping
Jan Jungclaus
Natalia Kalucka
Diana Kandora
Yasemin Karababa
Katharina Kober
Florian Kolberg
Simon Krauß
Sarah Stephanie Kraußlach
Jessica Kroll
Jan Kuchcinski
Sebastian Kulle
Yagmur Kumcu
Neele Leson
Tobias Leunig
Hanbai Li
Fabian Loock
Linn-Marie Löbkens
Tim Ludwig
David Lüken
Sabine Lutzmann
Maher Madi
Stefan Martin
Veronika Martin
Beate Mielsch
Yvonne Mitschke
Hanna Maja Murzin
Aida Nejad
Maria Nizhelovska
HyunHo Oh
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