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Digital Cartography of a Judenhaus: Spatial, Technical, and Atmospheric Strategies in ScanLAB Projects /

Cartografía Digital de una Casa Judía: Estrategias Espaciales y Técnicas Atmosféricas en Proyectos Scanlab

On June 29, 2023, the German theatre company Berliner Ensemble premiered Felix's Room, a theatrical piece set in Nazi Germany in 1942. The play recounts the story of Felix and Erna Ganz following their expulsion from their home and subsequent confinement in a Judenhaus –a type of housing where the Nazi regime concentrated the Jewish population under inhumane conditions prior to deportation. Based on letters and sketches discovered by their great-grandson, Adam Ganz, the project evolved into a scenographic proposal that foregrounds the use of advanced digital technologies. In collaboration with ScanLAB Projects –a studio specialized in LiDAR (3D laser scanning) and SLAM systems– Ganz reconstructs domestic spaces and personal memories through high-resolution spatial scans.

This article investigates how the spatial technologies developed by ScanLAB Projects give rise to sensitive digital architectures that unsettle conventional understandings of materiality in architecture. Through scenographic analysis, it explores how these technologies facilitate the recreation of marginalized or erased realities. Adopting a qualitative case study methodology, the research draws upon a combination of visual documentation and theoretical sources to examine two key Projects –Frozen Relic and Displaced Witness– with the aim of identifying the spatial strategies deployed and comparing them with those implemented in the scenography of Felix's Room as a spatialized form of memory.

Keywords: scenography; 3D scanning; Felix's Room; atmosphere; memory; cartographic narratives; LiDAR; SLAM.

◆ *El 29 de junio de 2023, la compañía alemana Berliner Ensemble estrenó Felix's Room, una obra teatral ambientada en la Alemania nazi de 1942. La pieza narra la historia de Félix y Erna Ganz tras ser expulsados de su casa y confinados en una Judenhaus, espacios donde el régimen nazi agrupaba a la población judía en condiciones inhumanas antes de su deportación. A partir de cartas y bocetos encontrados por su bisnieto, Adam Ganz, surgió una propuesta escénica centrada en el uso de nuevas tecnologías. En colaboración con ScanLAB Projects, estudio especializado en LiDAR (escaneo 3D) y sistemas SLAM, Ganz recrea espacios y recuerdos con escaneos tridimensionales de alta resolución.*

Este artículo analiza cómo las tecnologías espaciales desarrolladas por ScanLAB generan arquitecturas digitales sensibles que cuestionan la noción de materialidad en la arquitectura a partir del análisis escenográfico y posibilitan la recreación de realidades invisibilizadas mediante herramientas digitales. La investigación adopta una metodología cualitativa de estudio de caso, basada en el uso combinado de material gráfico y documentación teórica, y analiza dos proyectos –Frozen Relic y Displaced Witness– con el objetivo de identificar las estrategias espaciales desplegadas y compararlas con las aplicadas a la escenografía de Felix's Room como espacio de memoria.

Palabras clave: *escenografía; escaneo 3D; Felix's Room; atmósfera; memoria; narraciones cartográficas; LiDAR; SLAM.*

01. Judenhäuser in Nazi Germany: Urbanism and Architecture as Instruments of Antisemitic Control

Judenhäuser, or "Jewish houses," were buildings originally inhabited by non-Jewish citizens and subsequently expropriated by the Nazi regime to forcibly concentrate the Jewish population prior to their deportation to concentration and extermination camps. This measure was part of a systematic strategy of urban and social segregation, initially implemented in Germany and later extended to the occupied territories across Europe. It served as a precursor to the establishment of ghettos.

Living in a Judenhaus entailed extreme overcrowding, a total loss of privacy, and constant surveillance by the authorities. Residents were stripped of their property and civil liberties, enabling their control, localization, and eventual deportation within the repressive machinery of the Nazi regime[1].

These dwellings were located in numerous German cities –such as Berlin, Hamburg, Munich, or Mainz– and were selected for their strategic position within the urban fabric. They were often situated in neighborhoods with pre-existing Jewish communities or in areas that allowed for more efficient police surveillance.

Although no precise or unified figure exists regarding the total number of Judenhäuser recorded across Germany and Austria –due to the lack of centralized records and the destruction of documents during and after the war– it is estimated that there were several hundred. This suggests the systematic and organized scope of segregation and persecution implemented by the political antisemitism of the Nazi regime during that period.

Beginning in 1939, the restrictions imposed on the daily lives of Jews intensified drastically, with an increasing number of legal and administrative measures aimed at their isolation and persecution. The forced concentration in Judenhäuser enabled stricter control over the Jewish population and facilitated subsequent deportations.

In the case of Rhineland-Hesse, Jews were compelled to relocate to the city of Mainz, as their surrounding rural areas were declared "Jew-free" (Judenhaus – Teil I Innenstadt, n.d.). The doors of their apartments had to be marked with a black Star of David on a white background.

In September 1941, it was established that each room had to be occupied by at least two people. Mass deportations from Mainz took place in March and September 1942, and in February 1943. Residents were taken from their homes in broad daylight and initially moved to school gyms (such as those at Feldberg and Goethe schools), from where they were transported to the freight station, where a special Reichsbahn train awaited them. These transports were headed to the Piaski camp (near Lublin), Theresienstadt (near Prague), or directly to extermination camps. Some Jews, upon learning of their imminent fate, chose to commit suicide.

[1] BRODERSEN, Ingke, 2025. Adeu, Martha: Històries d'un edifici jueu. Translation of Marc Jiménez Buzzi. 1.ª ed. Barcelona: Editorial Comanegra.

In 1945, following the arrival of American troops, only around sixty Jews remained in the city –most of them either married to non-Jews or survivors who had been in hiding. Ultimately, the historic Jewish community of Mainz, known as Magenza, ceased to exist. Among the numerous documented Judenhäuser in Mainz, the building at Adam-Karrillon-Straße 13 stands out, where more than fifty people lived in overcrowded conditions until their deportation. Commemorative plaques mark other similar dwellings, such as Walpodenstraße 17 (with around forty residents), Breidenbacherstraße 25 (at least 122 people), and Adam-Karrillon-Straße 54 (forty-three people). At Margaretengasse 19, 21, and 28, more than ninety people lived before being deported. Additional Judenhäuser were located at Rheinallee 12, Kaiserstraße 32, Frauenlobstraße 4, and Taunusstraße 45. At the small Jewish hospital on Gonsenheimer Straße 11 (now Fritz-Kohl-Straße), which also served as a home for the elderly after 10 November 1938, around one hundred people –including residents and staff– lived before being deported in September 1942 to Theresienstadt and other camps[2] (fig. 1).
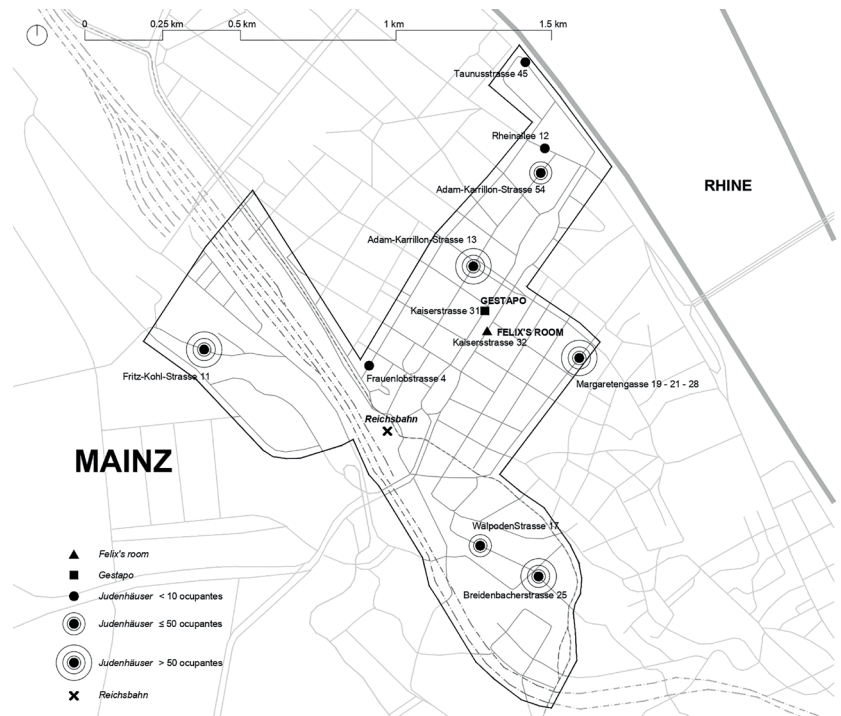
Fig. 1. Map of the Judenhäuser in Mainz, showing their location and density of occupation. Author's own elaboration.

[2] INSTITUT FÜR GESCHICHTLICHE LANDESKUNDE RHEINLAND-PFALZ e.V., 2001–2025. „Judenhaus" – Adam-Karrillon-Straße 13 [online]. Mainz: mainz1933-1945.de

02. Architectures of the Intangible:
Hybrid Digital Environments as Sensitive Scenic Design

On June 29, 2023, the German company Berliner Ensemble premiered Felix's Room, a theatrical piece set in Nazi Germany in 1942. The play recounts an episode in the life of Felix Ganz –a prosperous carpet dealer and art collector, popularly known as the "Merchant of Mainz"– and his second wife, Erna Ganz, after they were expelled from their villa in Michelsberg and confined to one of the so-called Judenhäuser. The Jewish house in which Felix and Erna Ganz were forced to live in Mainz was located at Kaiserstraße 32. Prior to that, they had been housed in another Judenhaus on Rheinallee 12, both located in the city center of Mainz.

Some years ago, Adam Ganz –professor in the Department of Media Arts at Royal Holloway, University of London; writer; director; and great-grandson of the Merchant of Mainz– discovered several family documents in which Felix had recorded his confinement. These included a sketch of the Judenhaus at Kaiserstraße 32 and letters addressed to friends and relatives who had managed to flee Germany before the implementation of the segregation laws. Using this material (fig. 2), Adam Ganz developed a proposal that was selected as the winner from among some three hundred entries in a competition held by the Komische Oper Berlin –an institution that, since 2019, has been researching potential uses of new technologies in the operatic stage. The exact address of this residence plays a central role in the scenic and emotional reconstruction of the story. In collaboration with ScanLAB Projects –a studio specializing in advanced 3D scanning technologies and Simultaneous Localization and Mapping (SLAM[3]) systems– Adam Ganz created holographic projections and high-resolution 3D scans of Felix's room.

[3] SLAM (Simultaneous Localization and Mapping) is a technology that allows a device to locate itself and map an unknown environment in real time using sensors like cameras or LiDAR, without relying on GPS.

Fig. 2. Ganz family archive. Excerpt from the project presented by ScanLAB Projects at the BEYOND Conference 2023, Karlsruhe. Accessible online: https://www.youtube.com/watch?v=uGJbGLtz1bE

Fig. 3. Felix's Room (2021), digital scenography created by ScanLAB Projects for the homonymous play by the Berliner Ensemble. The scene recreates Felix's room, granting it a narrative agency that activates memory.

The proposal by Adam Ganz and ScanLAB Projects serves as the case study through which we examine and reflect on the production, thinking, and questioning of the architectural discipline in a present where the integration of Artificial Intelligence is inevitable. Embracing and understanding this new reality as one of possibilities, the aim of this paper is to analyze the Spatial, Technical, and Atmospheric Strategies [STAS] implemented by the studio ScanLAB Projects to challenge the notion of architecture as purely object-based and tangible, in favor of one that is elusive and intangible. This approach envisions architecture as a sensitive, affective, and resonant experience, seeking –through a new materiality– to reawaken emotional engagement with architecture and the city, in contrast to the generic, hyper-regulated, and code-driven environments that have been endlessly produced and replicated over the past decades.

ScanLAB creates immersive experiences by recreating spaces where the physical and the digital converge, generating what they describe as precise hybrid digital reality –a concept we will define later. To achieve this, they combine computational techniques (such as SLAM) with artistic resources that shape a unique visual and conceptual style. The technologies employed by ScanLAB –also used in the training of machine learning models for the computer vision systems of autonomous vehicles [4] [5]– enable the creation of scenographic environments where perception is articulated as a form of architecture based on a new, vibrant materiality –one composed of a constellation of intangible point clouds that affect us. In the specific case of the staging of Felix's Room[6] (fig. 3), these technologies generate three-dimensional projections from real scans, making spatial fragments linked to personal memories emerge on stage. The result is a scenographic space that evokes places and experiences of the past –a space of memory.

[4] YOUNG, Liam. Where the City Can't See. [vídeo]. London: Liam Young / Unknown Fields Division, 2016. 9 min.

[5] SCANLAB PROJECTS. Dream Life of Driverless Cars [vídeo]. London: ScanLAB Projects, 2015. 6 min.

[6] SCANLAB PROJECTS. Felix's Room. London: ScanLAB Projects, 2023.

03. Research Methodology

The research adopts a qualitative case study methodology, focused on a comparative analysis of three projects developed by ScanLAB Projects: Frozen Relic, Displaced Witness, and Felix's Room, with a cartographic analysis applied specifically to the latter. This approach combines graphic material with theoretical and critical documentation, enabling an examination of how spatial technologies are used to construct digital representations of complex contexts.

The cases were selected due to their thematic diversity –climate change, the migration crisis, and Holocaust memory– each addressing issues tied to specific spatialities that affect us. ScanLAB's projects become a paradigm of scientific research from an aesthetic and artistic standpoint, generating scenographies capable of evoking memory, emotion, awareness, or absent presences.

Thus, the performative design deployed in Frozen Relic and Displaced Witness is analyzed and compared with the aim of classifying which of the aforementioned Spatial, Technical, and Atmospheric Strategies [STAS] are applied in these two initial case studies. Once these strategies are identified and categorized, we can then understand how they are also implemented in the scenographic proposal of Felix's Room, revealing how ScanLAB Projects succeeds in shaping an intangible architecture imbued with memory, perception, and affect –one that opens a communicative channel accessible to a non-specialist audience.

Finally, upon completion of the comparative study, narrative cartographies[7] will be developed with the aim of making visible the spatiality of the constructed scenography.

04. Precise Hybrid Digital Realities Designed by ScanLAB Projects

ScanLAB Projects is a creative studio based in London, founded in 2010 by two architects from the Bartlett School of Architecture, Matthew Shaw and William Trossell, whose trajectory is defined by an innovative approach to large-scale three-dimensional scanning. Their interdisciplinary practice brings together art, architecture, science, and audiovisual media with the aim of capturing and reconfiguring the physical world, transforming spaces and ephemeral moments into immersive experiences with strong visual and conceptual depth. The strength of their work lies in the creation of meticulously detailed digital replicas of buildings, landscapes, objects, and events. These representations, oscillating between the spectral and the corporeal, document and reinterpret the real, establishing new ways of narrating the visible and the absent, while evoking physical, emotional, or symbolic sensations.

[7] CANO CIBORRO, Víctor, 2023. La ciudad de Compton y sus cuerpos rebeldes en la Super Bowl 2022: cartografía de cinco estrategias escenográficas diseñadas por Es Devlin. Proyecto, progreso, arquitectura [en línea], n.º 30, p. 174–195. ISSN 2171-6897.

This is expressed in the interview The World in a Billion Points, published by the Society for Social Studies of Science (4S) [8]:

"We are offering a previosly unseen perspective through the eyes of the laser scanner, allowing all audiences to see in ways they couldn't before. I'd liken it to giving them a pair of binoculars, broadering their visual horizon."

In this interview, Shaw and Trossell delve into the conceptual and technical foundations of their unique methodology, which merges scientific and artistic production. Through the use of point clouds, they achieve not only exceptional geometric accuracy but also a symbolic density that activates sensitive and unconventional spatial narratives.

Within this framework, the concept of precise hybrid digital reality refers to a form of representation in which highly detailed metric data –obtained through technologies such as LiDAR or SLAM– is interwoven with digital interpretations that evoke memories, absences, or the affective dimensions of lived space. This reality does not replicate the physical world in a neutral manner, but rather reconfigures it as a perceptual environment where technical precision and affective ambiguity coexist. In this sense, the digital becomes a new expressive materiality capable of constructing scenographies in which data and evocation are fused. These configurations do not merely aim to represent the real; they seek to question the ways in which we inhabit, remember, and imagine it. From this perspective, visualization operates as a critical tool that articulates memory, experience, and technology; the technical image ceases to function as an objective copy and becomes instead a medium capable of generating critical thought and sensitive experience.

This intent to make scientific production visible through artistic works often gives their collaborations a dual nature: interacting with the scanner as both an "objective measurement" and a "subjective imaging device." As Trossell states:

"Our involvement gives us huge satisfaction in that we are contributing to the scientific process, and that there is an opportunity in our creative response to having been there and collected that data to share an artwork beyond that scientific community."

The reconstruction of these precise hybrid digital realities makes material and human absences visible, while also raising questions about the ethical and aesthetic dimensions of capturing and preserving the ephemeral. In this light, ScanLAB Projects proposes both a poetics of data and a politics of visualization –reconfiguring the relationships between technology, memory, and the perception of place.

From a technical perspective, they use LiDAR[9] scanners –electronic devices that emit light beams of a specific wavelength, measure the distance of the light pulse returning to the sensor, and record details to construct a point cloud model of the target space (fig. 4). Photogrammetry adds a color layer to this point cloud. Such

[8] ÖNAL, Gökçe, 2023. The world in a billion points: Interview with ScanLAB Projects [online]. 4S Online, March 13.

detectability would be impossible to capture through purely biological perception, highlighting the importance of incorporating non-human vision technologies to expand our epistemological capacity and production. Moreover, they combine these cartographic skills with other disciplines such as mathematics, data science, and history to build a visual framework that integrates relevant layers of information from the research process, enabling the reproduction of their sensitive narratives through the digitization of space.
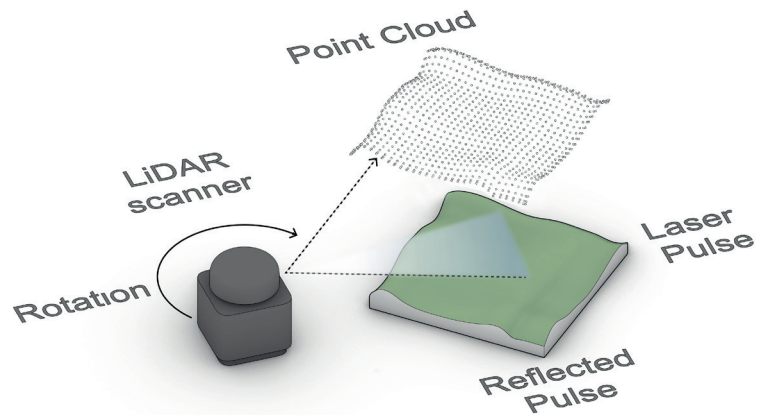
Fig. 4. Diagram of LiDAR operation, Author's own elaboration.

05. Spatial, Technical, and Atmospheric Strategies Identified in ScanLAB Projects' Works

Analyzing the first two case studies, four main [STAS] are identified, which often appear combined and are classified as follows: the reconstruction of intimate spaces [STAS.1]; the superimposition of the physical and the digital to create hyperreal environments (point clouds with LiDAR and photogrammetry) [STAS.2]; the integration of sound elements (sound, music, narration, etc.) [STAS.3]; and a performative design that implements digital technologies such as virtual reality devices, augmented reality, visual projection (video), and/or digital fabrication (3D printing, CNC) [STAS.4].

In the case of Frozen Relic, an precise hybrid digital reality is recreated through the installation Arctic Climate Impact Tour, a project that transforms scientific research on climate change into an immersive artistic hyperreality experience, generating environmental awareness through aesthetic sensitivity. In this project, ScanLAB, in collaboration with the Department of Applied Mathematics and Theoretical Physics at the University of Cambridge, participated in an expedition to the Fram Strait, northwest of Svalbard, aboard Greenpeace's icebreaker Arctic Sunrise. During the mission, the team meticulously documented the morphology of 26 icebergs using LiDAR scanning for the emerged surfaces and multibeam sonar for the submerged parts.

This technological combination resulted in one of the most accurate three-dimensional representations of sea ice obtained to date, significantly contributing to the validation and calibration of large-scale climate models. The collected data not only fed scientific research but also gave rise to the artistic installation Frozen Relic: Arctic Works, presented at the Architectural Association Gallery in London.

The exhibition reconstructed the scanned icebergs at scale [STAS.2], using frozen saltwater poured into molds produced by CNC technology [STAS.4]. Suspended in a dimly lit room [STAS.1], these sculptures slowly melted, producing a continuous dripping sound that became part of the installation's perceptual device [STAS.3], evoking the fragility of the polar ecosystem and the inexorable disappearance of these landscapes (fig. 5).

The second significant example implementing a different [STAS] within a hybrid environment is the installation Displaced Witness. This work, the result of research on migratory processes transformed into performative design, incorporates advanced technologies within a hyperrealistic narrative that enhances its immersive and critical dimension. It invites the viewer to participate in an act of spatial witnessing, where landscape, memory, and displacement converge.
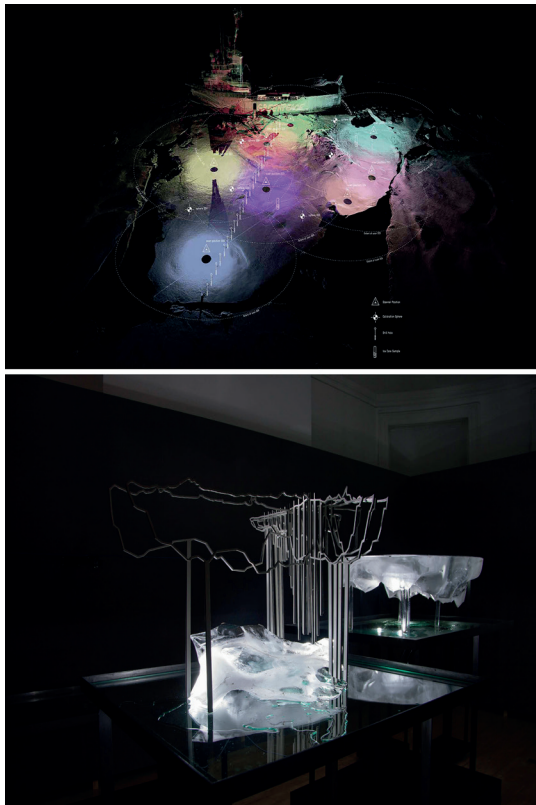
Fig. 5. Arctic Climate Impact Tour (2022), ScanLAB Projects. Installation presented at the Society for Social Studies of Science (4S). Above, it recreates Arctic landscapes affected by climate change using LiDAR scans. Below, it constructs icebergs with molds fabricated through CNC technology.

Fig. 6. Displaced Witness (2017), ScanLAB Projects. Digital installation based on LiDAR scans of forced displacement landscapes. Above, accumulation of life jackets at the municipal landfill on the outskirts of Mithimna. Below, installation of the Project, image from Aesthetica Magazine. https://vimeo.com/218628035?p=1l

The narrative is set on the Greek island of Lesvos, one of the main unofficial entry points for Syrian refugees crossing the Mediterranean Sea from Turkey in 2015. The beaches of Skala Sikamineas received overcrowded and precarious boats, guided by volunteer lifeguards to improvised camps offering basic assistance. Before this support network was established, many arrived in dangerous areas, forced to walk long distances seeking help. The creation of these reception devices helped prevent shipwrecks and saved numerous lives.

Over time, the beaches became covered with life jackets and remnants of inflatable boats. Faced with the ecological and symbolic impact on the landscape, local authorities initiated their collection. Thus, the Mithimna landfill was transformed into a space expanded by tens of thousands of life jackets, each bearing witness to a journey: some marking a safe arrival; others, the silence of the sea (fig. 6).

Upon entering the center of the small installation room [STAS.1], which allows individual access, the visitor –barefoot and equipped with virtual reality devices [STAS.4] and headphones– begins a process of sensory transport: the sound of waves crashing on the shore envelops the scene, while the crunch of pebbles beneath the feet evokes a physical presence [STAS.3]. A rotating point cloud slowly reveals a visual portrait of the place, suspended between reality and its digital reconstruction [STAS.2]. This performative installation unfolds over homogeneous surfaces measuring one meter by one meter, composed of 3D-printed digital textures [STAS.4] that faithfully replicate fragments of the scanned terrain, thus proposing a form of remote, poetic, and critical presence.

05. Felix's Room: Cartographic Narration of Theatrical Scenography

Once the [STAS] implemented by ScanLAB in the first two case studies have been made explicit, we move on to the cartographic analysis of the scenic proposal in the work Felix's Room, aiming to examine how these strategies materialize on stage. Narrative cartographies[10] will be presented to spatially analyze the tactics employed in this case, oriented toward conveying to the theater audience –deprived in this instance of digital devices– the particular atmosphere of confinement experienced by Felix and Erna Ganz during a crucial period of their lives. The scenography, conceived by ScanLAB in collaboration with Adam Ganz, shapes a deeply immersive experience that emerges on stage and combines cutting-edge digital technology with physical elements, leading us toward a new materiality, a vibrant matter[11]. This fusion enables a highly accurate reconstruction of the couple's confinement experience in the Judenhaus at Kaiserstraße 32, Mainz, during 1942. Beyond the mere recreation of an otherwise inconspicuous physical space, Felix's Room constructs an emotional and symbolic environment that invites reflection on memory, loss, and human resilience.

[10] Narrative cartographies is understood as a re-presentation of a situation that is as specific as it is corporeal and that, due to its origin within a very particular sensory regime, requires graphic instruments capable of narrating temporalities and spatialities beyond what is visible and tangible. See: (Cano-Ciborro, 2021).

[11] BENNETT, Jane, 2022. Materia vibrante: una ecología política de las cosas. Buenos Aires: Caja Negra. Disponible en: https://cajanegraeditora.com.ar/libros/materia-vibrante/

Within its technical and atmospheric spatial strategies –described, classified, and identified in the comparative study– the ones implemented by ScanLAB in Felix's Room to shape its precise hybrid digital reality are validated below. Therefore, the identification of these four main axes in the theatrical work is also confirmed: the reconstruction of intimate spaces [STAS.1]; the superimposition of the physical and the digital to create hyperreal environments [STAS.2]; the integration of sound elements [STAS.3]; and performative design through the implementation of digital technologies such as cinematic visual projections [STAS.4].

[STAS.1] Reconstruction of Intimate Space

The scenographic starting point is the appearance of a hologram on the theater stage. An austere room, located at the center of a completely darkened stage. The scene is based on the recreation of a floor plan hand-drawn by Felix himself and on an original chest of drawers discovered in 2019, which is the only physically material element aside from the main cast (fig. 7). These tangible elements anchor the narrative in historical reality, while the "holographic" projections and high-resolution 3D scans expand the physical space into virtual dimensions that evoke memories and emotions.

*Fig. 7. T*he protagonists inside the point cloud of the Judenhaus, digitally reconstructed through LiDAR scans by ScanLAB Projects for the play Felix's Room (2023), Berliner Ensemble. The scene transforms the spatial archive into an immersive environment where memory and absence materialize as scenography..

[STAS.2] Superimposition of the Physical and the Digital to Create Hyperreal Environments

The scenography dynamically transforms to reflect the oscillations between the oppressive present of confinement and memories of happier times. A new vibrant materiality emerges. The room's walls occasionally dissolve to reveal scenes of dances in Felix's former villa or trips to Istanbul's Grand Bazaar, using projections onto a volume constructed with translucent veils arranged center stage, replicating a point cloud at the actual scale of the Judenhaus at Kaiserstraße 32. These combine architectural scans with visual effects created through simulated video reenactments of experiences recorded in Felix's letters, suggesting the fragility of memory (fig. 8).

Fig. 8. Veit Schubert and Alma Sadé portray Felix and Erna Ganz in Felix's Room (2023), a Berliner Ensemble production featuring digital scenography by ScanLAB Projects. The performances unfold within a point cloud that reactivates the spatial memory of the Judenhaus.

## [STAS.3] Integration of Sound Elements

Live music, ranging from operetta waltzes to popular songs from the 1920s, is synchronized with scenographic changes to intensify the sensory immersion. Ambient sounds, such as footsteps of the Gestapo or creaking wood, are carefully integrated to reinforce the tension. The voice of Adam Ganz, the story's narrator, adds a touch of nostalgia (fig. 9).

Fig. 9. Felix's Room (2023), Berliner Ensemble. Top left: Adam Ganz as narrator. Top right: performer from the Komische Oper Berlin. Bottom: orchestra of the Komische Oper during the performance.

[STAS.4] Performative Design with the Implementation of Digital Technologies

The scenography functions as a memory palace: each element –from the furniture to the "holographic" video projections– evokes and preserves the experiences of Felix and Erna. Thus, the stage space becomes a living archive that invites the audience to explore the layers of a story that is both personal and collective (fig. 10).
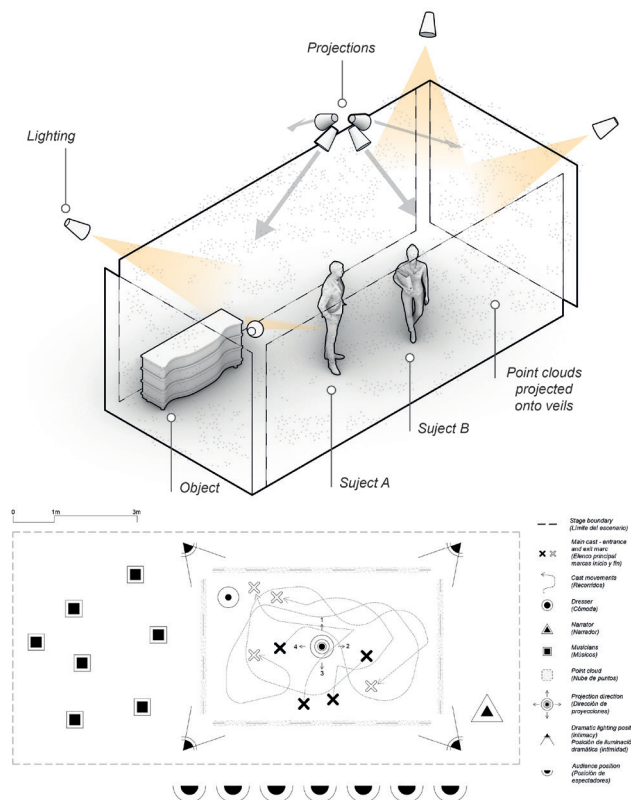
06. Discussion:
Architectures as Vibrant Matter of Affect and Memory

In the digital contemporary era, we are witnessing a radical expansion of the architectural field that questions the centrality of materiality as a sine qua non condition of the discipline.

This leads us toward a reconceptualization of materiality in architecture. Against the classical view of matter as inert, passive substance separated from the subject (e.g., concrete, steel, or wood), Karen Barad proposes the concept of vibrant matter[12]. Here, matter does not simply "is," but "becomes" through intra-actions[13]. It is neither stable nor autonomous but a vibrant energy –a point cloud– intersected by affects, contingencies, and potentialities between human and non-human bodies. This conception of matter opens a fertile field to rethink architecture from an artificial intelligence that does not operate on what is given but constructs itself in relation to the environment and its present bodies.

In this context, the proliferation of tools such as 3D scanning, spatial reconstruction with AI, immersive environment generation, and atmospheric simulation has given rise to forms of "architecture of the intangible" that shift attention from the built to the vibrant and lived; from the architectural object to immateriality and perceptual experience. These practices reconfigure architecture not as a mere production of physical structures but as an art of presence, evocation, and the construction of haptic worlds.

[12] BARAD, Karen, 2007. Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning. Durham: Duke University Press.

[13] Unlike "interaction," where two preexisting entities affect one another, "intra-action" implies that entities do not exist prior to their relation, but rather emerge through it. See: (Barad, 2017).

Digital–Intangible Architecture manifests through models such as point clouds, volumetric scan projections, augmented realities, or virtual environments.

This shift also redefines the role of the architect. As Hans Hollein anticipated in his 1968 manifesto Everything is Architecture 14, architecture is no longer limited to walls and roofs –it can be expressed as a sensory pill, a beam of light, or a mental image. The architect becomes a creator of atmospheres, a spatial dramaturge, or even a curator of memories. As evoked in episodes like San Junipero 15 or Eulogy 16 from Black Mirror, the architectural space of the future might become an emotional archive, a digital extension of consciousness, a capsule of affect.

Conclusions: Intangibles Architectures Where Data Evoke Emotion

The comparative study reveals a shared spatial strategy: transforming high-precision spatial data into affective experiences. Felix's Room, the central focus of this article, transforms a bedroom into a landscape of memory, where LiDAR scans stage a previously hidden historical conflict. In Frozen Relic, glacial retreat is represented as an immersive installation that materializes climate urgency. Displaced Witness reorders the cartography of Lesvos to expose the migration crisis, overlaying human trajectories with eroded digital terrains.

In these three cases, the point cloud ceases to function as a tool for objective documentation and becomes a critical medium capable of materializing absence, activating memory, and generating a space where sensory experience, symbolic narration, and ethical reflection intertwine. The resulting architectures do not merely represent space; they reconfigure it through the interaction between digital precision and human affect, between technical data and perceptual sensitivity.

Building on this foundation, the article argues that integrating artificial intelligence models with these strategies can further expand the narrative and projective potential of digital architecture. Technologies such as GANs (Generative Adversarial Networks), NeRFs (Neural Radiance Fields), or Stable Diffusion 3D allow for the imagining of what was not captured, the interpolation of scenes, and the addition of symbolic layers to existing scans. Combined with computer vision and semantic analysis, these tools offer new ways of constructing automatic descriptions, affective maps, or personalized spatial journeys.

In this framework, artificial intelligence is no longer a mere technical support but becomes a conceptual ally –one that enables new ways of narrating, perceiving, and constructing the contemporary experience of space. Thus, the architecture of the intangible asserts itself as a field where data, emotion, and critical thought converge in a vibrant materiality.

Figures

Fig. 1. Map of the Judenhäuser in Mainz, showing their location and density of occupation. Author's own elaboration.

Fig. 2. Ganz family archive. Excerpt from the project presented by ScanLAB Projects at the BEYOND Conference 2023, Karlsruhe. Accessible online: https://www.youtube.com/watch?v=uGJbGLtz1bE

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Fig. 7. The protagonists inside the point cloud of the Judenhaus, digitally reconstructed through LiDAR scans by ScanLAB Projects for the play Felix's Room (2023), Berliner Ensemble. The scene transforms the spatial archive into an immersive environment where memory and absence materialize as scenography..

Fig. 8. Veit Schubert and Alma Sadé portray Felix and Erna Ganz in Felix's Room (2023), a Berliner Ensemble production featuring digital scenography by ScanLAB Projects. The performances unfold within a point cloud that reactivates the spatial memory of the Judenhaus.

Fig. 9. Felix's Room (2023), Berliner Ensemble. Top left: Adam Ganz as narrator. Top right: performer from the Komische Oper Berlin. Bottom: orchestra of the Komische Oper during the performance.

Fig. 10. Diagram and Cartography of Scenic Elements, Author's own elaboration.

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