

MADE OF REALITIES

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AN ARCHITECT'S ATLAS OF THE METAVERSE



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2023, Meron Yebrâh

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WHAT'S THE POINT OF THIS THING...?

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Architecture serves many purposes. It shields, conceals, and protects, but it also enlightens; it generates narratives for societies. It offers people an identity to which they can relate and which is recognizable by others having the effect of establishing communities in need of a framework for communicative relationships. The advent of computer technologies led to new domains of architectural exploration and has finally reached a milestone where a virtual world, the metaverse, is more than just an idea confined to sci-fi novels. As this brave new and parallel world evolves and we slowly move towards digitalization, concerns surrounding infrastructure creation, human, social and cultural interactions arise. As it is currently missing, this study undertakes a charting and mapping of the metaverse to understand this new reality from an architectural point of view in the hope of contributing to the field of knowledge. It starts by defining terms and then gathering a substantial number of case studies in or about the metaverse to analyze its current state. It provides a curated collection of project topics in the form of an atlas to assist users in understanding the design features of the metaverse, using case studies as its primary source material. This study may help architects and virtual designers alike, to better understand the opportunities that the new reality has to offer in regards to social interactions and inhabiting living spaces. It offers fuel for thought on how these two realities may overlap and influence one another. This may potentially encourage further research and other critical perspectives on this issue.

ABSTRACT

The primary purpose of a lexicon is to serve as an inventory of the vocabulary of a specific work. It also serves as a link between a given language and the information or knowledge presented in the provided work. In light of this, the first step of this theoretical statement will be to define a few relevant keywords so that the principles and ideas surrounding the concepts of virtual realities and the metaverse may be comprehended the way they are intended to be understood. The following definitions are cited from the online Oxford dictionary.

VIRTUAL, /ˌvɜːtʃʊəl/, *n.* and *adj.*¹

1. *That is a computerized or digitized simulation of something*
2. *Senses relating to essential, as opposed to physical or actual, existence. That is such in essence, potentiality, or effect, although not in form or actuality. In later use also: supposed, imagined*

REALITY, /rɪˈælɪti/, *n.* ²

Real existence: what is real rather than imagined or desired; the aggregate of real things or existences; that which underlies and is the truth of appearances or phenomena.

VIRTUAL REALITY, /ˌvɜːtʃʊəl rɪˈælɪti/ , *n.*³

Computer-generated simulation of a lifelike environment that can be interacted with in a seemingly real or physical way by a person, esp. by means of responsive hardware such as a visor with screen or gloves with sensors; such environments or the associated technology as a medium of activity or field of study; cyberspace.

MEDIUM, /ˈmiːdiəm/, *n.* and *adj.*⁴

Mode of expression used in an artistic, creative activity or a channel of communication.

As one may expect, given the meteoric rise of computer technologies in the course of the last several decades, the Oxford Dictionary’s definition of virtual reality is only considered from a technological stance. Nonetheless, one may make the case that virtual reality refers to a more comprehensive concept than a digital simulation. Sherman and Craig argue that virtual reality is a medium, and virtual worlds are its content⁵. This argument is far from futile for it is exactly in this window that the architectural creation operates. It makes use of a medium to generate and anticipate not a single path towards a concept but a whole spectrum of them⁶. Hence opening the door for new ideas, new concepts, new initiatives, and new worlds to come forth.

Besides, if a virtual reality is to ever be considered as its own distinct world and stand on its own as a place, it can’t be considered as the physical world’s substitute and this distinction matters more so as the word “virtual” is easily confounded as “not existing” as argued by Kolko in the following citation. -->

LEXICON

Virtual Reality

“A place can be inhabited and filled with “things,” which are suitable for it: physical things for physical places; non-physical things for online worlds. The nature of the place – physical or non-physical – is a condition for the kinds of performance that can be attained: what can be done in a physical place, usually cannot be done in a non-physical one, and vice-versa. The two kinds are not substitutes one of the other. Architecture, commonly conceived as a discipline which deals with physical things, can, and should be, rethought as an instrument to understand the non-physical world, now more than ever since the introduction of networks is forcing us to re-elaborate on what space is”. (Kolko 2003, 83–84)

¹ Virtual: OED Online, n.d.
² Reality: OED Online, n.d.
³ Virtual Reality: OED Online, n.d.
⁴ Medium: OED Online, n.d.
⁵ Sherman and Craig 2002, 31–32
⁶ Picon 2011, 2–3

METaverse, /'mɛtəvɜːs/ , *n*.⁷

Computing (originally Science Fiction). A (hypothetical) virtual reality environment in which users interact with one another’s avatars and their surroundings in an immersive way, sometimes posited as a potential extension of or replacement for the internet, World Wide Web (web 3.0), social media, etc. Also more generally: the notional environment in which users of networked computers interact.

CRYPTOCURRENCY, /'krɪptəʊˌkʌrənsɪ/, *n*.⁸

Any of various digital payment systems operating independently of a central authority and employing cryptographic techniques to control and verify transactions in a unique unit of account; (also) the units of account of such a system, considered collectively.

BLOCKCHAIN, /'blɒk tʃeɪn/, *n*.⁹

Computing. A sequence of digital records linked using encryption and distributed and managed typically in a peer-to-peer network, used esp. by cryptocurrencies as a secure and verifiable ledger of transactions; the technology underpinning this.

NON-FUNGIBLE TOKEN (NFT), /ˌnɒnˈfʌŋ(d)ʒɪbl/, *n*.¹⁰

A unit of data that certifies a digital asset (e.g. a piece of digital art) as unique and provides proof of ownership, which is stored using blockchain technology and traded online using cryptocurrency.

⁷ Metaverse: OED Online, n.d.

⁸ Cryptocurrency: OED Online, n.d.

⁹ Block Chain: OED Online, n.d.

¹⁰ Non-Fungible Token: OED Online, n.d.

¹¹ Stephenson, 1992

¹² Qu'est-ce que le Web3 et comment il pourrait changer la face d'Internet, 2022

Neil Stephenson introduced the concept of the metaverse for the first time in his science fiction novel titled ***Snow Crash***¹¹ and published in 1992. It emerged from the combination of the words ***Meta*** and ***Universe*** and intended to be understood as *a **virtual world beyond the physical one***. For all intents and purposes and in the context of this study, as intended, the term should be regarded as a concept, and not as the Metaverse derived from the company Meta. In its most basic form, the idea outlines a decentralized digital ecosystem, complete with its very own decentralized currency and shared by a community of online users. It is possible to buy and sell non-fungible tokens (NFTs) that represent virtual assets like clothing, buildings, and other items using cryptocurrencies. The evidence of ownership for these assets are stored on the blockchain. As a result, the idea of the metaverse may, in theory, function completely independently of any intervention by a particular government or big tech. It is conceivable that its users may eventually federate it into a kind of self-governing space of their own creation.¹² As a result of this, it is frequently referred to as the new Web, or Web 3.0.

This new generation of the web comes after the Web 1.0, which is the first version of the internet and is described as being static, purely consultative, and non-interactive. It is followed by the Web 2.0, which is the current version of the internet and came into existence with the advent of social networks, blogs, and other similar platforms,

LEXICON

Metaverse

and is described as being collaborative; the keyword here being user-generated content. Web 3.0 is presented as an alternative to the current Web, free of the tech-giants’ shenanigans, market monopolies, and government censure; a web where users have control over their data, running on technologies like *blockchain networks, Artificial Intelligence, cloud storage[...]*decentralized app, etc...¹³ Even though, those key aspects are not yet fixed, the similarities between the metaverse and the Web 3.0 are evident. Schumacher even argues that the virtual reality known as the metaverse might turn out to be the Web 3.0 giving architects a much bigger role in the communicative technologies than ever before.

*“After 30 years of theoretical speculation and technological advances the internet is finally on the way to transforming in ways envisioned with the concept of ‘cyberspace’. The key analogy is no longer the magazine with separate pages but the city and its seamless web of spaces. The paper argues that this immersive internet delivers a superior, more productive platform for social exchange and communication. Co-location synergies will unfold and order the distribution of sites and enable an intuitive browsing navigation full of discoveries and serendipitous encounters, as well as creating sites for vivid crowd interactions.”*¹⁴

While forced to agree with Schumacher in the way this new immersive reality may influence our role as architect in regards to information technologies, some might think the way he and tech-experts envision this new utopic web is too idealistic. Indeed, multiple aspects of their vision can be criticised. From a technological point of view, will anyone in the world be able to access this

¹³ Qu'est-ce que le Web3 et comment il pourrait changer la face d'Internet, 2023
¹⁴ Schumacher 2022, 1

new web in the way most do today? Considering the means and ressources needed, I don’t think everyone will be able to in the foreseeable future. Furthermore, taking into account the massive investment of the giant tech companies, the issue of data privacy in a virtual reality where everything can be recorded and stored is a big issues that will probably need a worldwide legislation in order to gain the trust of the public. Nevertheless, the metaverse’s potential explained in this chapter still remains and, in the early stages, it will probably act as a good complement to the web 2.0 and its different plateforms. I’d like to remind the reader that advancements, in any regards, are rarely made by considering our dogmatic reality, an element of utopia is always needed... As such I don’t think this idea of the utopic immersive Web 3.0 should be put aside.

LEXICON

Metaverse

The advances in computing, networking, and virtual technologies that have occurred over the past six decades have made it possible for architects to access, share and spread a vast array of ideas, concepts, and knowledge. These advancements have made it much simpler to transition from theoretical constructs to working models. These last few years, this shift in paradigm affects all strata of our societies. Our societies are inching closer to the concept of a virtual reality known as the metaverse as the majority of past social and professional interactions migrate into the virtual realm. The cause is partly due to the global pandemic and the widespread adoption and investment in technologies that provide digitized virtual social experiences and interactions. As it develops, it attracts an ever-growing number of businesses, governments, investors, users, and designers. In fact, various academic fields are researching it to better understand the influence it has and will have on our societies as it continues to expand.¹⁵ These studies are conducted on significant topics such as the effect on social and economic interactions, data privacy, and so on. This effort of mapping the metaverse, from the point of view of their respective field of study, is something that architecture has yet to do. Currently, the metaverse is a clutter of several platforms, each of which hosts its own virtual reality, playground, and parcels ripe for real-estate speculation; yet there is no overarching image that can be formed from this. The topic of this theoretical statement is what I endeavour to do, it aims to contribute in our understanding of this new unfolding reality as its advance. If we, as architects,

are to ever understand what the metaverse is currently, what is being built and therefore, what are its needs and shortcomings; we should walk the same path that past architects and theorists have walked before in their attempts to understand our built societies by mapping and charting the metaverse.

Before all else, why do we need architects and more generally architecture in the metaverse? Well, by its different shapes, functions, or materials, architecture has been designed by societies’ needs, social constraints, ideologies, ambitions, or religious beliefs. Inextricably, the identity a society, and what its inspirations are, can be understood by the structures surrounding it. It bridges the gap between then, now, and what is to come. Furthermore, and as argued by Schumacher Architecture has a second essential function in framing social interaction through design:

*“The life process of society is a communication process that is ordered via a rich typology of communicative situations. It is the designed environment, both physical and digital, that spatially distributes, frames, stabilises and coordinates these distinct situations within an evolving order that allows us to self-sort as participants of various specific social interactions.”*¹⁶

If this new reality is to set strong roots it will need all kinds of spaces promoting the communicative interactions proposed by Schumacher: *such interactions include social networking, creative collaboration, conferencing, exhibitions, public performances, and many types of commercial interactions.*¹⁷ Under those circumstances, architects are naturally the better suited designers to

INTRODUCTION

¹⁵ See literatures&further readings section at the end of the present document.
¹⁶ Schumacher 2022, 1
¹⁷ Schumacher 2022, 2

take charge of turning the metaverse into a reality that can stand on its own and be of benefit to and for our physical reality.

This present work offers to chart the metaverse to understand it from an architectural standpoint, but also to discover what is being constructed, study if it differs from the physical reality and if anything is missing. To do so, this study will be presented in the form of an Atlas, because while atlases were originally collections of geographical maps, what makes them truly interesting is how they're curated rather than their content. The curation itself provides a good representation of the political, social, and economic conceptions of a given society. For example, atlases showing different borders for the same countries at the same time periods could be a good indicator of political conflicts. Likewise, an atlas has a unique particularity that allows it to be practically endless, as long as you keep curating the additional content, you can keep adding pages to it. This specificity is ideal in the context of this work as it studies and analyzes a curated list of projects in an ever-expanding field.

INTRODUCTION

The first step in the process of curating the Atlas is to collect, in the form of a table, a significant number of projects, platforms, mediums, and research papers in or about the metaverse to paint a representative and accurate image of the topic. While the vast majority of these case studies were discovered through Google searches, the research papers were discovered through the use of a platform known as *Elicit*¹⁸ which is an artificial intelligence research assistant that compiles a comprehensive list of research papers in response to the inquiries that you submit.

In this particular instance, 43 of the case studies that were obtained came from Elicit. The next stage is to determine the categories that will serve as points of comparison in relation to the metaverse and the research that is related with it. For this study, 16 categories came up. Of course, this number is not fixed at all and anyone, if they ever feel the inclination, can increase it. Finally, those 16 categories presented and explained below are filled for each case study in a binary logic, yes or no, respectively ● or ○. On the right are the explanations for each categories you'll find in the table. In the next double pages is the sample of case studies selected for the atlas. Explanations can be found in page 26.

¹⁸ *Elicit: The AI Research Assistant, 2022*

1. Virtual architecture: Does the case study relate to virtual architecture?
2. Cryptocurrency: Does the project rely on or relate to cryptocurrencies.
3. Urban planning: Does the case study explore urban planning?
4. Sustainable: Does the case study offer to research sustainability issues?
5. Immersive: Is the case study immersive?
6. AI: Does the case study use AI or machine learning in way?
7. Metaverse: Is the case study in the metaverse?
8. Community spaces: Does the case study aim at forming communities?
9. Heritage: Does the case study explore ways to save our built heritage?
10. Open access: Is the case study open to everyone, as opposed to VIP access or entrance fee
11. Real physics: Does the case study follow the laws of physics?
12. Simulation: Does the case study offer simulations to study future scenarios?
13. Real Estate: Is the case study a real-estate investment?
14. Conceptual architecture: Does the case study try to explore new architectural concepts relating to the metaverse?
15. Business-oriented spaces: Does the case study offers business-oriented spaces?
16. Created by designers: Are those case study created by designers or by non-professionals?

METHODOLOGY

Curation

Title	Case studies nature	Virtual Architecture	Cryptocurrency	Urban planning	Sustainable	Immersive	AI
Winter House	1	●	○	○	○	●	○
Ares House	1	●	●	○	○	●	○
The Mirage	1	●	●	○	○	●	○
SOLIDS	1	●	●	○	○	●	●
Metamundo's Villa	1	●	●	○	○	●	○
Mona's Renaissance competition	3	●	○	○	○	●	○
Steampunk Pavillion	1	●	○	●	○	●	○
Noor Studio	1	●	○	○	●	●	○
Cuervo Metadistillery	1	●	○	○	○	●	○
The meeting place	1	●	●	○	○	●	○
Liberland	1	●	●	●	○	●	○
Babel 4.0	1	●	●	○	○	●	○
Planet City	1	●	○	●	●	●	○
Wellington Digital Twin	1	●	○	●	●	●	○
OpenHeritage 3D	1	●	○	○	○	●	○
Low Carbon farms	1	●	○	○	●	●	○
Gather	4	○	○	○	○	○	○
Museum of the World	4	○	○	○	○	○	○
Meta-Tuvalu	1	○	○	○	○	●	○
Meta-Horizons: The future Now	1	●	○	○	○	○	○

Metaverse	Community spaces	Heritage	Open Access	Real Physics	Simulation	Real Estate	Conceptual architecture	Business-oriented Spaces	Created by designers
●	○	○	○	●	●	●	●	○	●
●	○	○	○	○	○	●	●	○	●
●	○	○	○	○	○	●	●	○	●
●	●	○	○	○	●	●	●	○	●
●	●	○	○	○	○	●	●	○	●
●	●	○	●	○	○	○	●	○	●
●	●	○	●	○	○	○	●	○	●
●	○	○	●	●	●	○	●	○	●
●	●	○	●	○	○	○	●	○	●
●	●	○	●	○	○	●	●	●	●
○	●	○	○	○	●	●	●	●	●
●	○	○	○	●	●	○	●	○	●
○	○	●	●	●	●	○	○	○	●
○	○	●	●	●	●	○	○	○	●
●	○	○	○	●	●	○	●	●	●
○	●	○	●	○	○	○	○	●	○
○	○	●	●	○	○	○	○	○	○
●	●	●	●	●	●	○	○	○	●
●	●	●	●	○	○	○	●	●	●

Although, at first glance, the binary choices might not seem complex enough to reflect the intricacies of the metaverse, the maths show 2^{16} possible combinations. Furthermore, a striking feature of binary choices is that they can create stark contrasts that will be useful to compare the 16 points of comparison within the 106 case studies of our analysis.

Due to the impossibility of displaying all variables using a conventional 2D or 3D graph, a method called TSNE (T-distributed Stochastic Neighbor Embedding) implemented in the sklearn.manifold programming library¹⁹ to reduce our 16-dimensional dataset (Table) into a 2-dimensional projection will be used. The use of this method of manifold learning for the curation of cultural artefacts was used in the Gugelman Galaxy²⁰ and described in Mathias Bernhard’s paper²¹. The advantage of this method is that it maintains spatial proximity, resulting in a reasonably accurate projection that will likely generate clusters of case studies with similar characteristics. These clusters of case studies may be identified and analyzed based on their position and relationship to or divergence from other clusters. Interestingly, this strategy is beneficial not just for identifying groups of similar objects, but also for identifying outliers.

Two distinct clusters are immediately apparent, cluster 1 and 2. On the one hand, they mostly consist of design projects, while on the other, they primarily consist of research projects. They appear to have major disparities in three categories, namely cryptocurrencies, open

¹⁹ Maaten and Hinton 2008, 2579–2605

²⁰ Gugelmann Galaxy, 2015

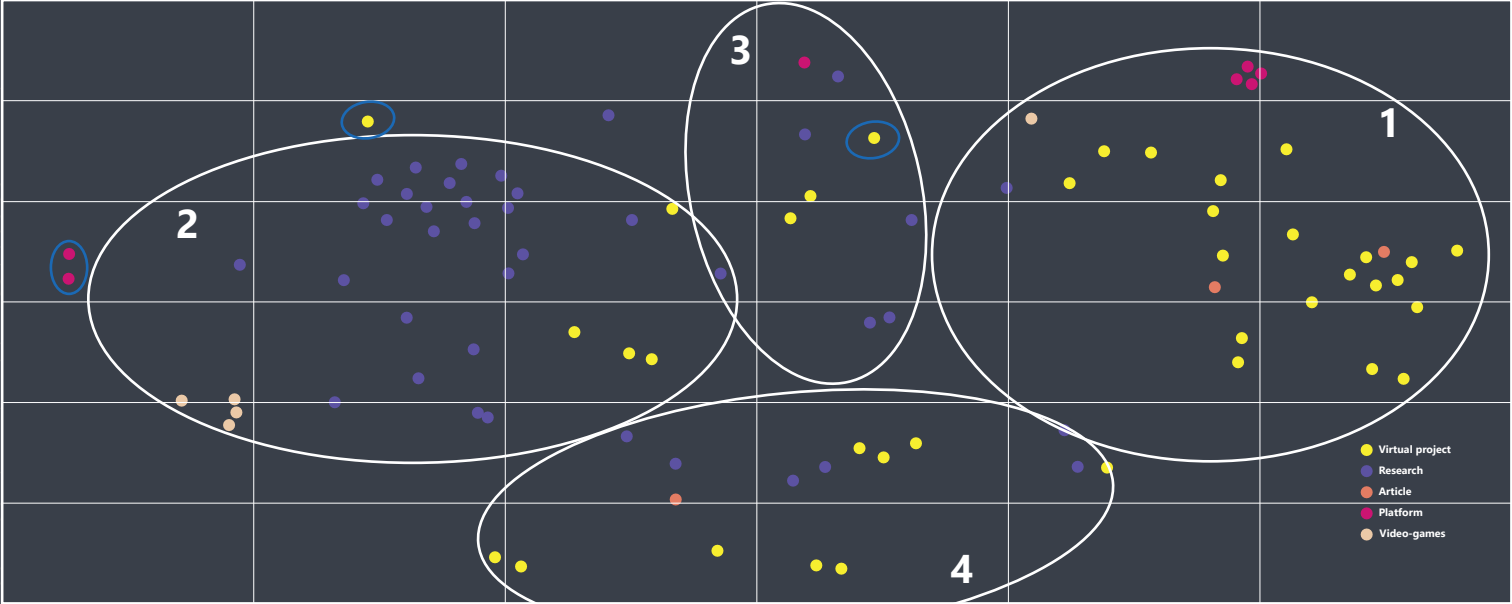
²¹ Bernhard, 2016

access, and the market for virtual real estate. The bulk of academic publications concentrate on strategies for virtual architecture and its teaching, while the majority of design projects are focusing into the implementation of said strategies. The first cluster is also distinguished by the presence of a sub-cluster that is composed of four metaverse platforms. Case studies that simulate aspects of physical reality, such as challenges and potential solutions related to urban planning or sustainability, are some of the topics covered by Cluster 4. The third cluster regroups case studies that place a stronger focus on cultural and community spaces. 4 case studies stand out as outliers for reasons that will be explained later in thr Altas. One virtual project at the top left-hand corner, 2 platforms on the left side and another virtual project in cluster 2. These case studies are respectively, a digital twin, 2 non-immersive platforms and an inaugural exhibition around virtual design for a design museum in Seoul.

METHODOLOGY

Table Analysis

Clusters Analysis



These five groups, meaning the four clusters and outliers, will constitute the sections of our Atlas. The case studies for each section will be chosen based on their location within their own cluster, as this reveals the particularities that are relevant to that chapter, and they'll be highlighted with the help of three images to contextualize them with a small description. In addition, a QR code, giving the possibility to the reader to further investigate the case studies, will be available. Furthermore, # followed by the categories these case studies correspond to will be indicated. Because I chose the Atlas format, a map derived from the cluster graph will be crafted using the *Self-Organizing Map algorithm*²² to create a topographic map based on the clusters' density to place them in the context of the entirety of the study. Each section will end with a discussion about the themes addressed.

The first section is about virtual real-estate. The chosen project are respectively about virtual housing as a mirror of the physical world, virtual housing as a sculpture, virtual housing as a dream, virtual housing as an experiment and virtual housing as a patchwork of stories.

The second section is about research. The selected project are regarding research to inspire the virtual, research at the border of the virtual and physical worlds and research for the physical world.

The third section will look at virtual communal spaces. The projects covered will be communal spaces for advertising, for art, for networking and finally communal spaces for culture.

²² (Broniowski 2021)

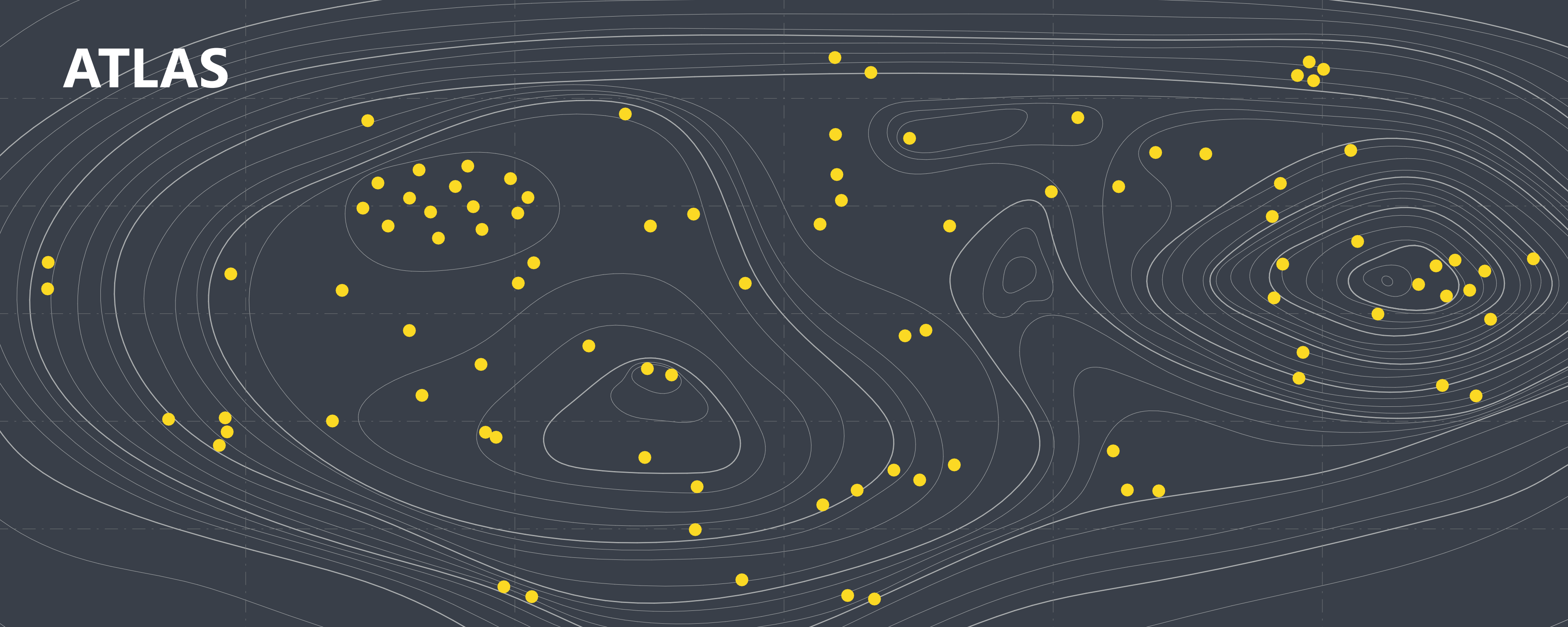
The fourth section is about implementation of virtual reality technologies for issues such as, respectively, possible futures, digital twin for urban planning, heritage and sustainability aspects of datacenters.

The section about outliers will be about those projects that have the potential to blur the lines between virtual and physical reality.

METHODOLOGY

Atlas Organisation

ATLAS



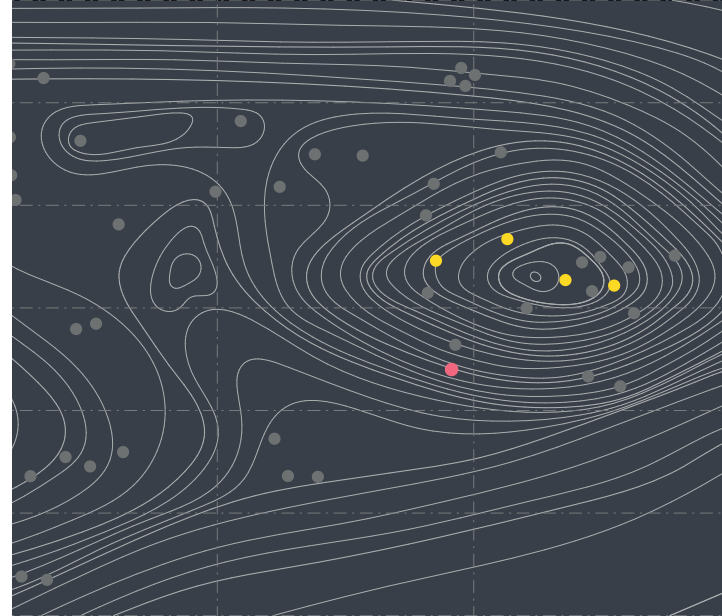
VIRTUAL REAL-ESTATE



WINTER HOUSE

The home is a visually striking structure, stacked on a massive concrete slab that creates the illusion of a “floating floor” and is situated in a snow-covered landscape. The designers were influenced by the minimalist and practical ideas of industrial designer Dieter Rams, who was active in the early 1960s. In addition, the home explores the concept of winter in the metaverse, giving it a distinct and intriguing appearance. The pink elevator that goes to the top of the building is one of the most striking aspects of the residence. This adds a whimsical and unexpected touch to the house’s overall design. The house also has a glass box that contains a large concrete staircase leading guests to the living areas of the property, which have interiors with pink-hued interiors with large windows. These windows are meant to increase the connection between the building and its natural surroundings, since they give enough natural light and stunning views of the surrounding countryside. The interiors are created with pink furnitures, giving the space a distinct and edgy vibe. The house has commonly found spaces such as a bedroom, an office and a living room. The mix of modernist style, the snowy ambiance, and the addition of whimsical aspects such as the pink elevator provides a visually appealing virtual mansion that will leave every visitor with a lasting impression.

#VirtualArchitecture#UrbanPlanning
#Immersive#Metaverse#RealPhysics#Simulation
#RealEstate#ConceptualArchitecture#CreatedByDesigner



“It’s the same as for the physical world: these houses are designed to live in and use as curated spaces to showcase ourselves, I truly believe that we can use the metaverse as an exploration territory to apply successful outputs to our beloved physical world” (Reisinger, André. 2022. Winter House viewsDezeen. <https://www.dezeen.com/2022/01/21/virtual-modernist-winter-house-andres-reisinger-metaverse/>.)

André Reisinger & Alba de la Fuente
2021
Virtual design

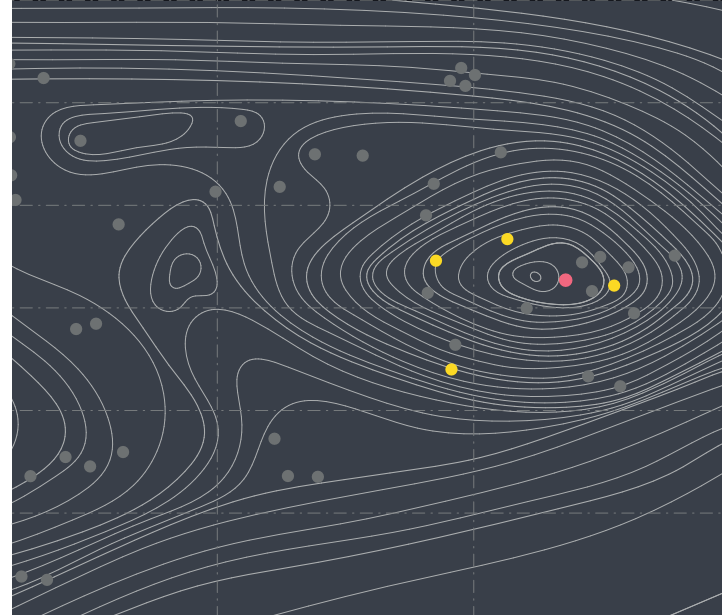




ARES HOUSE

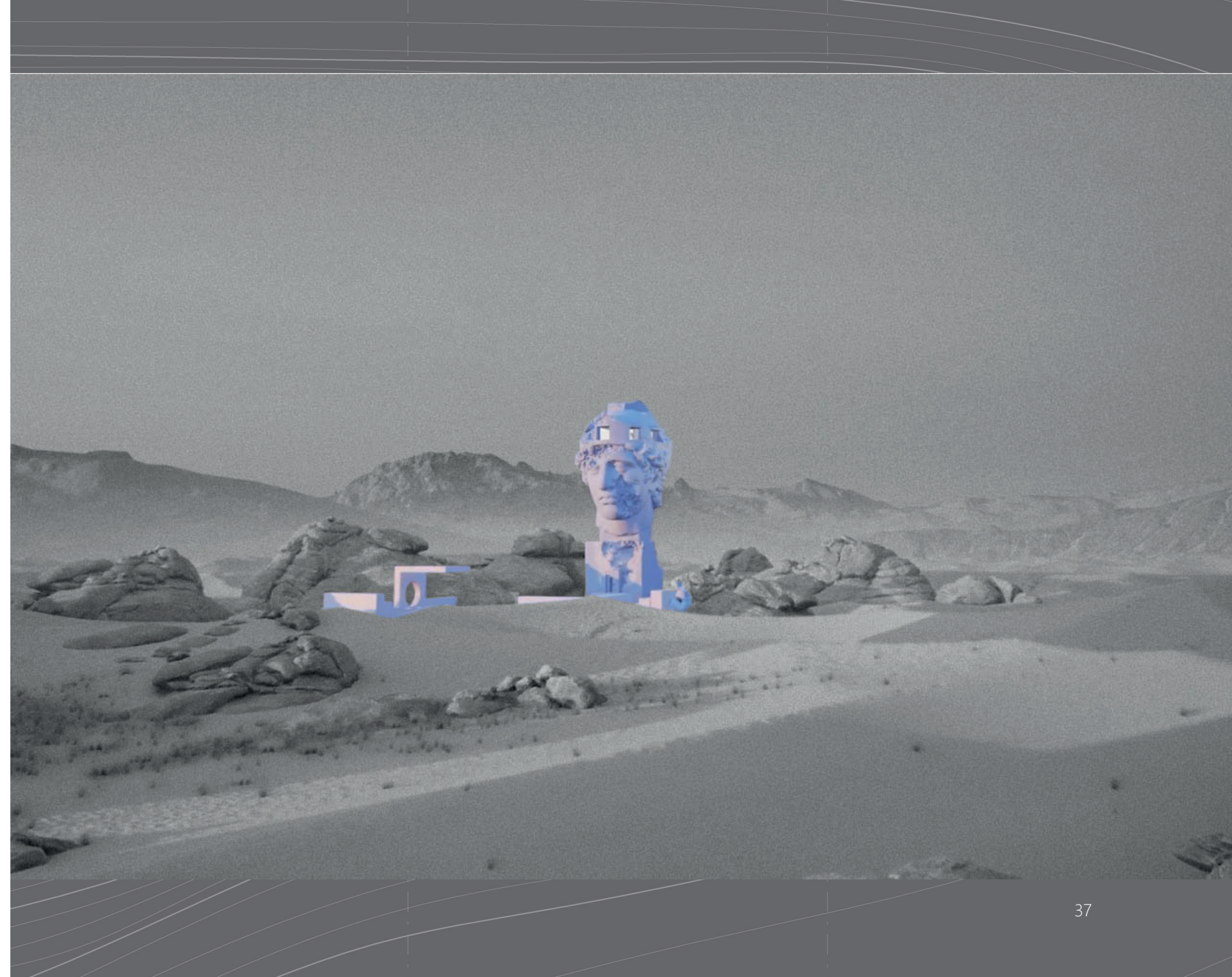
The Ares House is a unique architectural design based on the notion of fictional archeology. The structure looks like an old artifact from ancient times, it's a huge sculpture of Ares that can be inhabited. An open door leads you to a high-ceiling hall filled with artifacts and ancient greek statues followed by a spiral staircase twisting around a bust. At the end of the stairs, the user can finally experience the living spaces in the head of Ares. Those spaces are arranged in a circular fashion around the spiral staircase and present wide opening to the outside world. Daniel Arsham produced five variants of the Ares House, each with a distinct material: amethyst, quartz, pyrite, and volcanic ash. These materials are designed to make you consider age and time, as well as their architectural applications. The Ares House is not just a one-of-a-kind architectural experience, but also a piece of art intended to provoke contemplation on the link between architecture, time, and history. The usage of various crystal materials and the colossal size of the edifice produce an immersive experience that transfers the visitor to another era.

#VirtualArchitecture#Cryptocurrency #Immersive#Metaverse
#RealEstate#ConceptualArchitecture#CreatedByDesigner



"When creating Ares House [...] I wanted to really push the boundaries on how we perceive and interact with these environments, but yet still retain elements that evoke familiarity." (Arsham, daniel. 2022. daniel arsham + everyrealm translate virtual "ares house" into immersive miami installationDesignboom. <https://www.designboom.com/design/daniel-arsham-ares-house-everyrealm-mona-metaverse-miami-12-06-2022/>)

Daniel Arsham
2022
Virtual design

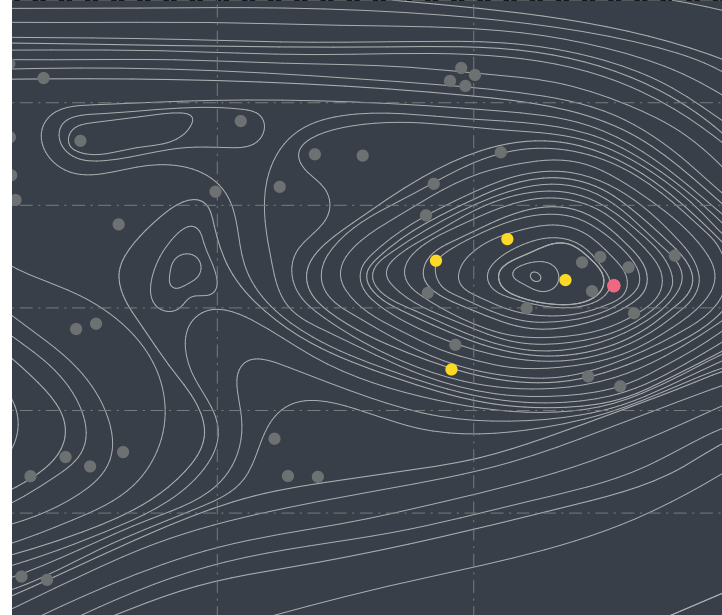




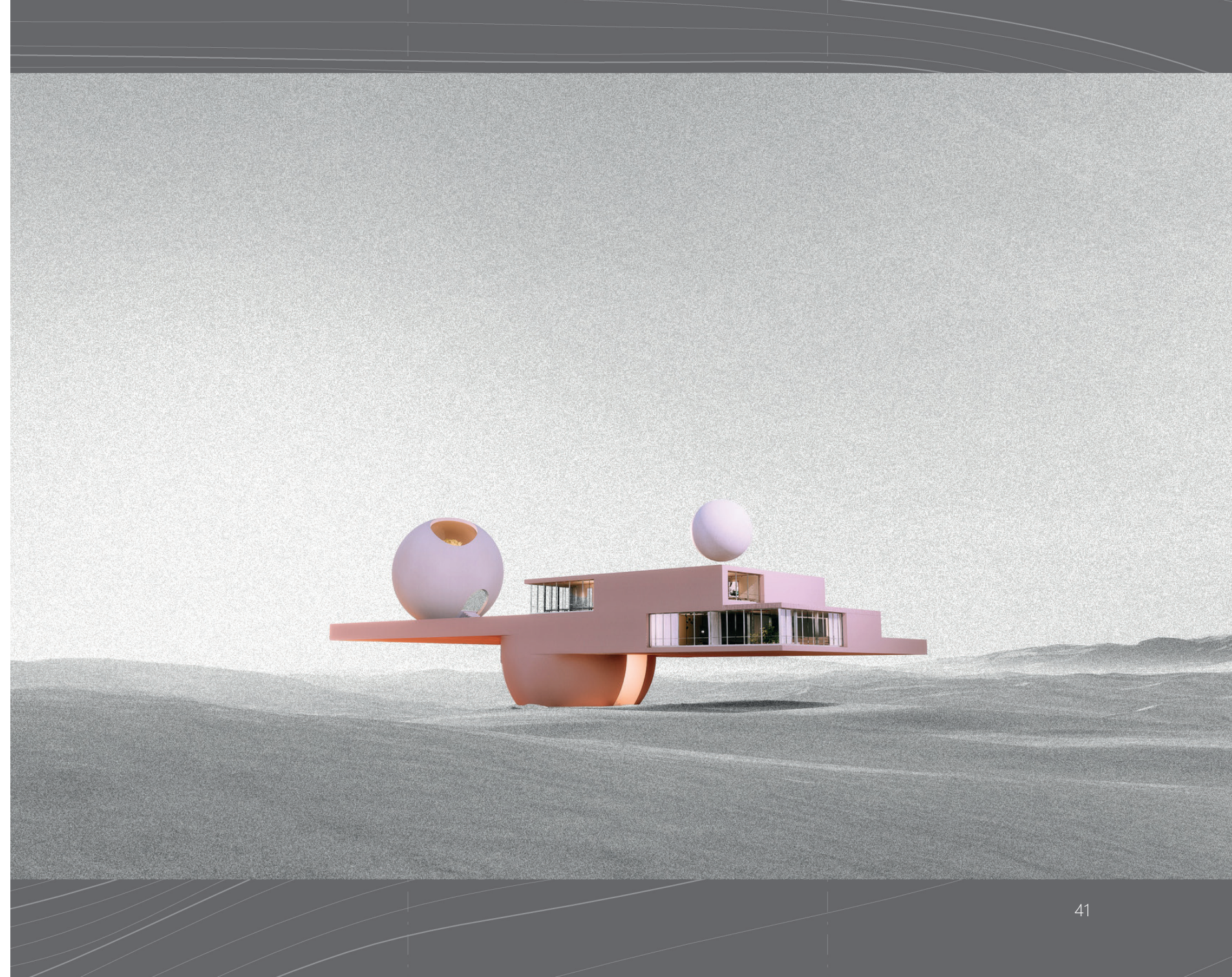
THE MIRAGE

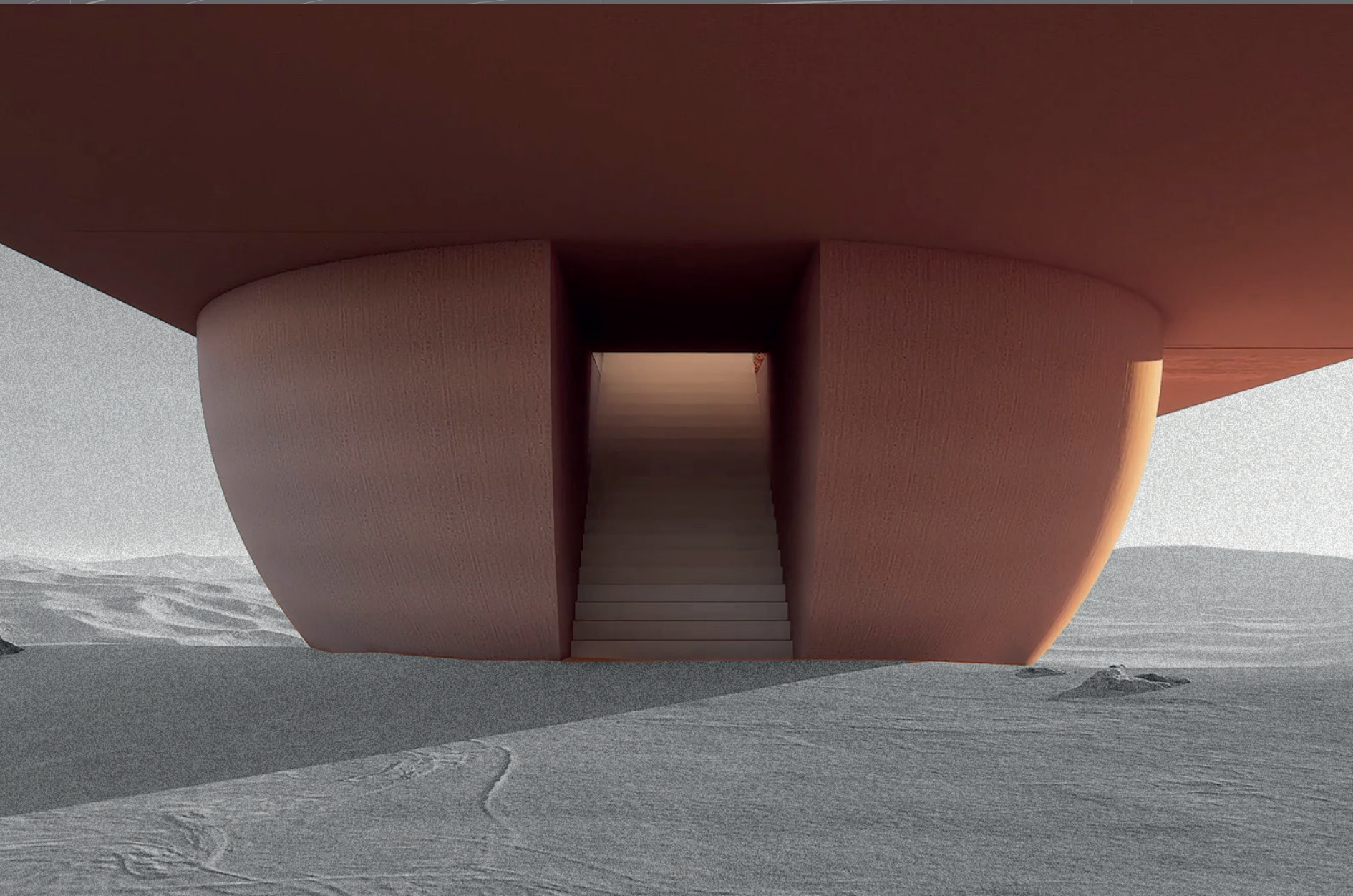
The Mirage aims to offer visitors with a one-of-a-kind experience. The designer defines it as a *personal levitation center* (Christodoulou, 2022). The home was designed to be the first of its sort in the metaverse; it is a cantilevered construction that offers all the classical luxury spaces you'd expect to find in a home such as bathroom, living room and so on... with a small twist, the floating objects. The Mirage's design is based on the paradox of gravity at different times of day. Each edition of the Mirage has a tint that resembles the location of the sun in the sky. This implies that the home will appear to change colors throughout the day, providing visitors with a dynamic and ever-changing experience. The architect of the Mirage encourages everyone to begin their virtual life in this one-of-a-kind facility, since it is designed to be a place unburdened by material concerns. He thinks that by beginning a virtual voyage in the Mirage, individuals will be able to fully grasp the metaverse's possibilities and undergo a spiritual shift into a digital existence. The Mirage is an ambitious project that promises to present visitors with a singular and immersive experience. Those who enter its cantilevered structure, floating globes, and ever-changing hues will have an unforgettable and transforming experience for *one's enjoyment and spiritual transition into a digital existence* (Christodoulou, 2022).

#VirtualArchitecture#Cryptocurrency #Immersive#Metaverse
#RealEstate#ConceptualArchitecture#CreatedByDesigner



Alexis Christodoulou
2022
Virtual design

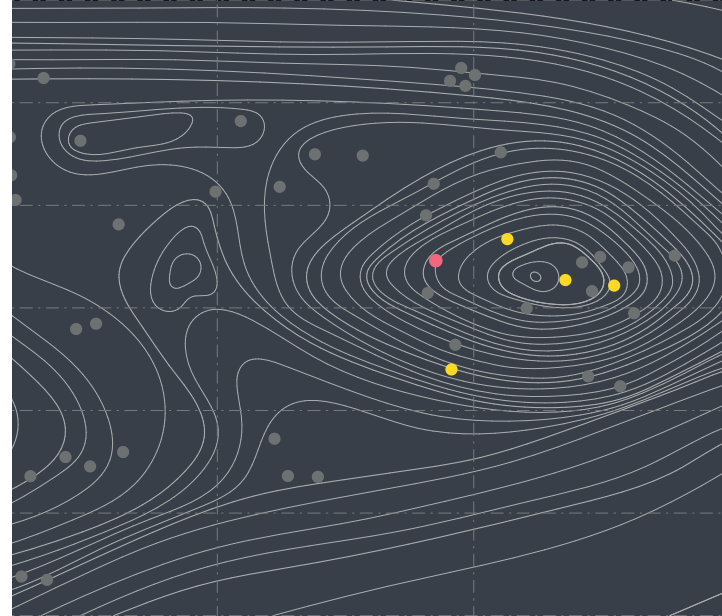




SOLIDS

SOLIDS is a revolutionary initiative that is the first of its type in the realm of generative architecture for the Metaverse. It employs powerful generative processes to develop unique, metaverse-compatible buildings that are suited to the special demands of the metaverse. The project uses over a dozen generative algorithms to construct 8,888 different SOLIDS buildings that are compatible with metaverse platforms, game engines, and modeling software. This form of generative architecture is groundbreaking since it sparks a dialogue concerning the developing role of architects and the possibilities of digital surroundings. It also lends new meaning to the idea of virtual accessibility and security. With the use of generative algorithms, the SOLIDS project is able to generate structures that are optimized for the metaverse, delivering a smooth and immersive experience for users. The SOLIDS project is a clear indicator of the future of architecture, where the use of technology and generative processes will play a key part in the design and construction of structures. It also raises crucial concerns about the role of architects in the digital era, as well as the possibility for virtual accessibility and security in the metaverse. This project is a huge step forward in the field of generative architecture, and it is expected to stimulate greater creativity and exploration in the future.

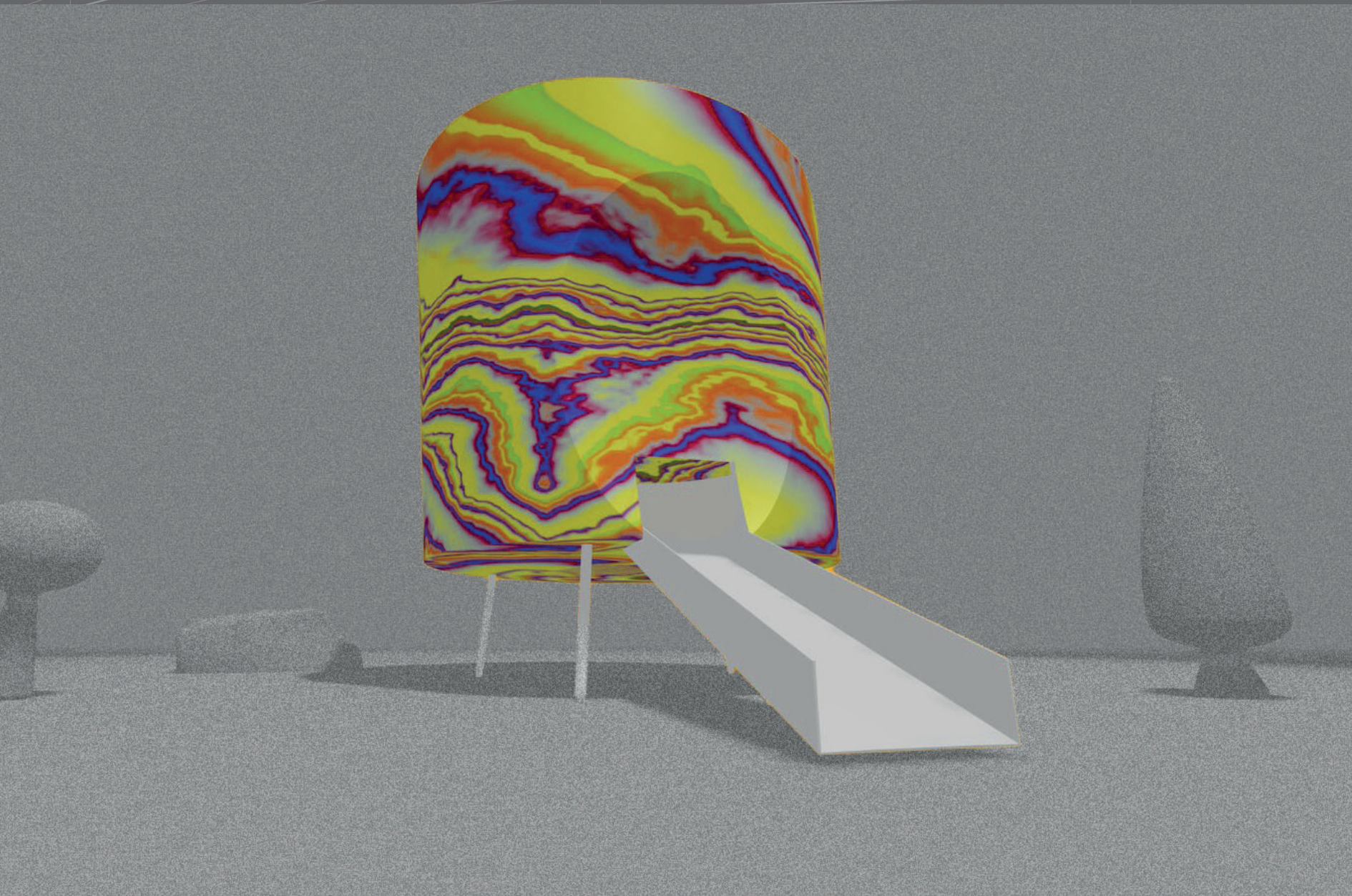
#VirtualArchitecture#Cryptocurrency
#Immersive#AI#Metaverse#CommunitySpaces#Simulation
#RealEstate#ConceptualArchitecture#CreatedByDesigner



"Wearing my Architect hat, I must say that I like that evolution in architecture. I believe that Architecture is never finished - it evolves over time, and that's something we would like to emphasize with SOLIDS, by building tools that allow that to happen." (FAR. 2022. SOLIDS representations Archdaily. <https://www.archdaily.com/990862/i-believe-that-architecture-is-never-finished-in-conversation-with-far-creator-of-the-first-generative-project-for-the-metaverse>.)

FAR
2022
Virtual design





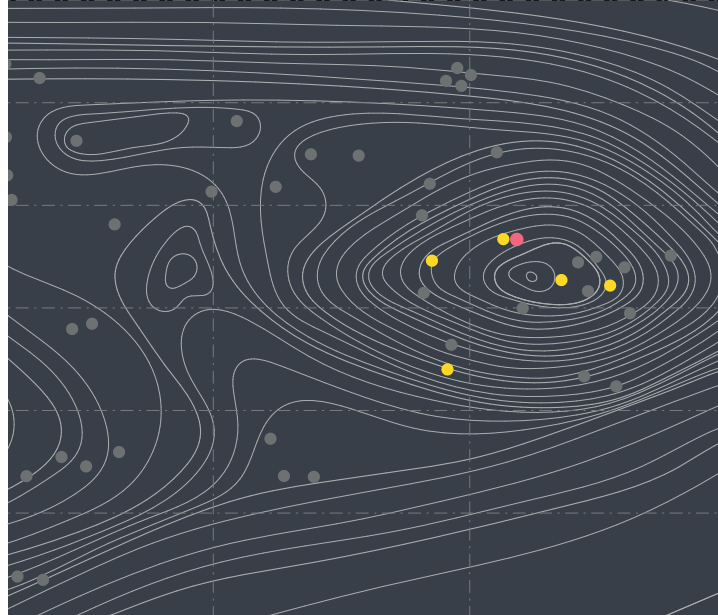
METAMUNDO'S VILLA

The villa is designed for gathering, entertainment, and relaxation. The architect built the structure as an immersive space featuring an NFT gallery, meditation pavilions, and entertainment sections. The architect's objective is to investigate the shifting paradigm of building in the metaverse, and his approach is concentrated not on the form of the final product but on the metaverse-related functions architecture may serve. To design the villa, the architect studied references to architectural history and philosophy in order to design a structure that was both useful and aesthetically beautiful. Users are taken to the villa's main entryway, which is reminiscent of ancient Greek temple columns. The architect drew influence from renowned architects of the past to create this design such as Franck Lloyd Wright and Mies van der Rohe, which lends the building a feeling of grandeur and antiquity. The NFT gallery is a one-of-a-kind feature of the villa, allowing users to see and purchase digital artworks, while the meditation pavilions give a pleasant and tranquil environment for users to rest. The entertainment facilities are intended to accommodate a wide range of activities, including hosting parties and gatherings.

#VirtualArchitecture#Cryptocurrency

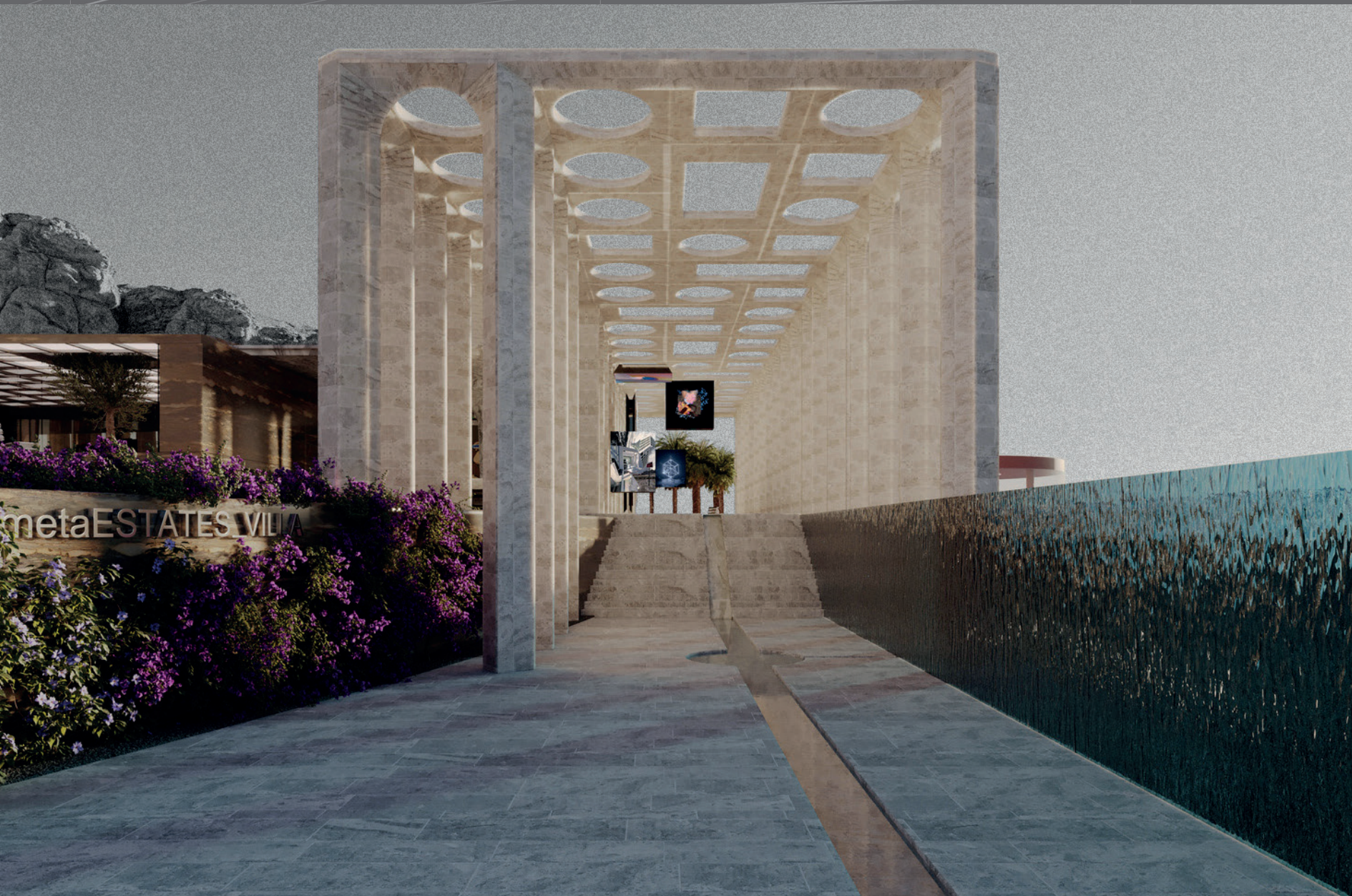
#Immersive #Metaverse#CommunitySpaces#

#RealEstate#ConceptualArchitecture#CreatedByDesigner



"At the end of the day, I think of these spaces, those in the metaverse, as being very similar to set design, as in the set of a theater, or film; they're all telling a story." (Fernandez, Luis. 2022. Villas's viewsArchdaily. <https://www.archdaily.com/988739/metamundos-3d-nft-villa-opens-questions-about-the-function-of-architecture-in-the-metaverse>.)





The metaverse has a thriving real estate market, with some properties fetching up to, after conversion to physical currency, \$500,000¹ (march 2021). Defining what makes them so valuable is difficult since the market lacks a focal point, unlike city centers in the physical world, their worth is mostly based on the user experience these properties will provide. But what exactly are these experiences? From the sample offered in this section, it does not appear that they differ significantly from the physical reality. According to the Influencer MarketingHub’s² response to the question *why acquire virtual real estate?*, these locations are utilized as meditation or showcase areas, but they might also be used for other purposes such as advertisment for brands, content monetizing and so on.

As the laws of physics become obsolete and materials are reduced to surface representations, the sample of case studies seems to divide in two different attitudes that will be analyzed here. The first attitude is to take advantage of the lack of constraints and produce explorable sculptural objects. This attitude is represented by the following case studies: Ares House, The Mirage, and the solids project. On the other hand, the second attitude seems to reproduce the recognizable shapes and form of the physical reality, those case studies are Winter House and Metamundo’s villa.

From an architectural standpoint, they raise questions about the concepts of virtual housing and what those spaces are intended for. Altogether, they study the relationship we have with our housing structures. The interest in the first approach is that architectural concepts

¹ (Parkes 2021)

² (Mileva 2022)

can be explored in ways concretely impossible in the physical world as the matters of physical feasibility and building standards can be removed out of the equation. What it means for our practice as architects? I believe that the ideas of space and what emotions are generated in said spaces can be explored without being hindered by pragmatic decisions. And while I think that those decisions are drivers in our physical designs as they frame the limits of our intervention, the idea of pure creation is appealing. Arguably, a metaverse house doesn’t need a bathroom, dining room or even a bedroom, but it seems that, at the exception of SOLIDS, all of the case studies offer these spaces. Why is that? According to Daniel Harsham (Ares House, p.36), the goal is to keep a sense of familiarity for the owner which leads us to the second approach.

As we can see from Luis Fernandez work in the *Mettamundo’s villa* or *Winter House*, the virtual house acts as a showcasing space for its owner, it becomes a mirror of the physical world. This approach offers another look on what our physical reality could be. It allows to explore different ideas, different territories that could lead to physical applications. Overall, both approaches seem promising but, apart from *SOLIDS*, all of these projects seem to be too focused on producing a trophy house, not unlike the luxury homes you can find in the physical realities. While those houses are more affordable than what you can find in our reality, it would be interesting to explore more “regular” designs and see what they’d look like but as the market and the pool of architect’s lead designs expand, a clearer view on these questions might arise.

DISCUSSION

Virtual Real-Estate

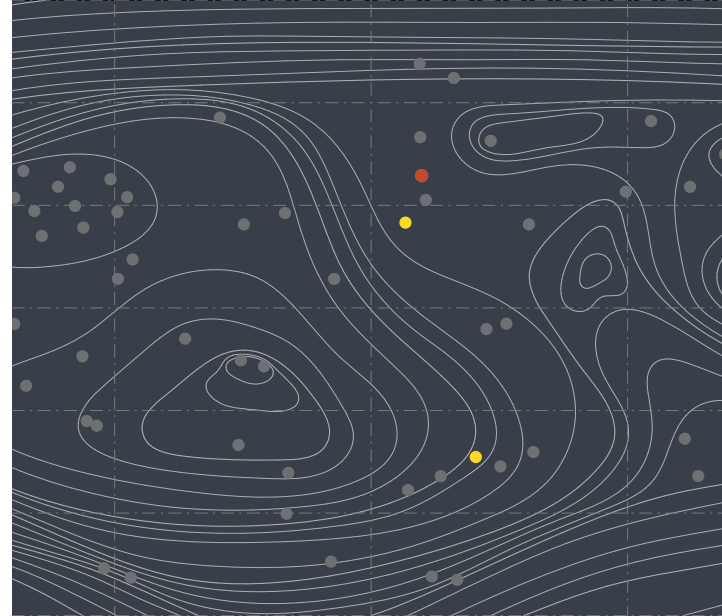
RESEARCH



RENAISSANCE COMPETITION BY MONA

Mona, a metaverse organisation whose mission is to push the frontiers of digital art, launched Renaissance, a digital competition that requested the creation of new virtual worlds. The competition was accessible to participants from all around the world and required them to design their own metaverse based on one or more of the following themes: gathering areas, exhibition spaces, and performance venues. Mona felt that this occasion would inspire other designers to create 3D landscapes for the metaverse, a rapidly expanding parallel digital environment. The competition was open for submissions from October 2021 to February 2022, and competitors from all around the world submitted a great number of entries. In March of 2022, the three winning concepts were unveiled: *Andromeda Arena*, *MEGA FORUM*, and *Neon City Street*. Andromeda Arena is a virtual venue meant for large-scale gatherings, such as concerts and sporting events. *MEGA FORUM* is a virtual exhibition place intended to display digital art and other digital material. *Neon City Street* is a virtual venue for live events and other interactive activities. Overall, the Renaissance competition was a resounding success, and has inspired a large number of designers to create virtual environments for the metaverse. The three winning projects which are shown in the atlas in order are only a small example of the numerous virtual worlds that were produced as a consequence of the competition.

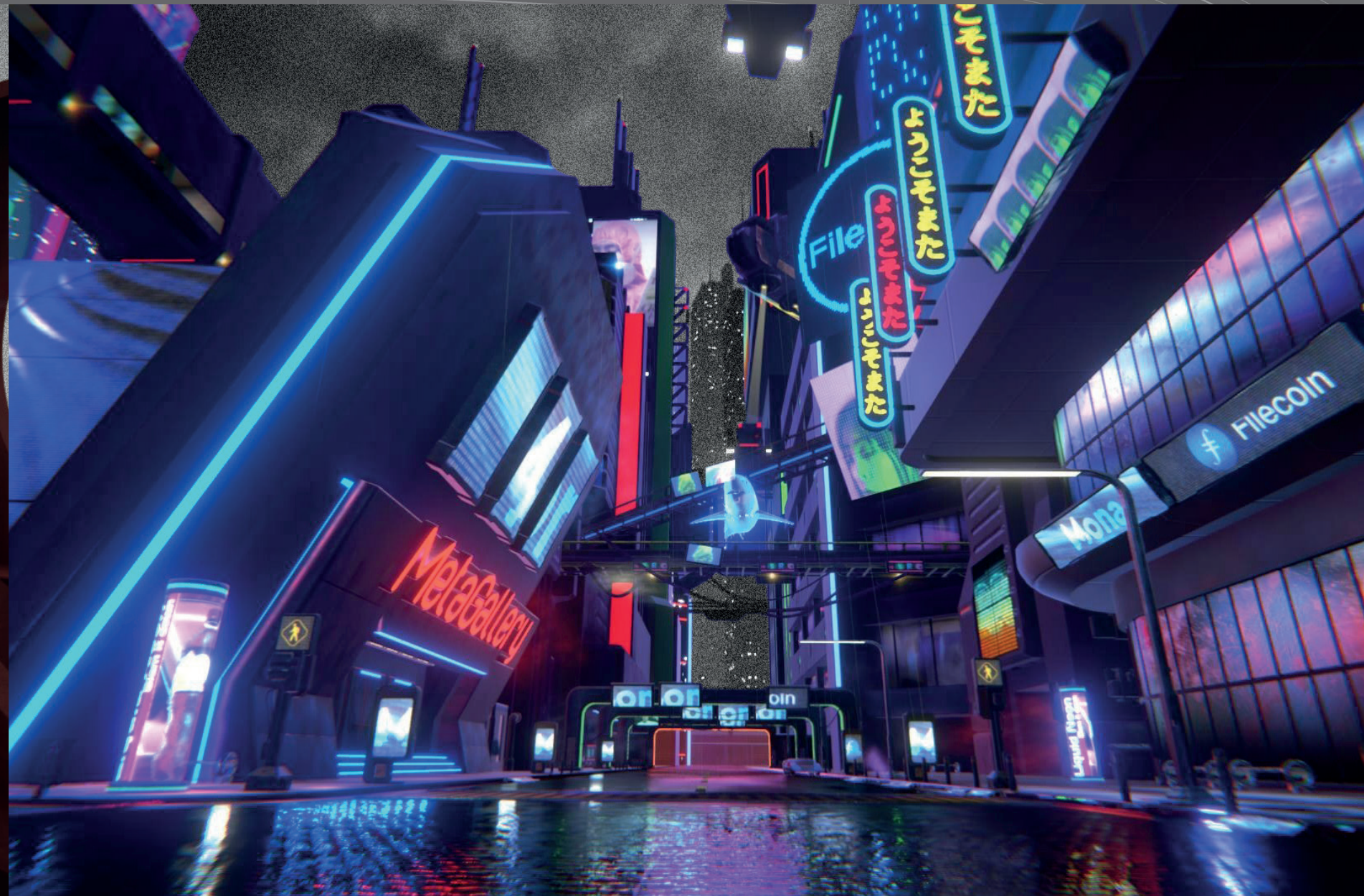
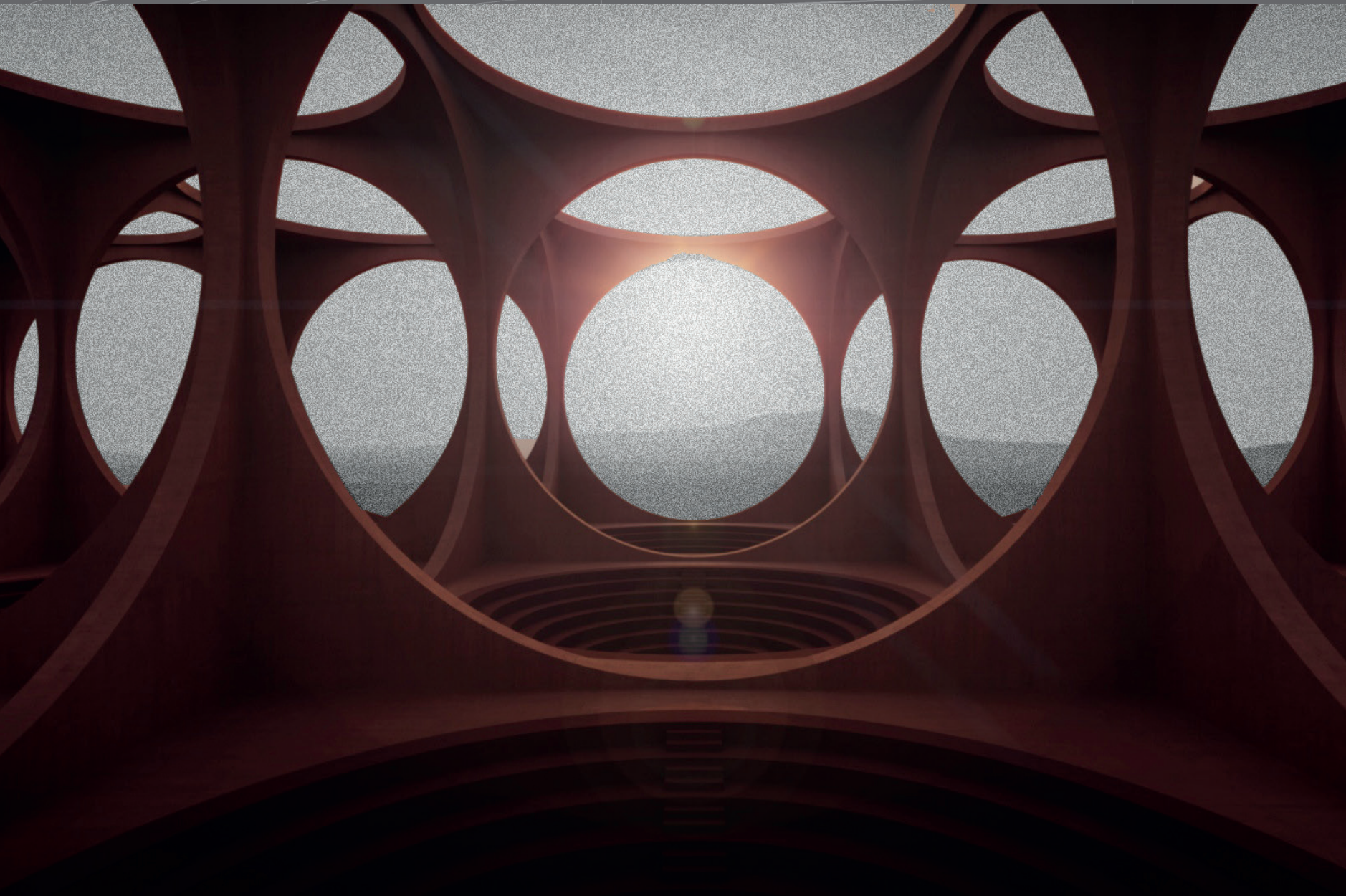
#VirtualArchitecture#Immersive
#Metaverse#CommunitySpaces#OpenAccess
#RealEstate#CreatedByDesigner



"Humanity may soon spend more time in virtual worlds than in the physical world, it is important that these virtual spaces are beautiful and habitable for all" (Hoerl, Matt. 2022. Call for entries to Mona's Renaissance metaverse competitionDezeen. <https://www.dezeen.com/2022/01/10/mona-renaissance-metaverse-competition-design-virtual-reality/>.)

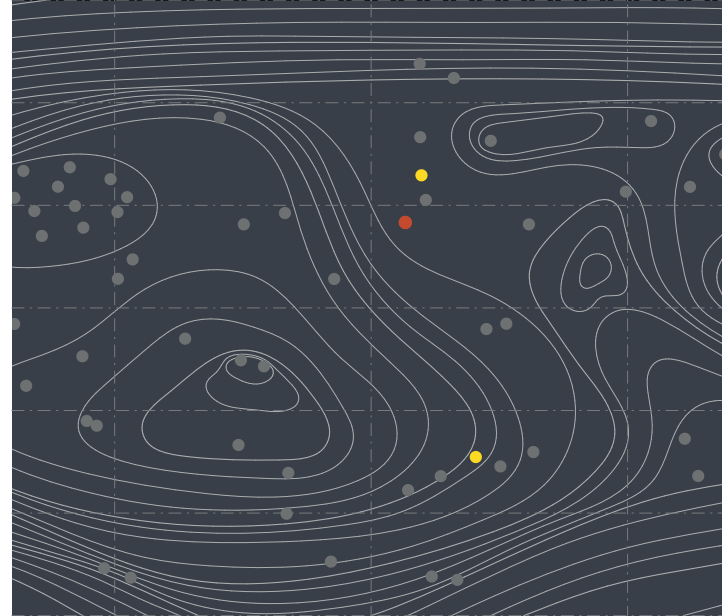
Faraz Mobin, Zumo, NeonGlitch86
& 78Special
2022
Virtual design





STEAMPUNK PAVILLION

Steampunk is an inventive and one-of-a-kind pavilion designed in Estonia for the 5th Tallinn Architecture Biennale. A group of architects and engineers, including Gwyllim Jahn, Cameron Newnham, Soomeen Hahm, Igor Pantic, and Format Engineers, created the pavilion. The construction was built by using steam-bent hardwood and archaic hand tools, as well as clever holographic guidance for additional precision. No technical drawing was done. The use of holographic overlays in the production process enabled fabricators to create very complicated and elaborate items by merely following the holographic guidance. This emancipation of digital expression from the limitations of conventional digital manufacturing processes was the driving factor behind the pavilion's architectural effects. The Steampunk remained in place until the next edition of the Biennale in 2021, demonstrating the possibilities of this innovative method to architectural design and production.



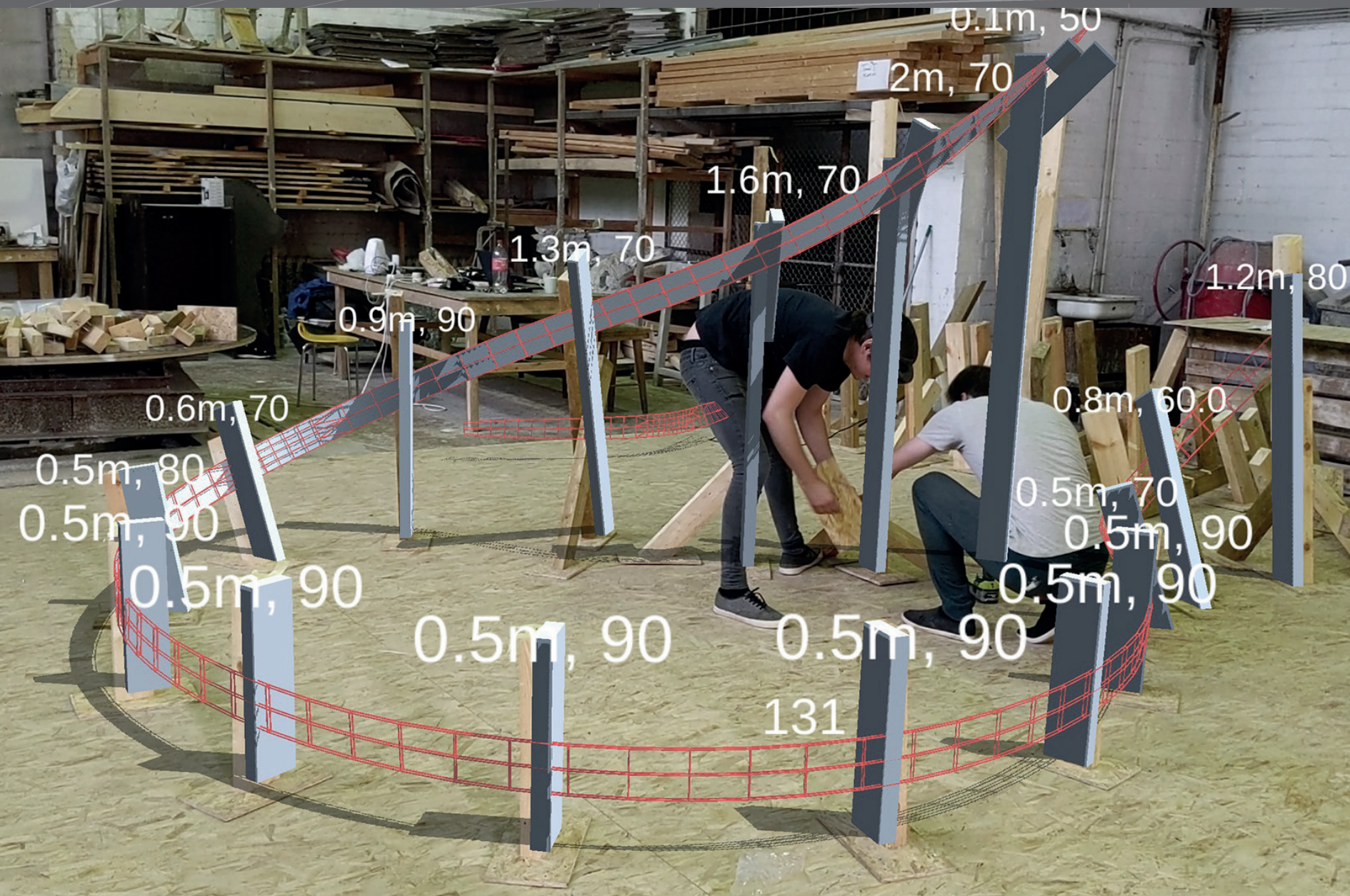
"An architectural project is indeed a virtual object. It is all the more virtual that it anticipates not a single built realization but an entire range of them. [...] Whereas the architect used to manipulate static forms, he can now play with geometric flows. Surface and volumes topological deformations acquire a kind of evidence that traditional means of representation did not allow."(Picon 2011, 2)

Fologram, Soomeen Hahm Design
& Format Engineers
2022
Virtual Design



#VirtualArchitecture#UrbanPlanning#Immersive
#Metaverse#CommunitySpaces#OpenAccess
#RealEstate#CreatedByDesigner

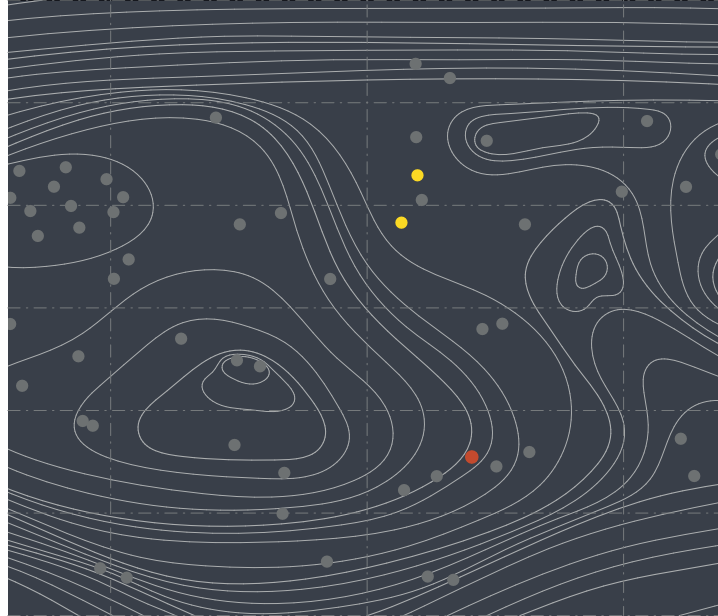




NOOR STUDIO'S VIRTUAL PRACTICE

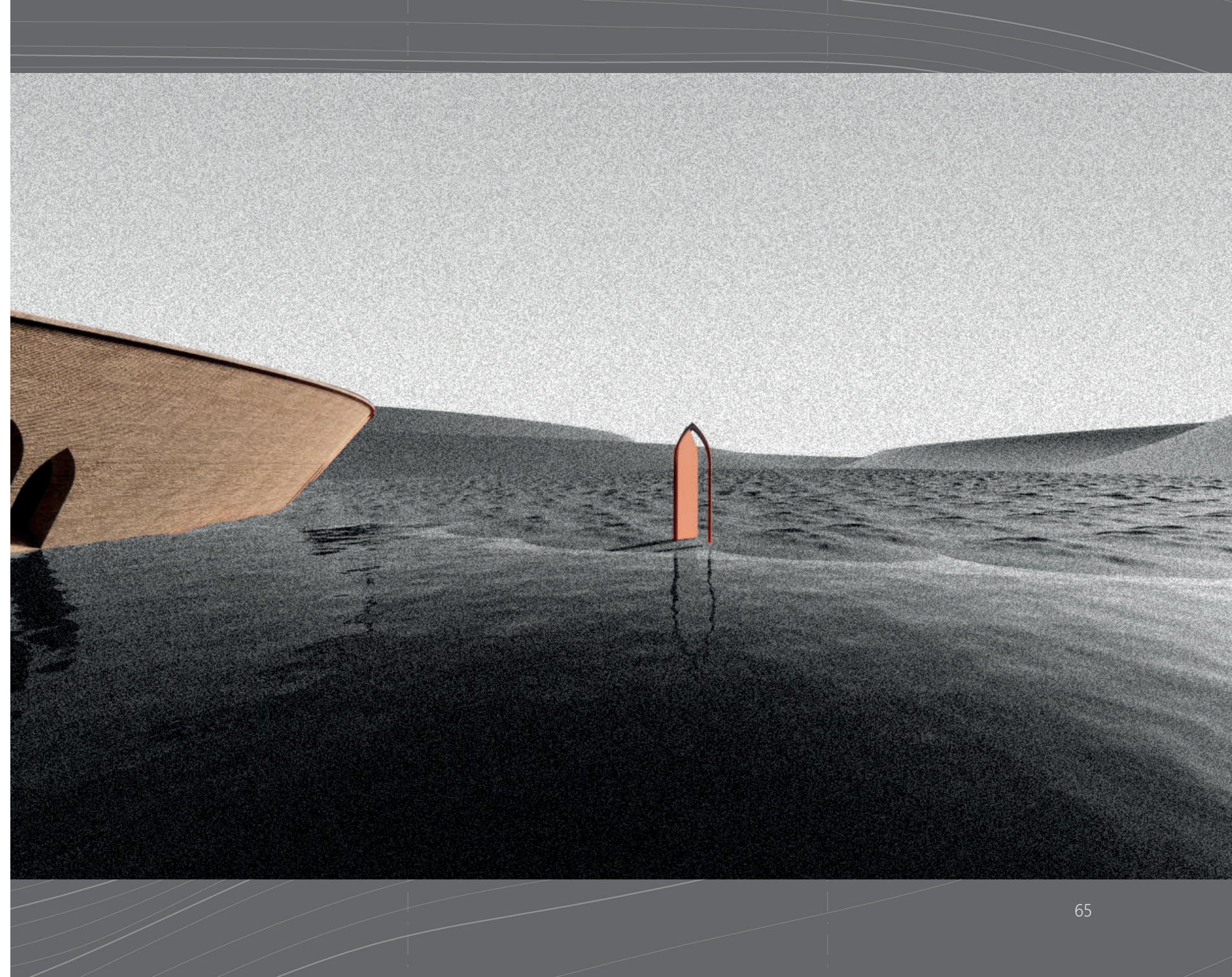
The Chandigarh-based architecture firm has recently joined the virtual realm to investigate new potential for experimentation, inquiry, and the creation of physical solutions. Before accepting customer contracts, the company's first duty was to create a virtual studio to develop its web presence. This virtual studio, showcased in the Atlas acts as an extension of their real studio in Chandigarh and enables them to investigate the metaverse's possibilities. Their virtual office offers a dream-like ambiance with hints of indian vernacular architecture. It offers wide indoor and outdoor spaces conducive to creation. The firm's practice studio in the metaverse is founded on the notion of configurable, ever-changing avatars. The company describes this new approach to architectural design and construction as *post-architectural* (Noor Dasmesh Singh, 2022) which dissolves boundaries with ease and represents the notion that *anything is possible, everything is one* (Noor Dasmesh Singh, 2022). This word emphasizes the firm's commitment to expanding the boundaries of traditional architecture and investigating new opportunities in the virtual domain. Using the metaverse, the company is able to explore new types of design and construction that would be impossible in the actual world but could eventually be applied as construction technologies and methods advance.

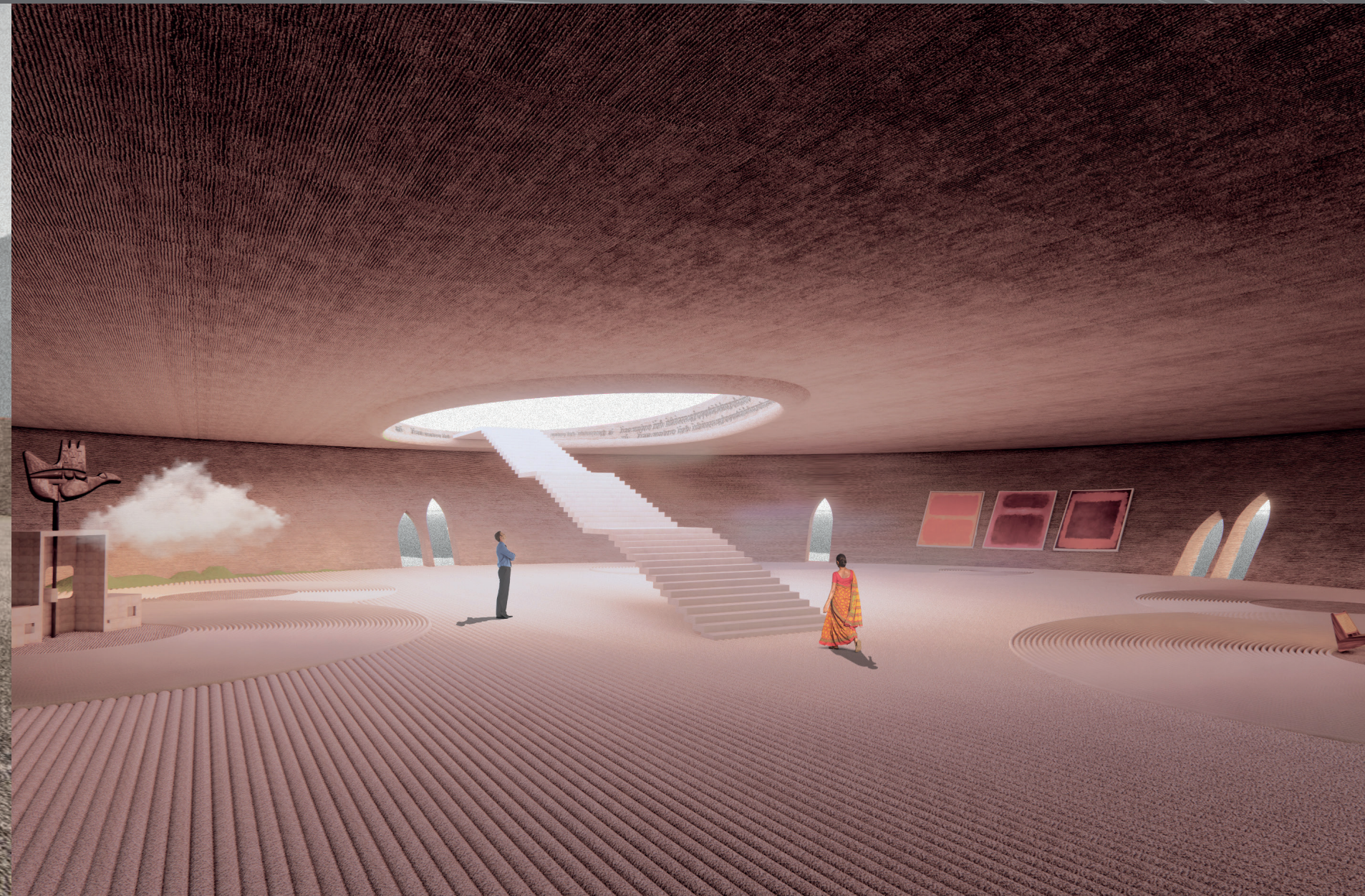
#VirtualArchitecture #Sustainable #Immersive #Metaverse
#CommunitySpaces #OpenAccess #Simulation
#ConceptualArchitecture#CreatedByDesigners



"The metaverse encourages and allows for the creation and compilation of ideas, and [the generation of] a repository, which may not be fully possible in material reality as of now but is likely to push the boundaries of design and building construction techniques." (Singh, Noor Dasmesh. 2022. Noor Architects explores architecture and the metaverseWallpaper. <https://www.wallpaper.com/architecture/noor-architects-in-the-metaverse-india>.)

Noor architects
2022
Virtual Design





This section of the Atlas focuses on the difficulties associated with the study and development of virtual reality solutions in architecture. It was the hardest to sample, my conjecture is that probably due to the fact that the majority of study publications in this field are aimed at academics and emphasize hard data rather than the aesthetically pleasing renderings of architecture representation. However, this portion is deemed essential for the creation of metaverse architecture.

Mona created the Renaissance competition to inspire more architects and digital artists to devote their time and ideas in the metaverse. The objective of the competition was to encourage the construction and exploration of virtual worlds that may be inhabited and experienced. In contrast to the majority of other case studies, all virtual worlds developed as part of the competition were issued as NFTs, with the artists retaining full ownership of their works.

Through the deployment of XR technology, SteamPunk Pavillion emphasizes the potential of virtual reality for architectural, engineering, and construction endeavors. During both the planning and execution phases, these technologies permit the blending of virtual and actual environments. As described in the following Archdaily article, this means that virtual worlds of the metaverse may be blended into our physical reality.

“The digital world can be brought into our urban life very intuitively through AR, which becomes a medium for interaction between virtual and reality. The infinite nature of AR space allows people to interact with the virtual world through the real world, changing the demand for public space and making urban space design more complex.”¹

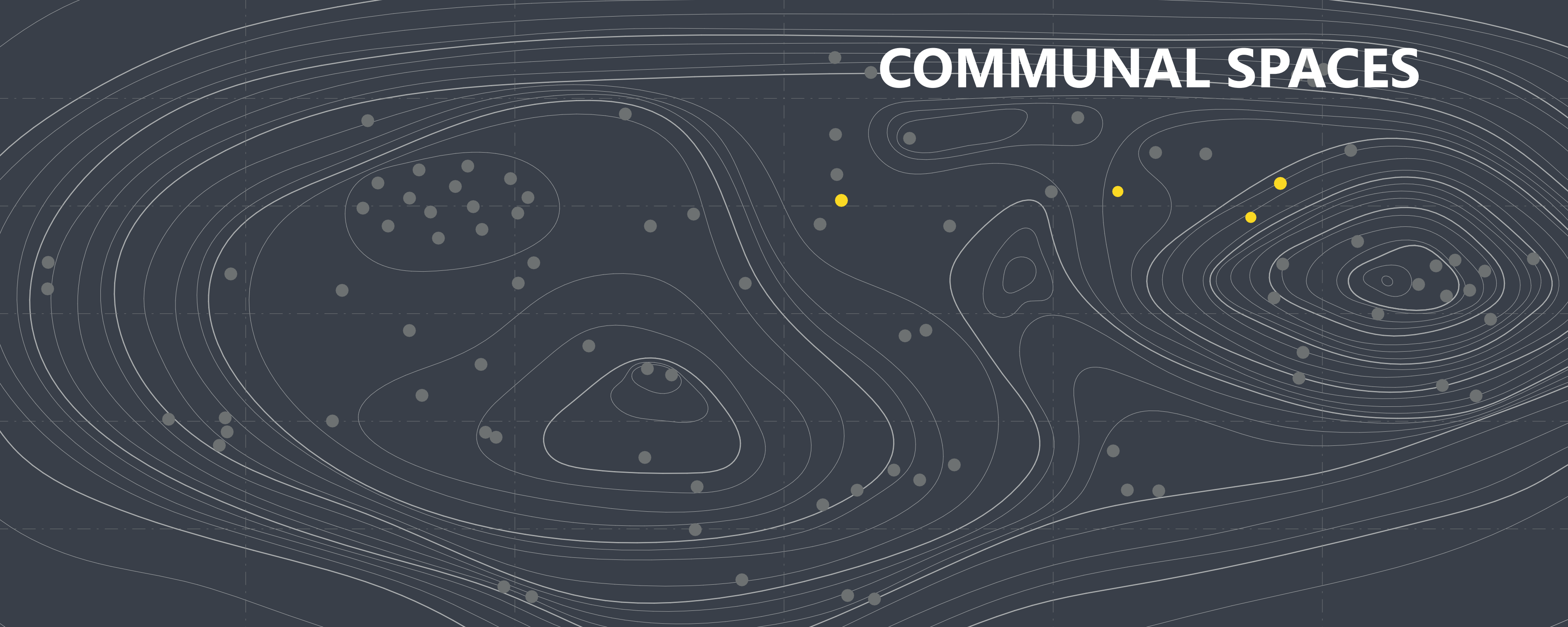
¹ (Hou 2022)

The last case study is important because it demonstrates how exploring and experimenting with building in the metaverse may inspire new design concepts and push architectural design to its limits. By working in the virtual domain, architects and designers are not constrained by the restrictions of physical reality, allowing them to explore new ideas and stimulate thought about the challenges in the actual world. This case study indicates that the metaverse has the potential to act as a testing ground for new and novel architectural concepts, ultimately leading to improvements in the built environment because when individuals view metaverse architecture as an extension of the real world, their perspectives and expectations change. As thoughts and designs created in the metaverse are transferred into physical reality, this shift in viewpoint can result in a revolution in the actual world.

DISCUSSION

Research

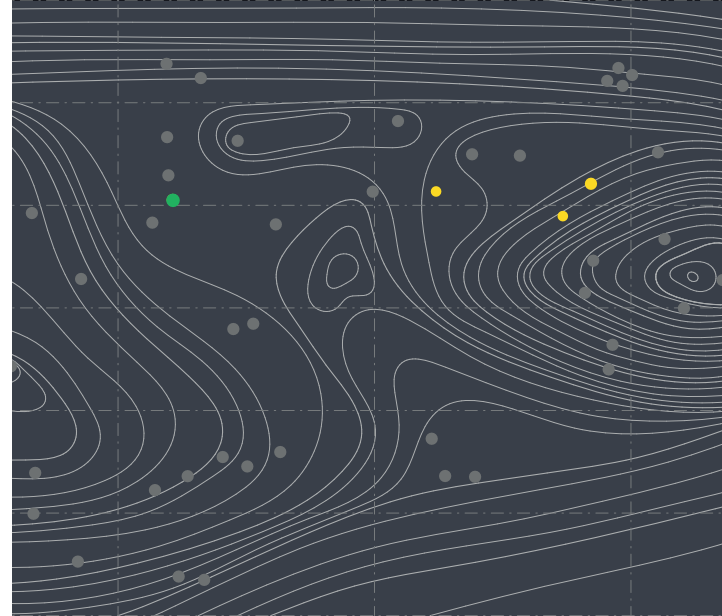
COMMUNAL SPACES

The image features a dark blue background with a grid of dashed white lines. Overlaid on this are several sets of white contour lines, which are more densely packed in some areas (like the bottom right) and more spread out in others (like the top left). Scattered across the map are numerous small circular data points. Most of these points are a light gray color. There are four distinct points that are bright yellow, located in the upper-middle and upper-right portions of the image. The overall aesthetic is clean, modern, and data-driven.

CUERVO METADISTILLERY

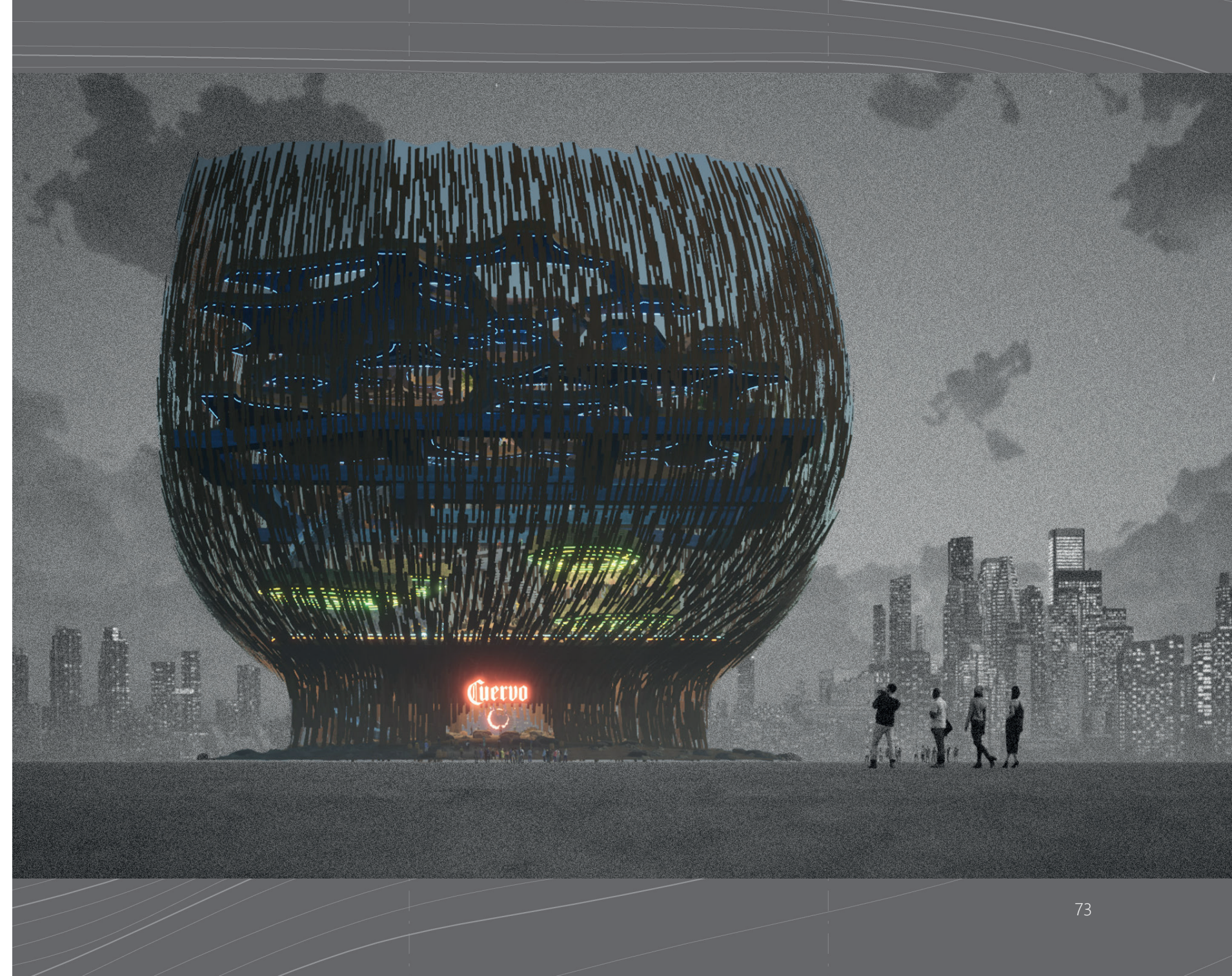
The Jose Cuervo Metadistillery is an unusual experience center developed by architects Rojkind and Bompas & Parr. The facility is a gigantic virtual building built on the agave plant's roots, which are essential to the manufacture of tequila. The structure is intended to urge people to engage with the business in ways that are physically impossible. The exterior of the structure is comprised of a curving agave-fiber facade that lets light slip in, while the inside is made up of floating platforms hosting various activity and social interactions. The building's architecture is designed to physically convey the brand's identity and values and provide visitors with an immersive experience. Bompas & Parr have designed a number of gaming challenges for clients to complete as they walk across the building. These activities are intended to further educate visitors about the brand and the tequila-making process. The Metadistillery is a creative and novel approach for customers to engage with the brand and learn more about the tequila-making process.

#VirtualArchitecture #Immersive #Metaverse
#CommunitySpaces #OpenAccess
#ConceptualArchitecture#CreatedByDesigners



"We are always seeking to create architecture that questions and responds to current events, Jose Cuervo's Metadistillery is no exception, we want to understand the enormous potential that design represents in digital environments."(Rojkind Arquitectos 2022)

Rojkind Arquitectos, Bompas & Parr
2022
Virtual Design

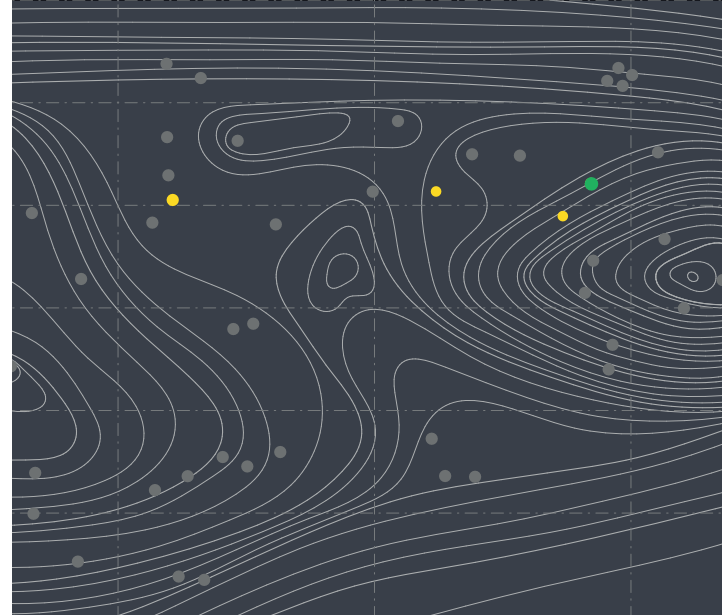




THE MEETING PLACE

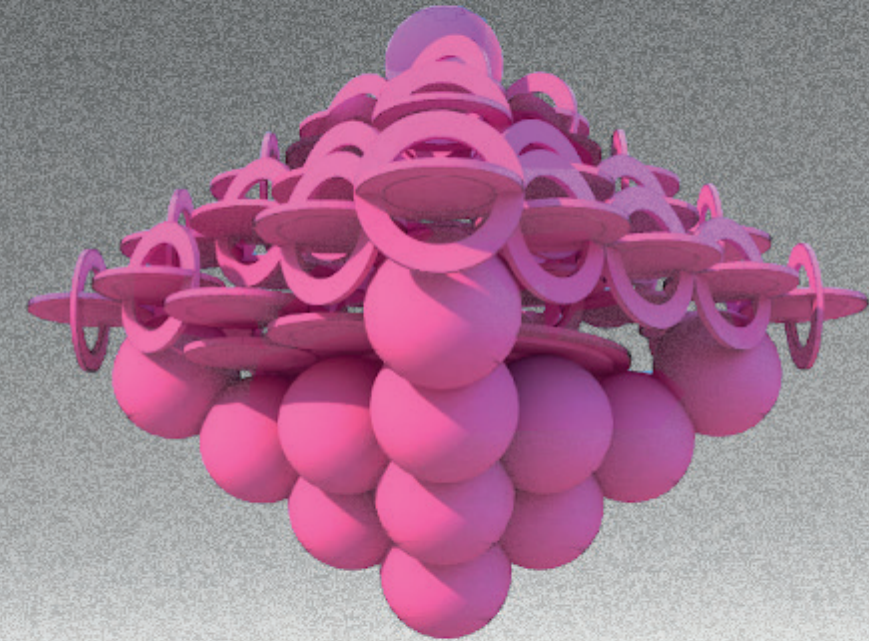
The Meeting Place is an innovative, immersive NFT based on the premise that social interactions are the genesis of some of humanity's most astounding inventions. It is the first NFT developed from the bottom up to be experienced and explored in virtual reality, with an emphasis on aesthetics. The designers sell it as a adaptable space that serves as a case study for the subsequent generation of digital social engagements and as a portal to new prospects for environmental artists and designers. The pink-colored, and devoid of structures, spaces offer a a casual experience punctuated with social encounters on the floating platforms. The Meeting Place aspires to inspire people and society as a whole by creating a more social digital experience. The designers think that a more inspired society will result in a more prosperous human race. The adjustable and immersive rooms offers a venue for social interactions and partnerships, which may lead to the exchange of ideas and the creation of novel initiatives. The Meeting Place is an illustration of how virtual reality and NFT technology may be utilized to facilitate social interactions and encourage innovation.

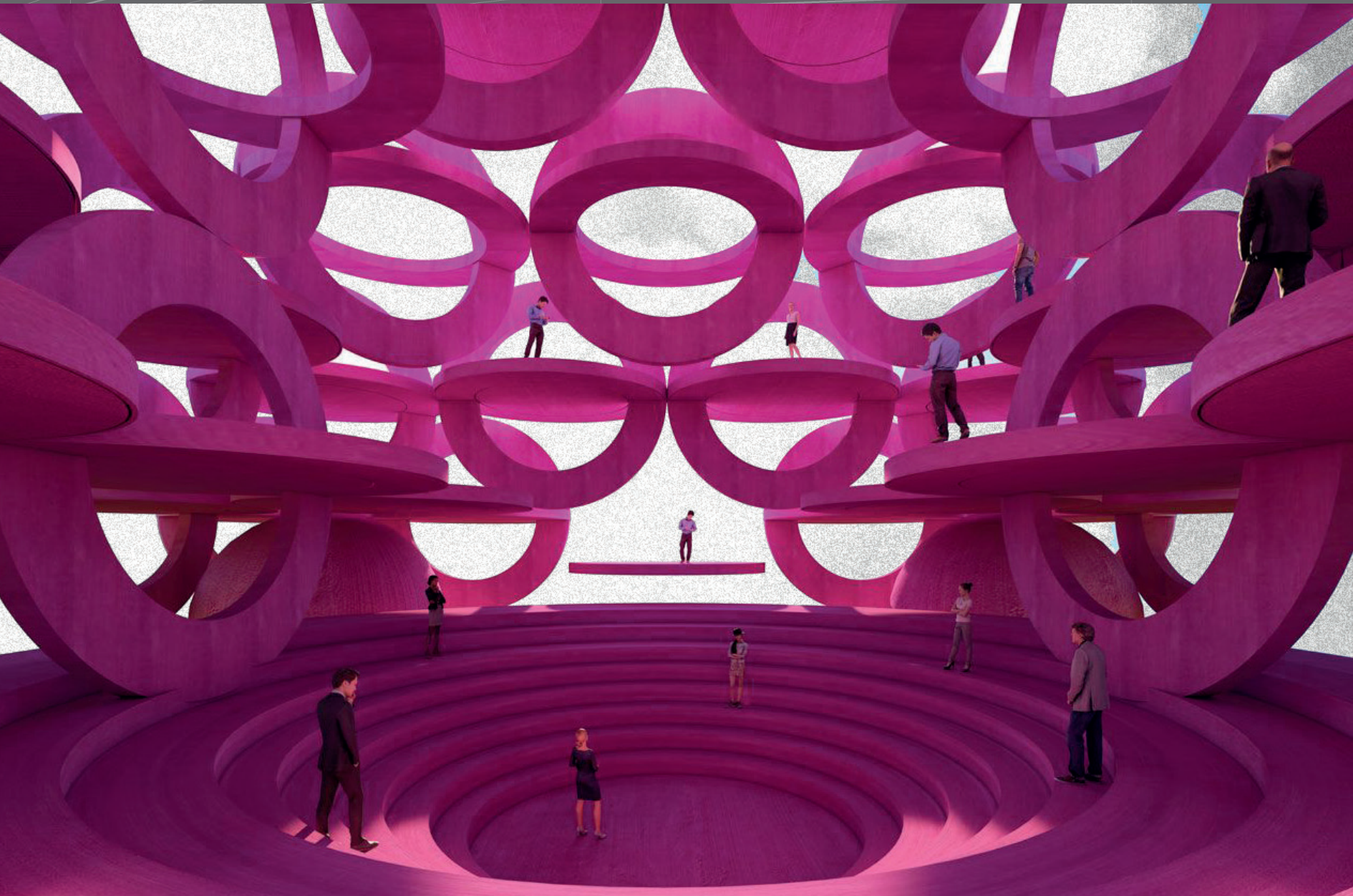
#VirtualArchitecture #Cryptocurrency #Immersive #Metaverse
#CommunitySpaces #RealEstate #BusinessOrientSpaces
#ConceptualArchitecture #CreatedByDesigners



"As our realities become increasingly virtual, the importance of the quality of our digital environments will come into focus. Unrestrained by physics and limited only by our imaginations, our virtual spaces have the potential to inspire, challenge, and even love us." (Kim 2022)

Cyril Lancelin, Benny Or
2022
Virtual Design

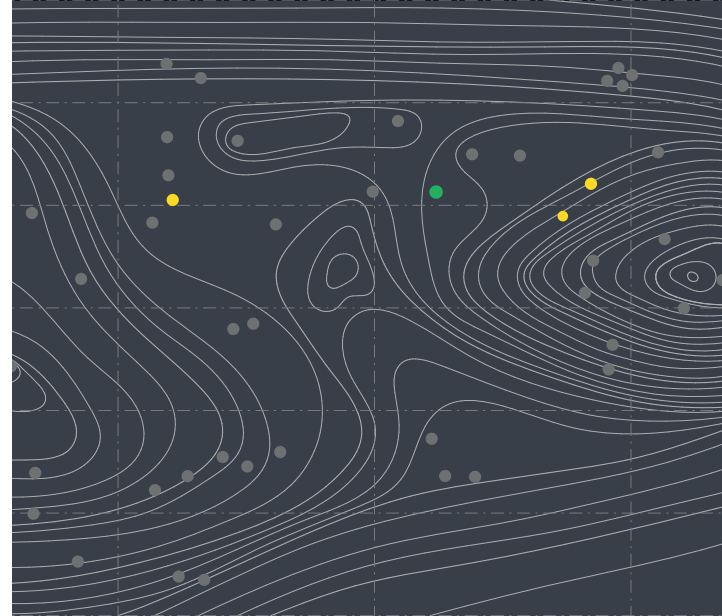




LIBERLAND

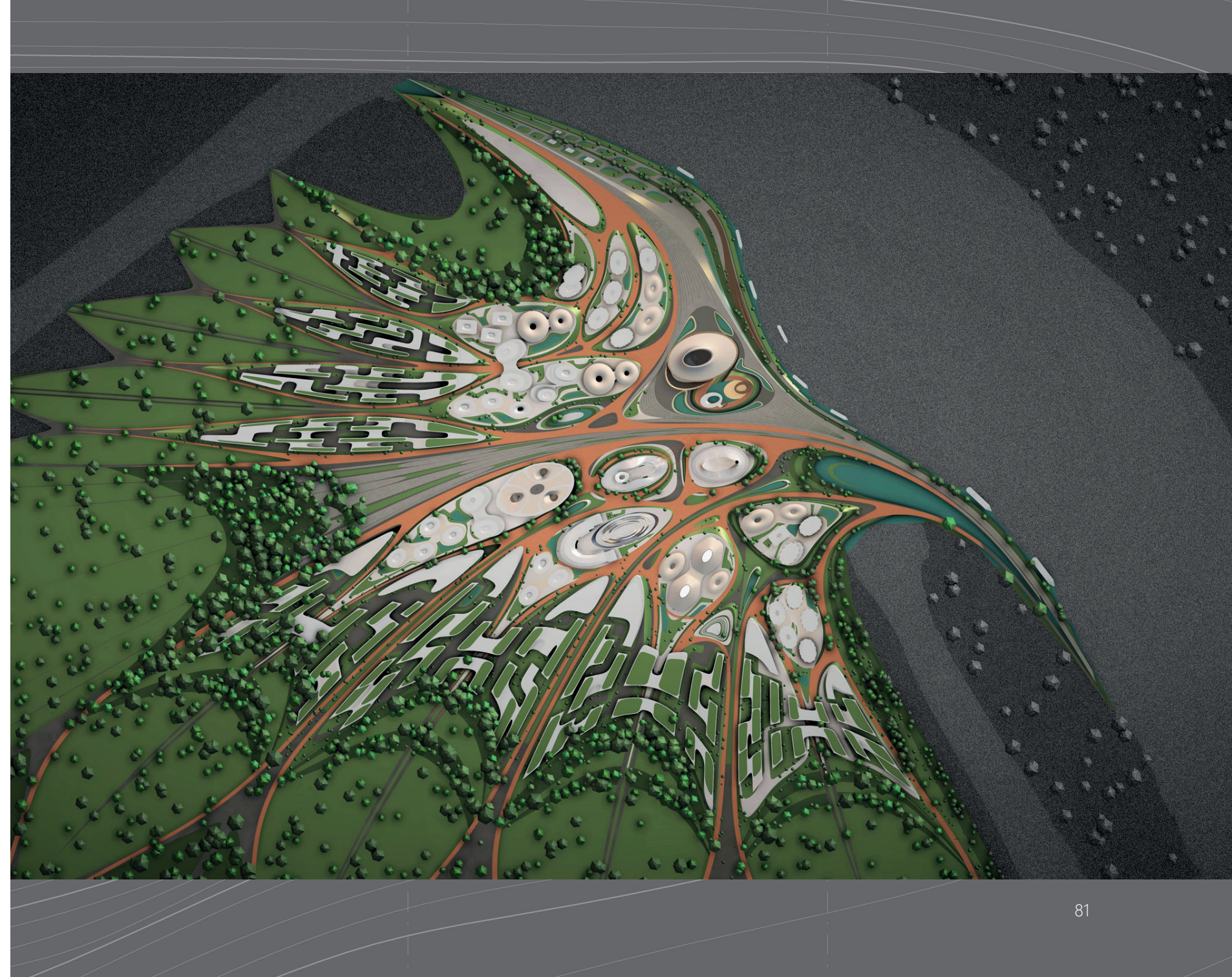
The ambitious Liberland Metaverse project is a virtual city in the metaverse that allows users to purchase land parcels with cryptocurrencies and visit digital buildings as an avatar. The virtual city includes city hall, a plaza, and an exhibition center, all designed by Zaha Hadid Architects. As there are no urban planning restrictions in virtual places, the team behind the project hopes the metaverse will serve as a stimulus for parametric design. The virtual city, entitled Liberland Metaverse, is based on the micronation of the Free Republic of Liberland, which was claimed by a Czech politician and borders the contested region between Croatia and Serbia. The project seeks to create a platform for individuals to explore and experience a parametrically built virtual metropolis, with the intention of delivering an innovative and immersive experience that can be accessed and explored via bitcoin, allowing business opportunities and networking to flourish. At the exception of the parcels, little to no urban planning is made, the architects expect the micronation to work as a self governing structure. The project is an interesting illustration of how virtual reality and NFT technology may be combined to generate new and creative urban design and development platforms.

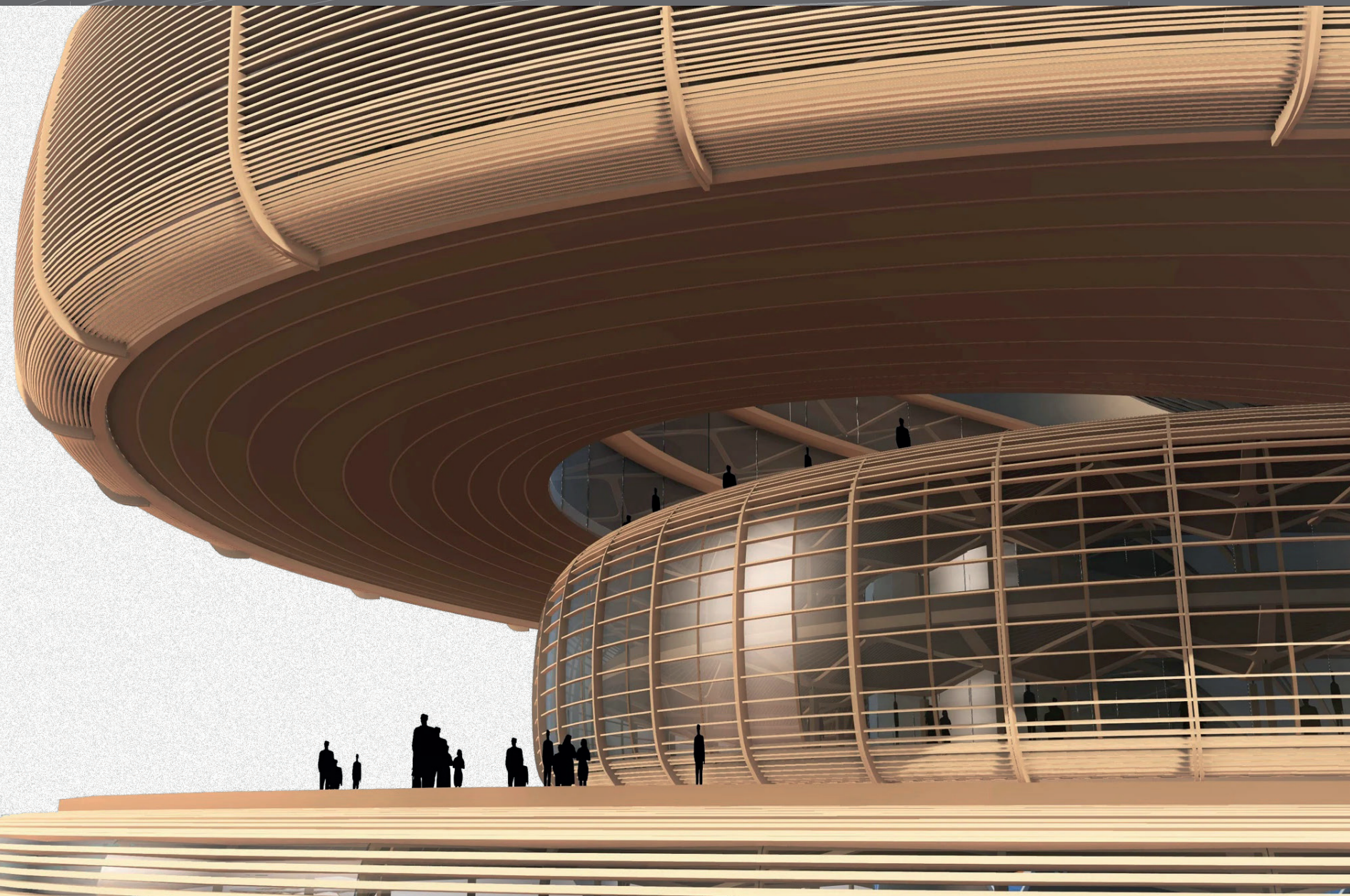
#VirtualArchitecture #Cryptocurrency #UrbanPlanning
#Immersive #Metaverse #CommunitySpaces #OpenAccess
#RealEstate #BusinessOrientSpaces #ConceptualArchitecture
#CreatedByDesigners



"The ambition is for it to become the go-to site for networking and collaboration within the burgeoning web 3.0 industry, its the metaverse for metaverse developers and the crypto ecosystem at large" Schumacher, (Patrik. 2022. Liberland viewDezeen. <https://www.dezeen.com/2022/03/11/liberland-metaverse-city-zaha-hadid-architects/>)

Zaha Hadid Architects
2022
Virtual Design

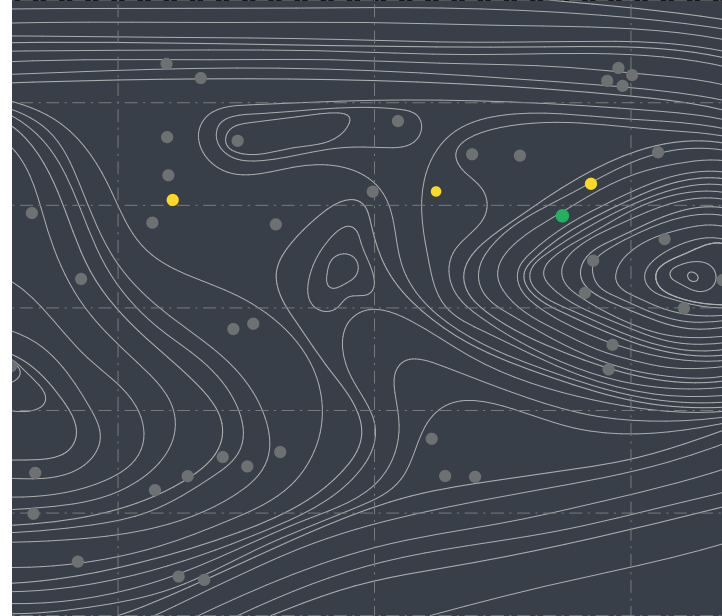




BABEL 4.0

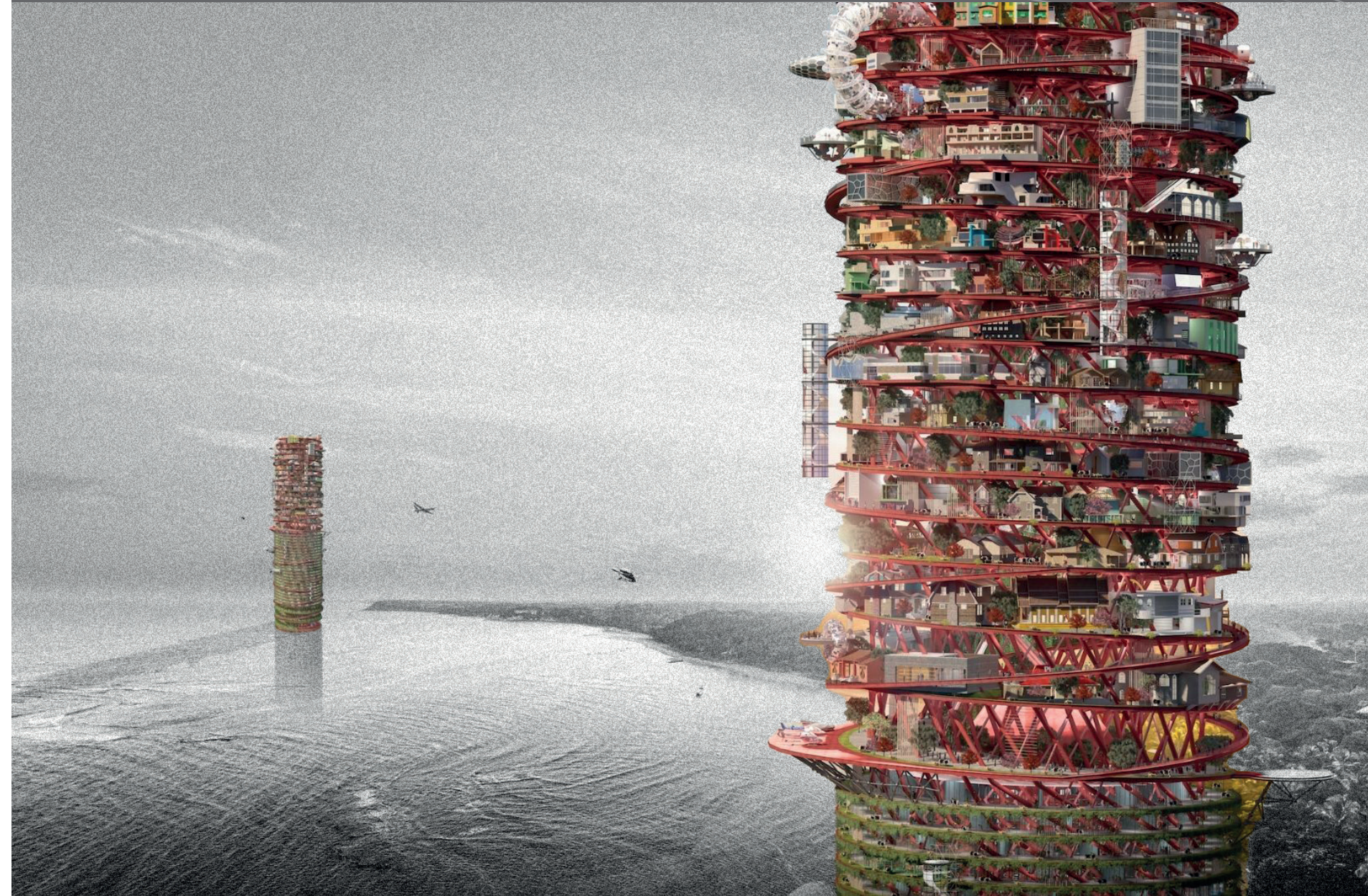
The digital city project's creators view it as a blank canvas for cultural exchange, an inclusive, helix-shaped metaverse that links numerous digital communities. Hailed as the first metaverse project coming from the middle-East, the goal of the project is to bring together a wide spectrum of talent, including gamers, hardware developers, coders, VFX specialists, and storytellers, in an architectural environment free of physical context or ties to a particular location, culture, or people. Visitors to the digital city will be able to use their NFTs to enter virtual cultural institutions and museums. They will also be able to determine the length of their stay and interact with members of the digital communities. The city's helix-shaped tower looks like a clutter, a patchwork of different objects. Its layout enables visitors to move across several levels, offering a feeling of depth and layering to the experience and allowing them to explore different sections of the city at their own speed. The designers think that this design will encourage a feeling of community and inclusiveness, making the digital city a place where individuals from many origins and cultures may connect.

#VirtualArchitecture #Cryptocurrency #Immersive
#Metaverse #CommunitySpaces #OpenAccess #RealEstate
#BusinessOrientSpaces #ConceptualArchitecture
#CreatedByDesigners



"Interestingly, Babel 4.0 has no owners. This vertical city relies solely on autonomous dialogue and exchange between its members, with the eagerness to express one's heritage and share their knowledge being the pre-requisite."(Dewan-Architects 2022)

Dewan-Architects
2022
Virtual Design





The case studies given in this research have one thing in common: they do not propose alternatives to or provide an escape from our social existence in the physical world. Instead, they propose to enhance it through virtual reality enhancements. As these public spaces in the metaverse become an inherent and vital part of social production and societal reproduction, they are gaining appeal as a way for individuals to interact and cooperate in ways that are not possible in the real world. The Jose Cuervo Metadistillery, The Meeting Place, and the Liberland Metaverse are examples of how virtual reality can be used to create immersive and interactive experiences that connect people to companies, art, and culture.

These community places in the metaverse are intended to be adaptable and inclusive to foster social interactions and collaboration, which are the foundation of human creativity. This is also reflected in the structure and layout of these places, with everything appearing to lead consumers towards the interior where the interactions happen. It may be inferred from these case studies that communal spaces of the metaverse are more important than virtual real estate in developing solid foundations for virtual reality.

While many platforms offer such spaces, what distinguishes these case studies from other metaverse platforms or open-world videogames? Well, the latter are essentially primarily open-world multiplayer games with added in-game economic operations and as such, they are built on narratives developped by those plateforms. On the other hand, the locations presented in this Atlas are built on genuine spontaneous social interactions.

In conclusion, social locations in the metaverse have the potential to be idea generators. These locations foster creativity and the exchange of new ideas by providing a forum for individuals to collaborate. In addition, they offer a one-of-a-kind opportunity for individuals from many backgrounds and industries to contribute their ideas and expertise, resulting in more diverse and creative solutions. By providing access to common locations, the metaverse might be a formidable tool for fostering innovation and progress in several disciplines. creative idea generators These locations foster creativity and the exchange of new ideas by providing a forum for individuals to collaborate.

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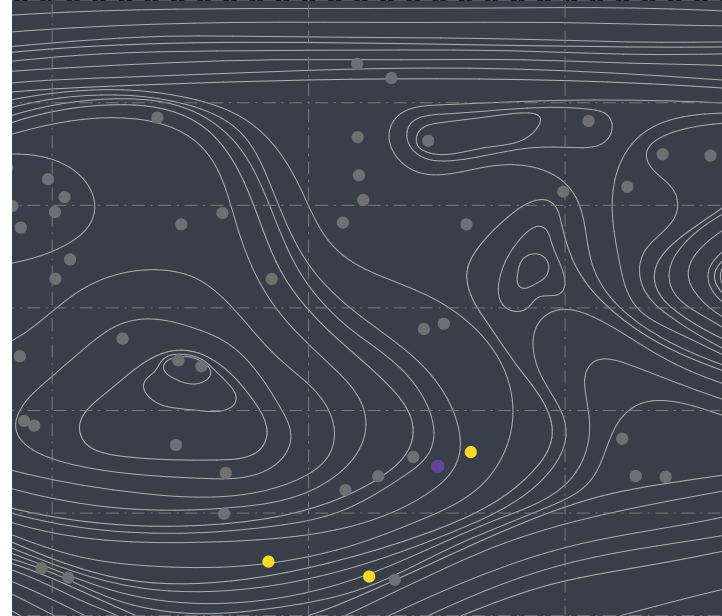
DISCUSSION

Communal spaces

PLANET CITY

According to the designer's movie, the whole human population may be able to live in a sustainable megacity that occupies only a small portion of the earth's surface, allowing the rest of the globe to be rewilded and stolen lands to be restored. The film "Planet City" shows a 10 billion-person hyperdense, self-sufficient city. The circular economy-based metropolis could be developed on 0.02% of the earth's surface, comprising an area *about the size of a normal U.S. state* (Liam Young, 2021). The designer's animated short film is a thought-provoking examination of how to reverse *centuries of colonization, globalization, and never-ending economic extraction and expansionism* (Liam Young, 2021) in order to combat climate change and the exploitation of natural and human resources. The film claims that by establishing a sustainable, hyper-dense metropolis that occupies a small portion of the earth's surface, it may be feasible not just to solve climate change and the exploitation of natural resources, but also to rewild and restore places that have been plundered. While this model presents a fragmented dystopic-like city, the notion of a sustainable city is ambitious and difficult to implement, but it is worth considering as a solution to the present environmental issues.

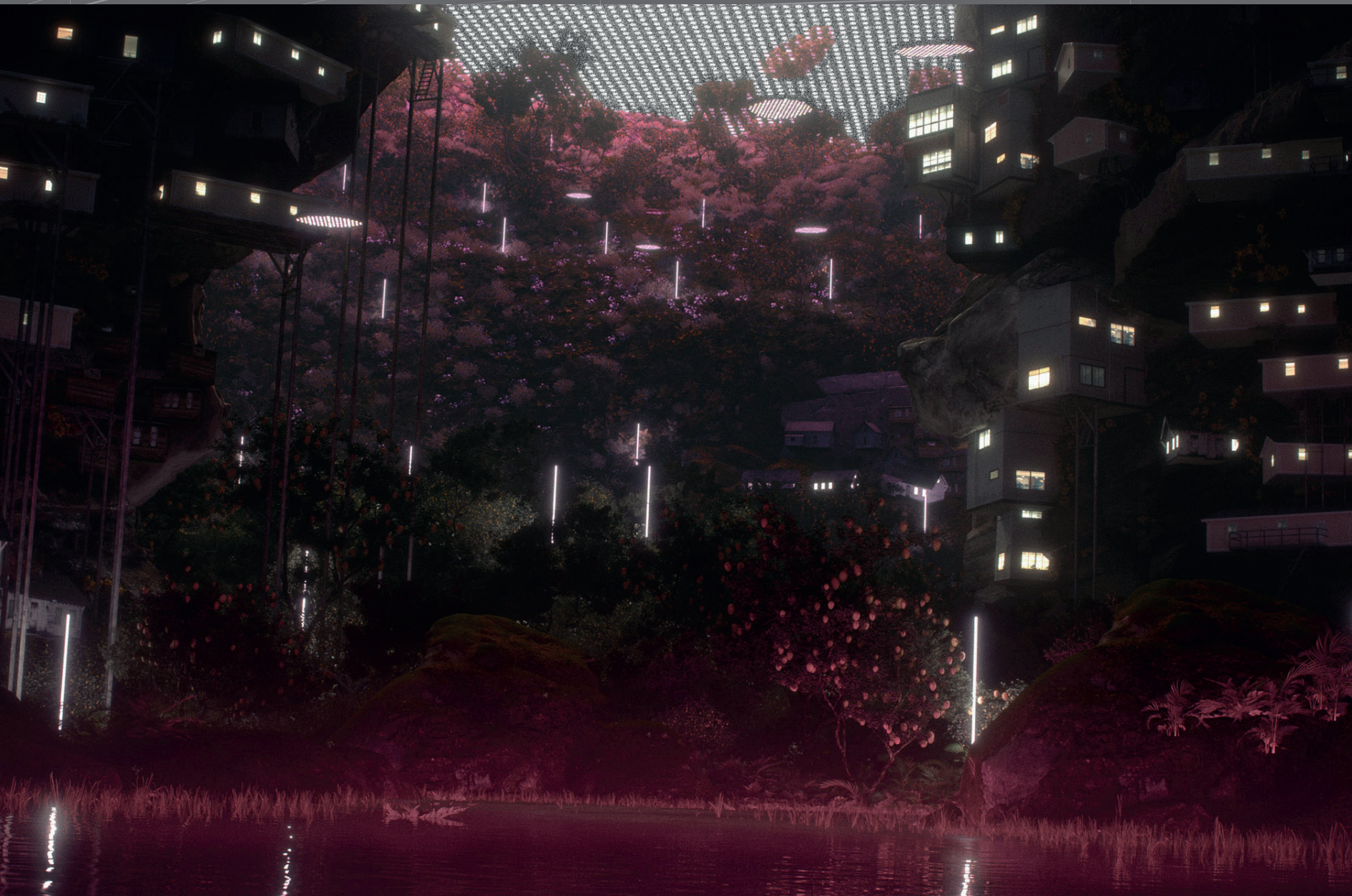
#VirtualArchitecture #UrbanPlanning #Sustainable
#Immersive #Metaverse #RealPhysics #Simulation
#ConceptualArchitecture #CreatedByDesigners



"Planet City is a speculative narrative of what could happen if we were to radically reverse this planetary sprawl," (Young, Liam. 2021. Liam Young's Planet City could tackle climate change by housing 10 billion people in a single metropolis. <https://www.dezeen.com/2021/01/06/liam-young-planet-city-climate-change-10-billion-people-metropolis/>.)

Liam Young
2021
Virtual Design

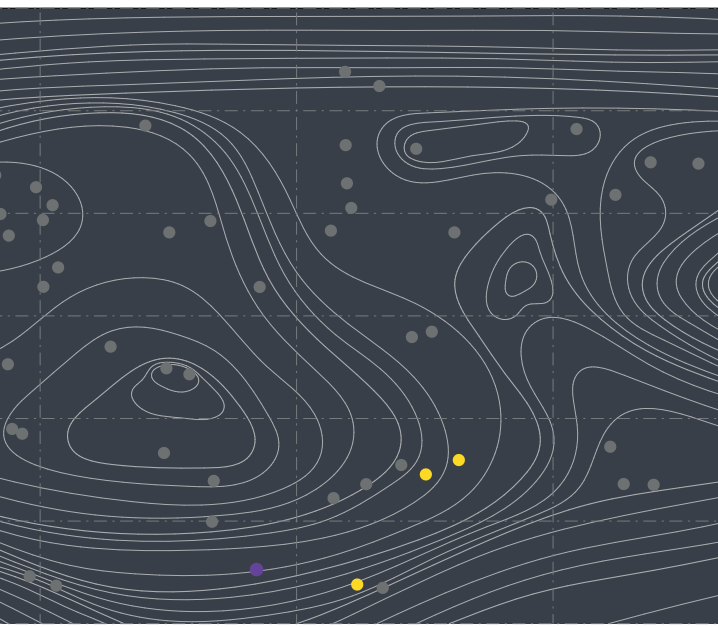




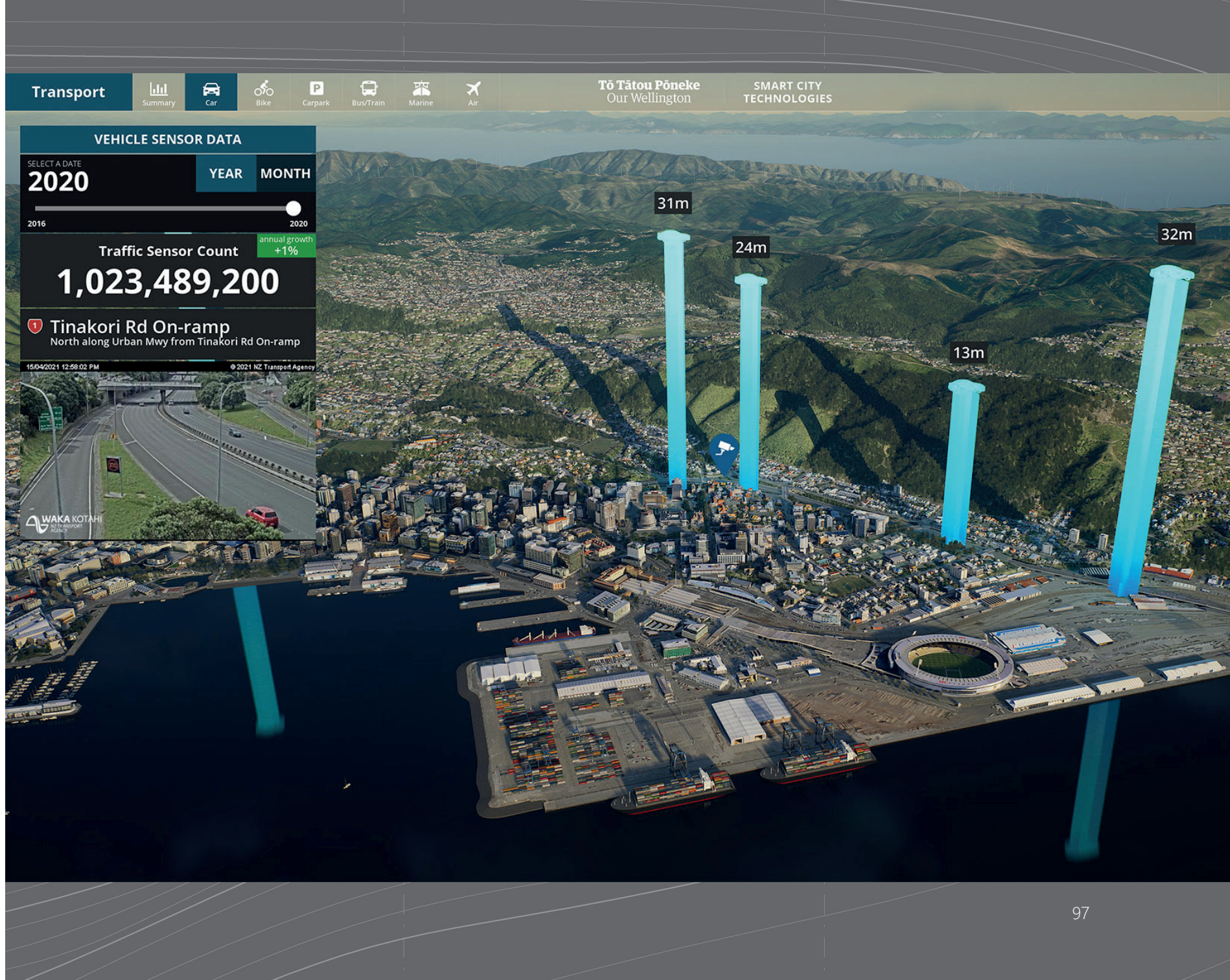
DIGITAL TWIN

Digital twins are a new technology with endless potential applications. They're virtual duplicates of actual objects, such as buildings and infrastructure, that may be utilized for a number of purposes by utilizing real-time data. The ability to educate all aspects of civil engineering and city planning is one of the most important advantages of digital twin cities. Using digital twin cities, for instance, students and experts in these professions may envision and comprehend the complexity of urban infrastructure, from transportation networks to building development. For instance, a city council may utilize a digital twin to simulate the impact of proposed modifications to transportation systems or to depict the impact of new building development on the neighborhood. This digital twin of the city of Wellington created in collaboration with the Wellington City Council is one example. Using genuine municipal data, the designers constructed an interactive environment that allows users to explore the city and see the interaction between various transportation systems, such as buses, trains, and boats. They can also observe the impact on traffic flow, aviation traffic, and parking availability. Historically, animations were utilized to produce large-scale depictions of cities. With the advancement of gaming technology, it is now feasible to construct large-scale, dynamic city models with included data to enable a far more realistic and immersive experience that creates new opportunities for city planning and infrastructure design.

#VirtualArchitecture #UrbanPlanning #Sustainable
#Immersive #Heritage #OpenAccess#RealPhysics #Simulation
#CreatedByDesigners



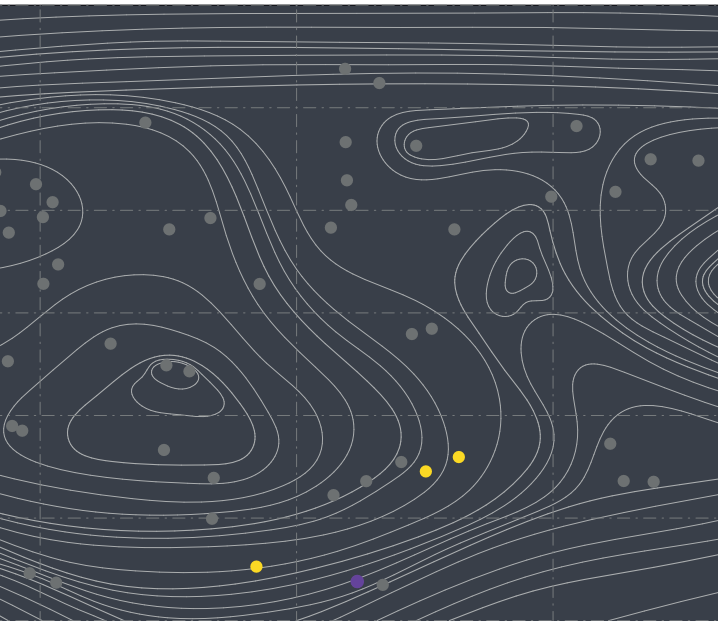
Buildmedia
2021
Platform



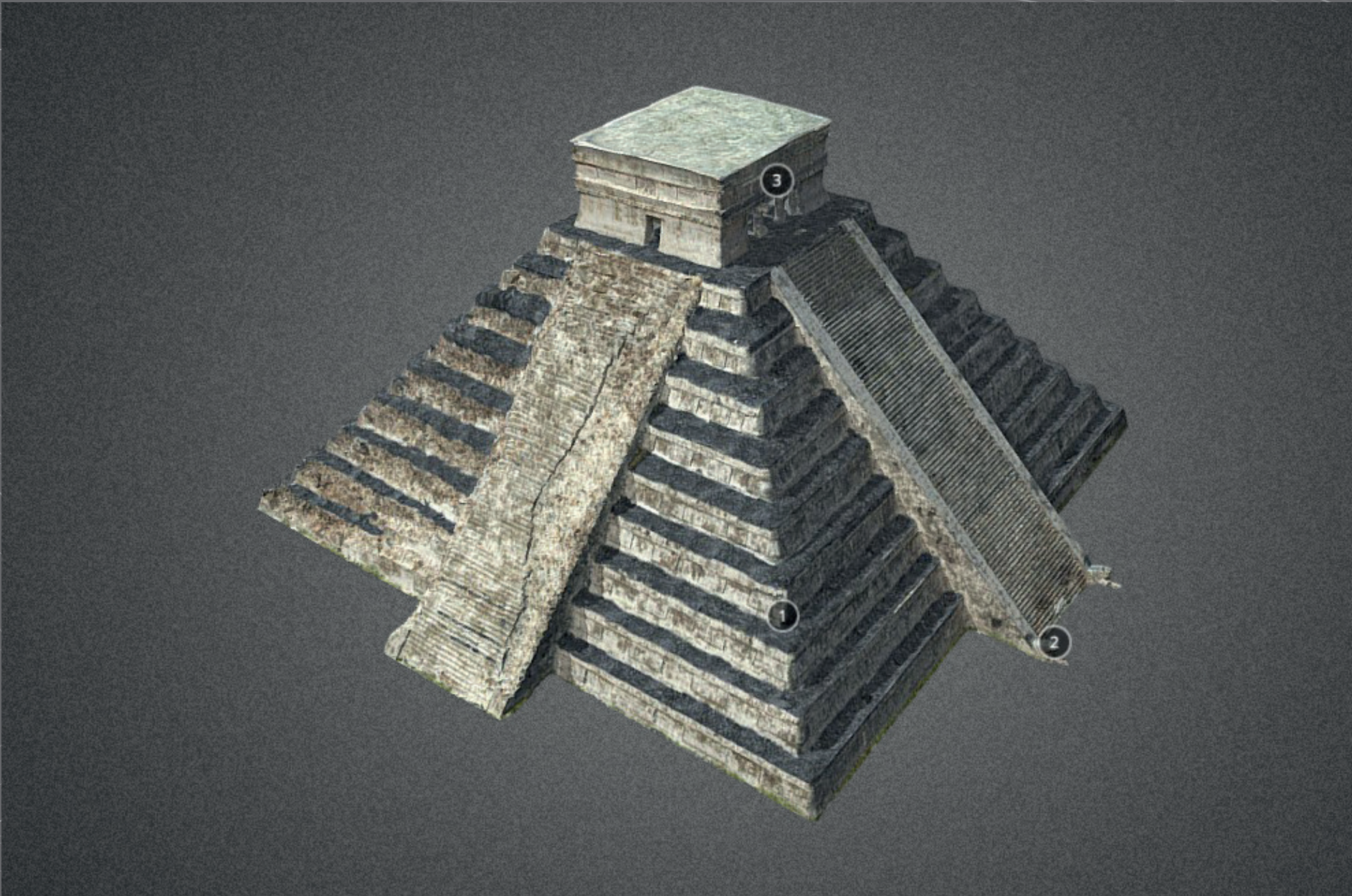
OPENHERITAGE 3D

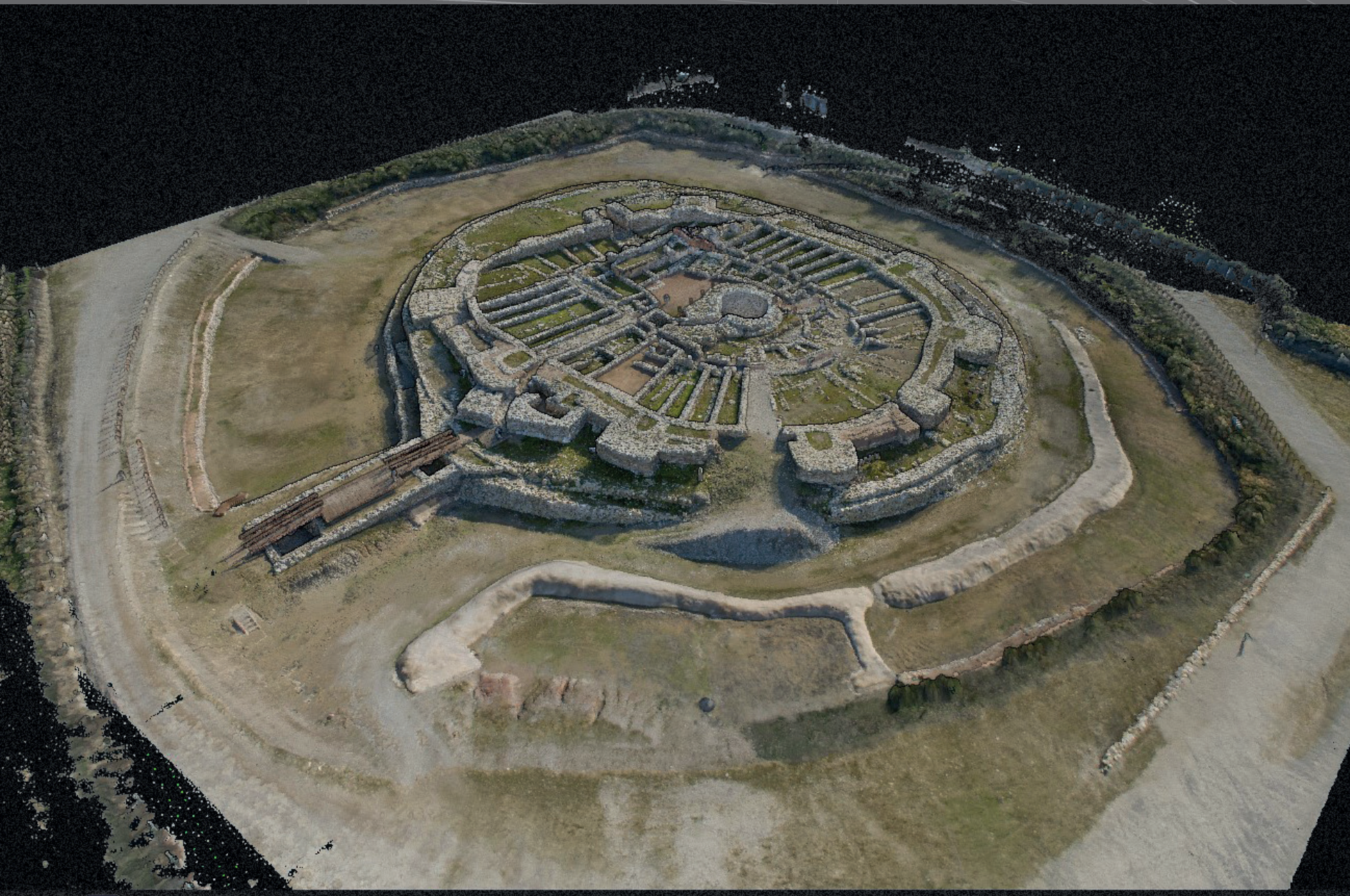
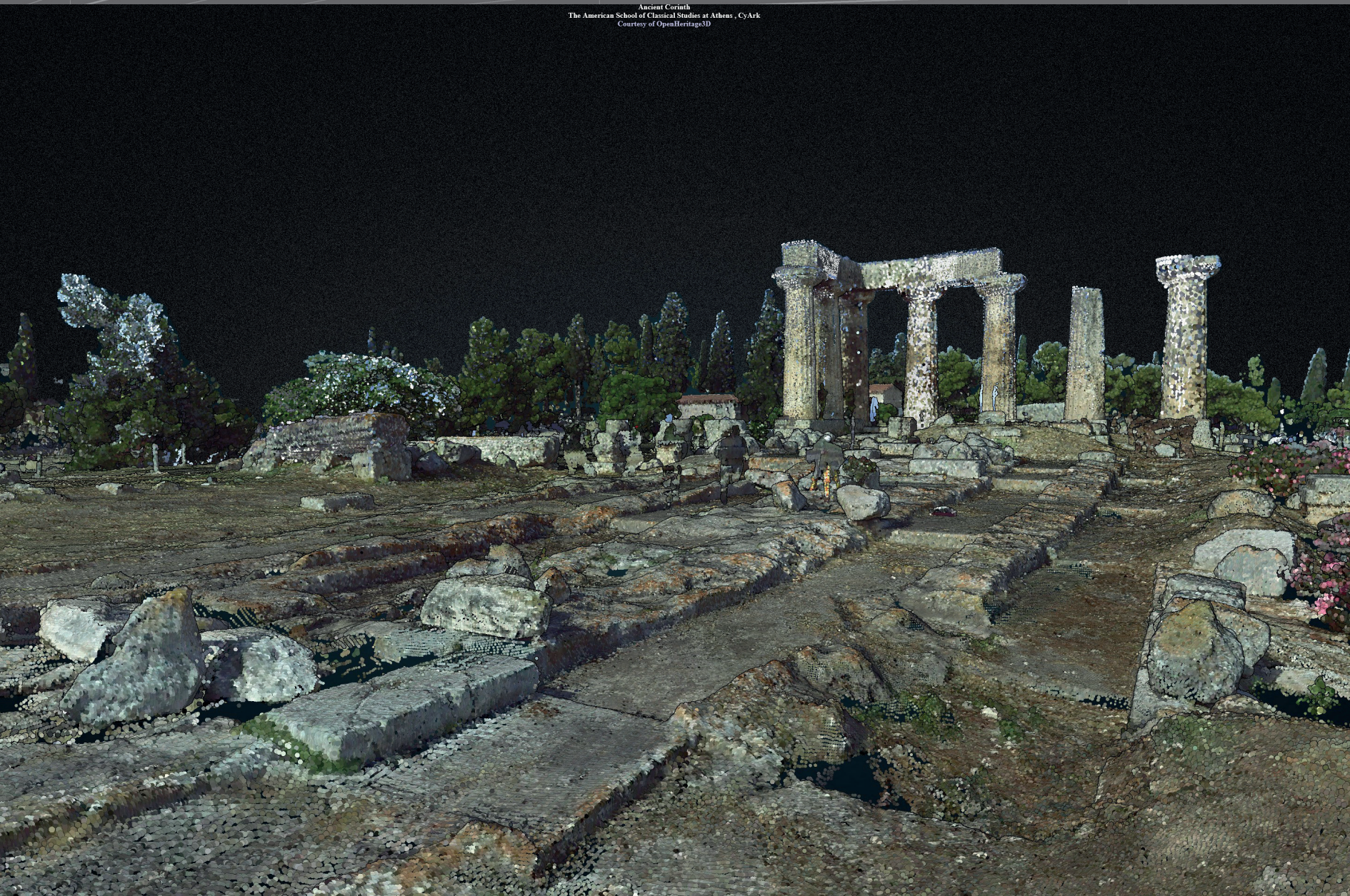
The platform is a reaction to the increasing demand to assist with the dissemination and open access to the developing collection of 3D data recorded for the documentation of cultural heritage. As 3D data collection becomes an increasingly prevalent tool for recording cultural heritage, it is crucial that this data is made accessible in a manner that preserves scientific rigor, respects cultural and ethical sensitivity, and removes barriers for content producers to contribute their data. The Open Heritage 3D project was designed to fulfill these demands by making publicly accessible primary 3D cultural heritage data. The goal of the project is to establish a platform for the exchange and dissemination of 3D data acquired from cultural heritage locations, making it available to researchers, academics, students, and the general public. Numerous organizations have joined the campaign and vowed to make accessible their enormous data banks from past and future 3D documentation efforts. The Open Heritage 3D project is a crucial instrument for the protection and comprehension of cultural heritage, as it provides a means of sharing and accessing the data recorded in 3D documentation initiatives. It is anticipated that the Open Heritage 3D project will continue to play a crucial role in the preservation and sharing of cultural heritage data as the usage of 3D capture technology increases.

#VirtualArchitecture #Immersive #Heritage #OpenAccess
#RealPhysics #Simulation #CreatedByDesigners



Open source, multiple designers
Constant updates
Virtual Design

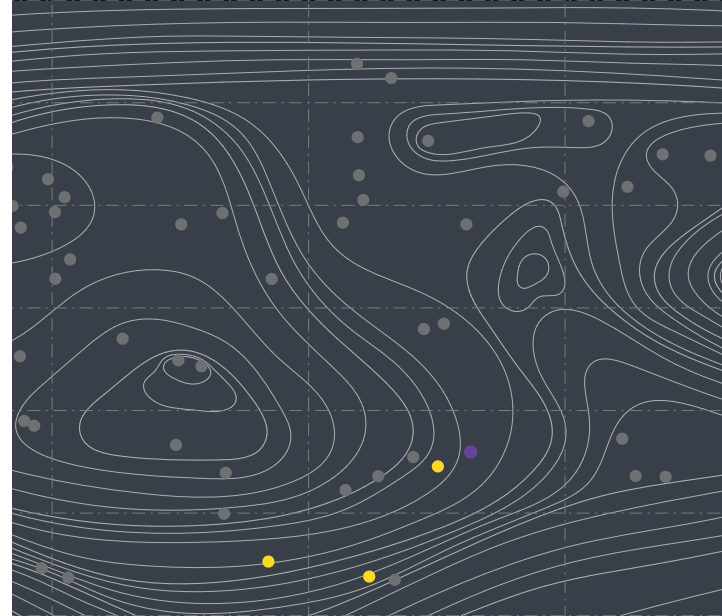




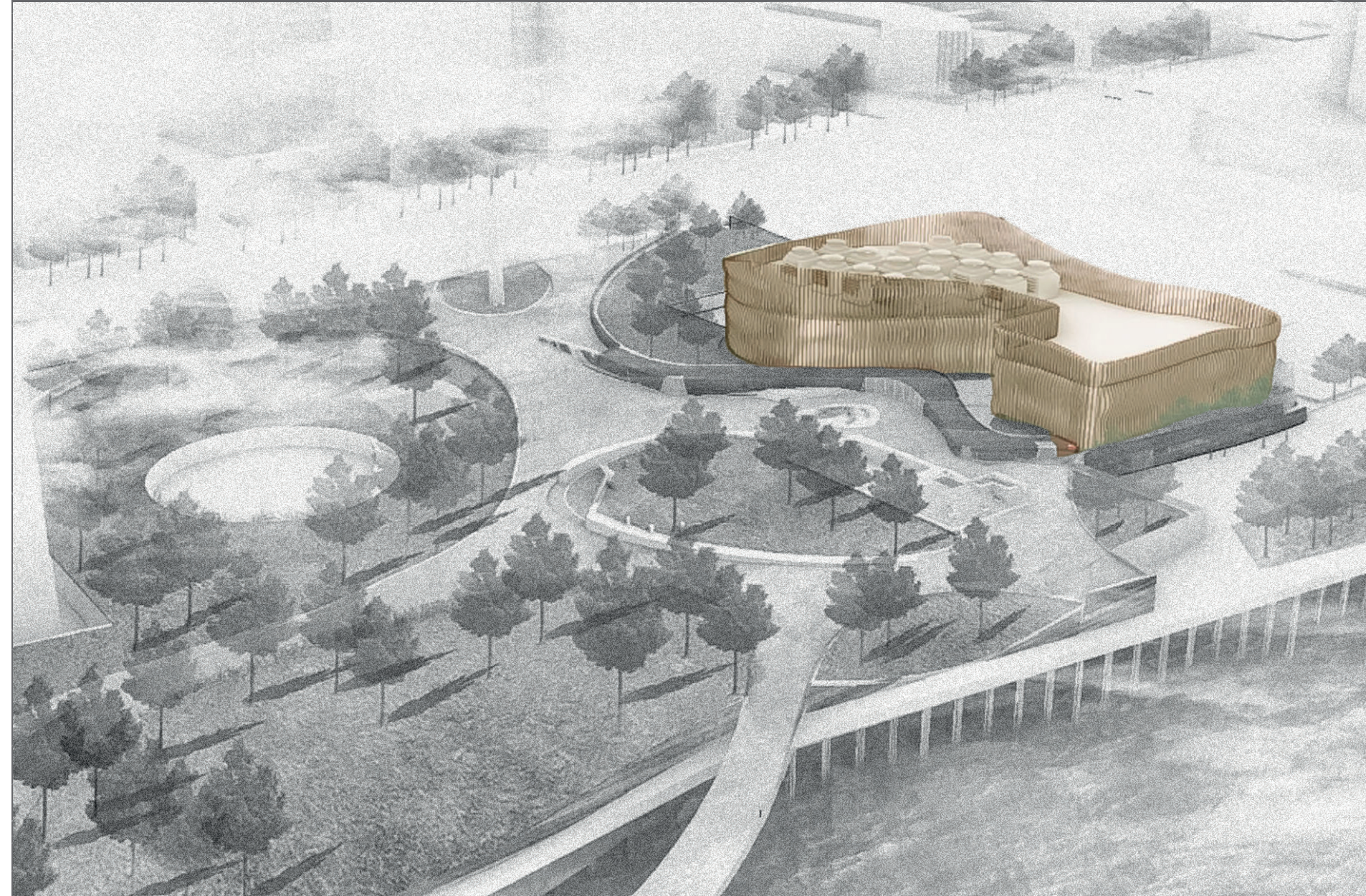
LOW-CARBON SERVER FARMS

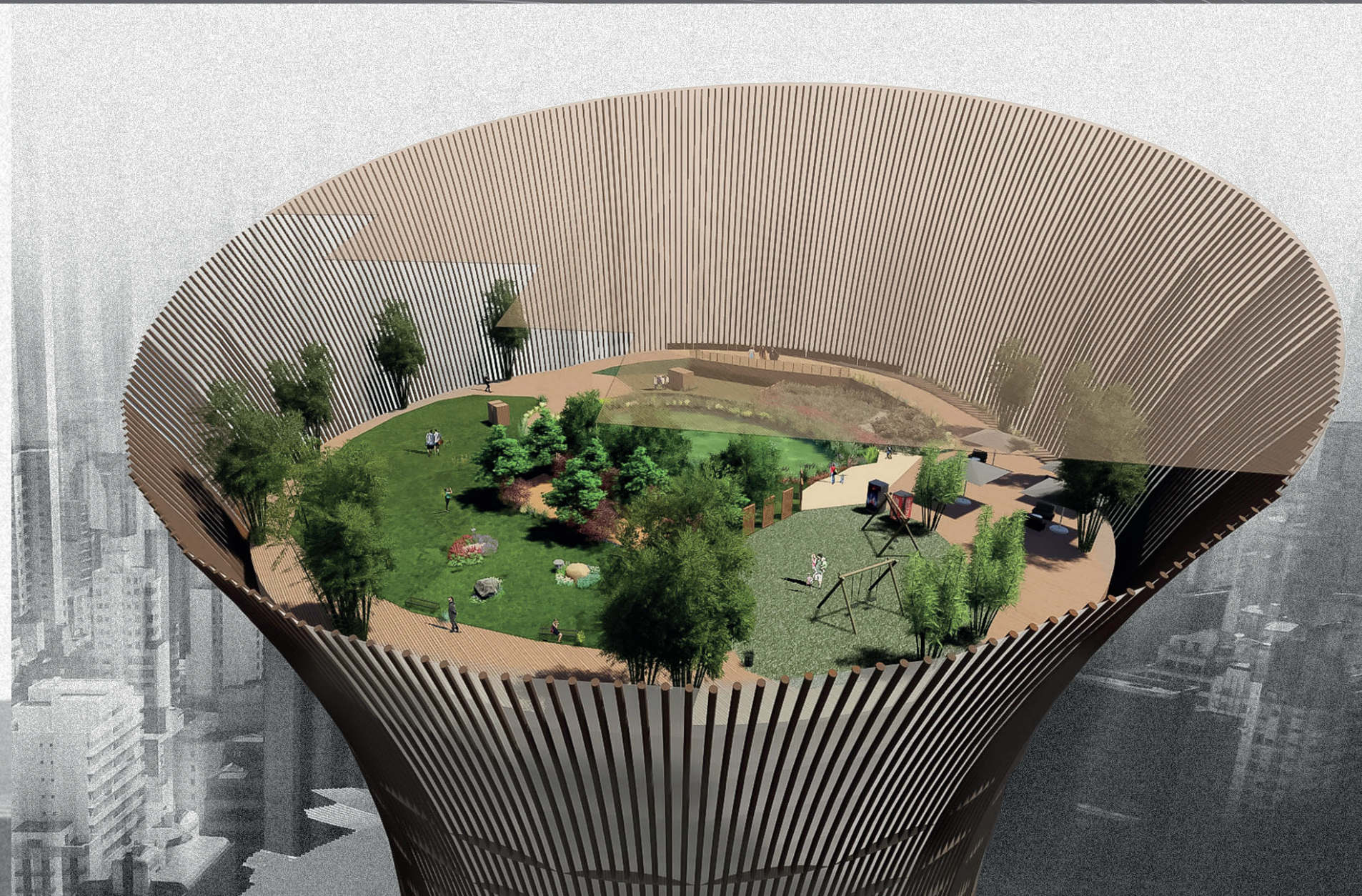
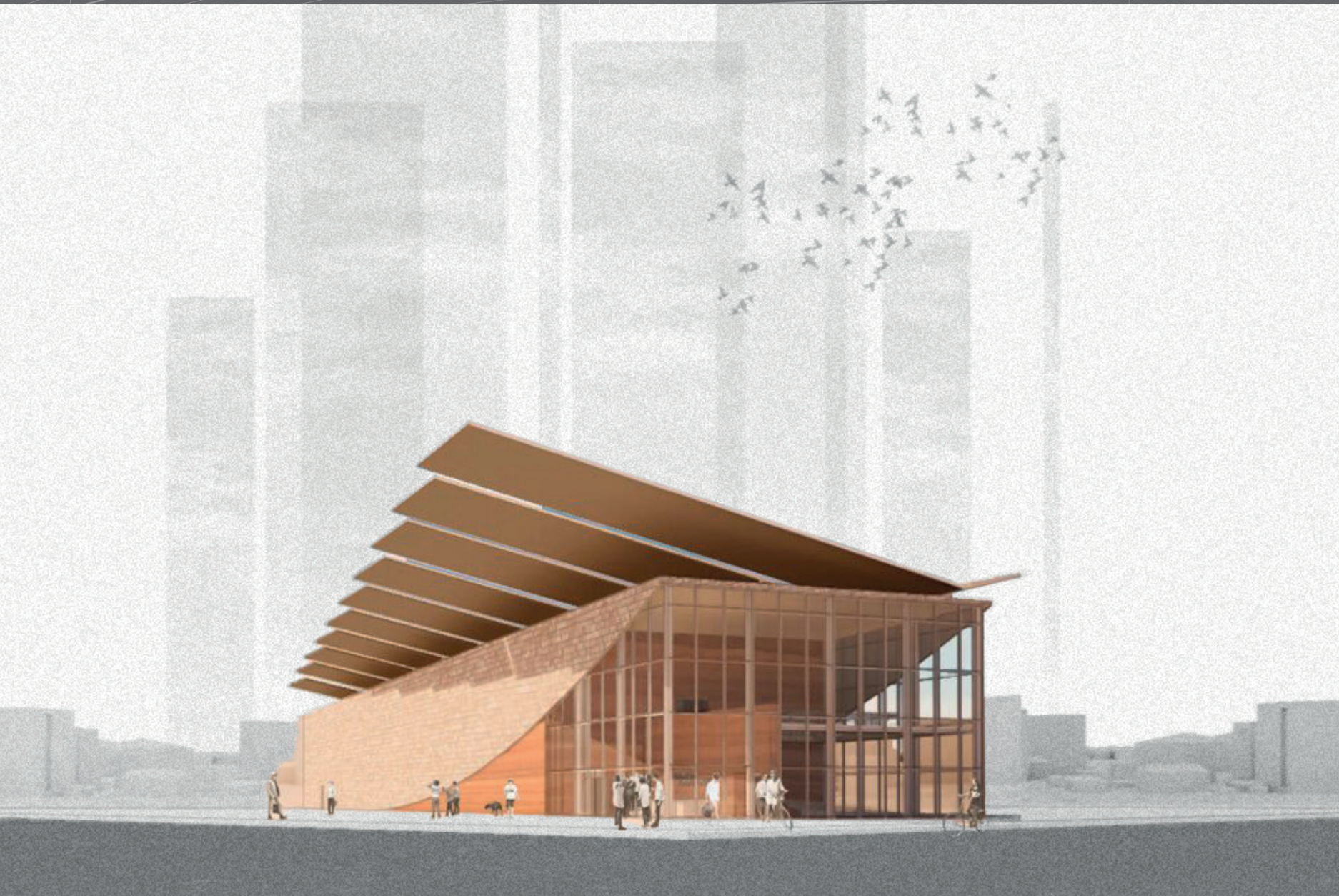
This project is a collaborative studio that required architectural students from three major colleges, the University of Washington, the University of Arizona, and the University of Pennsylvania, to reinvent the modern data center. The objective was to push the limits of what was feasible and discover solutions to achieve net-zero energy use in data centers. Students were separated into six teams based on various climatic zones with the assistance of tech-giants such as Google and Microsoft. Each team was responsible for doing research and conducting experiments on various materials and designs that may assist minimizing the energy usage of data centers such as employing low-carbon materials like recycled steel and concrete substitutes. As server and microprocessor technology advances, data centers are routinely redone every decade, hence modular and reusable designs were also considered. Students were urged to think imaginatively and develop ideas that might have a significant influence on lowering the carbon footprint of data centers. Their propositions were then presented their to a panel of architects, engineers, and IT professionals. The concepts created by the students might serve as inspiration for future data center developments.

*#VirtualArchitecture #Sustainable #Immersive #Metaverse
#RealPhysics #Simulation #ConceptualArchitecture
#BusinessOrientedSpaces #CreatedByDesigners*



Multidisciplinary studio
2020
Virtual Design





In *Planet City*, the designer suggests a sustainable, hyper-dense megacity that could potentially accommodate the entire human population, enabling the rest of the planet to be rewilded and stolen lands to be restored. While the images depicted are that of a fractured dystopian metropolis, the potential of virtual reality to imagine what our world could look like in a near future is virtually limitless (as long as our technology allows it).

The concept of a sustainable city is ambitious and challenging to realize. Nevertheless, the use of digital twin technology combined with the development of rendering engine technologies enable the production of realistic and immersive city models for city planning and infrastructure designs. Hence, these technologies may be used to teach students on all elements of civil engineering and city planning, as well as city councils to simulate the impact of proposed changes to transit networks or to represent the impact of new building development in a neighborhood.

In addition, the Open Heritage 3D project is an essential instrument for the preservation and appreciation of cultural heritage since it provides a platform for the interchange and distribution of 3D data obtained from cultural heritage sites.

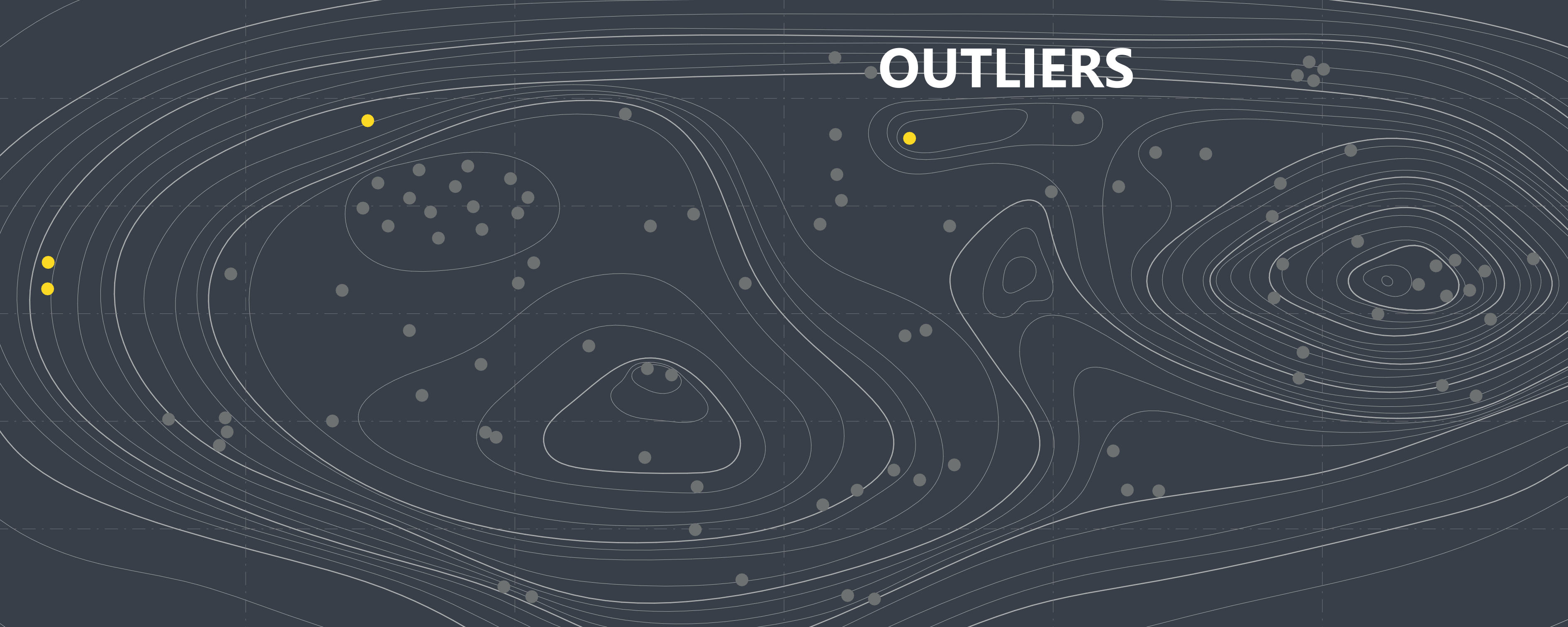
The case studies offered in this section highlighted the benefits of virtual environments for the real world. They highlight how the architectural profession may employ virtual technology such as digital twins, scanning methodologies, and hypothetical situations to make better design and construction processes, conserve our built history, or determine the future of our society. Furthermore, these case studies have highlighted that

physical and virtual realities have a deep and multifaceted interaction. On the one hand, we have virtual simulations of what may be feasible in the actual world, allowing us to explore and experiment with diverse situations without physical boundaries. This is especially beneficial in industries like architecture, engineering, and product design, where virtual reality can be used to construct precise models and simulations of structures and systems. On the other hand, there are tangible realities that are duplicated in the virtual world by means of 3D scanning and photogrammetry. This allows us to construct very realistic digital representations of real-world objects and places, which may be utilized for a number of reasons, including education, entertainment, and the preservation of cultural heritage. This interaction is neither restricted to the virtual replication of physical environments or the physical reproduction of virtual worlds. It also includes the use of virtual reality technologies to enhance the user experience in actual locations. The link between physical and virtual realities is intricate. Both have the power to impact one another and are utilized in diverse ways to enhance the user experience. Understanding the interaction between physical and virtual realities is crucial for the development and use of technology in numerous sectors. This reflexion will lead us to the next chapter of this Atlas.

DISCUSSION

Simulation

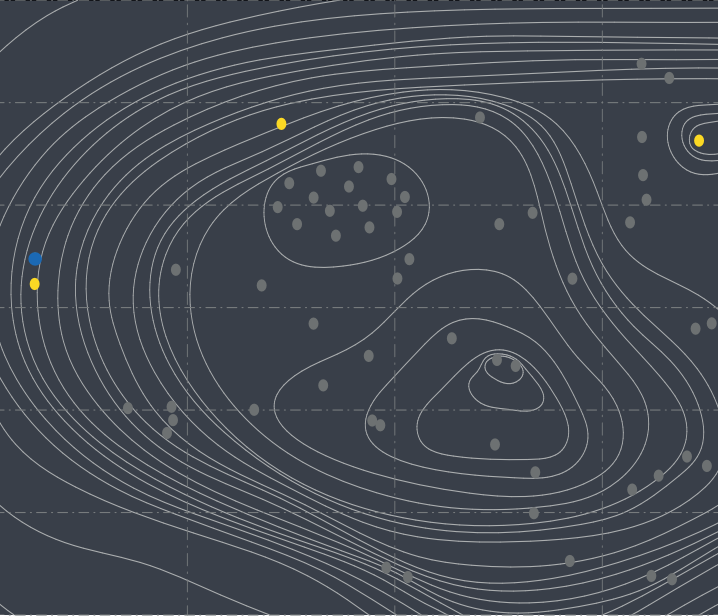
OUTLIERS



GATHER

Gather is a platform that provides companies with digital non-immersive places to enhance the remote work experience. They specialize in designing non-immersive virtual worlds to feel as near as possible to the physical world, making virtual interactions more natural. They provide an array of services and functionalities in order to accomplish this objective. Similar to a game environment, clients may develop and design their own virtual worlds in which their avatars can move and interact with various items and features. These areas can serve a range of objectives, including meetings, cooperation, and team-building exercises. Clients may, for instance, construct virtual conference rooms where team members can hold face-to-face meetings and conversations, as well as breakout rooms for smaller groups to do certain tasks. Additionnaly, customers may develop interactive whiteboards, document libraries, and even games to facilitate teamwork and communication among distant employees. The platform’s objective is to strengthen remote corporate culture beyond physical offices by establishing virtual spaces that generate a sense of community and belonging among remote employees. These services and features allow businesses to imitate as much as possible the collaborative atmosphere of the physical office, which they argue lead to enhanced remote working productivity, and professional satisfaction.

#CommunitySpaces #OpenAccess #BusinessOrientedSpaces

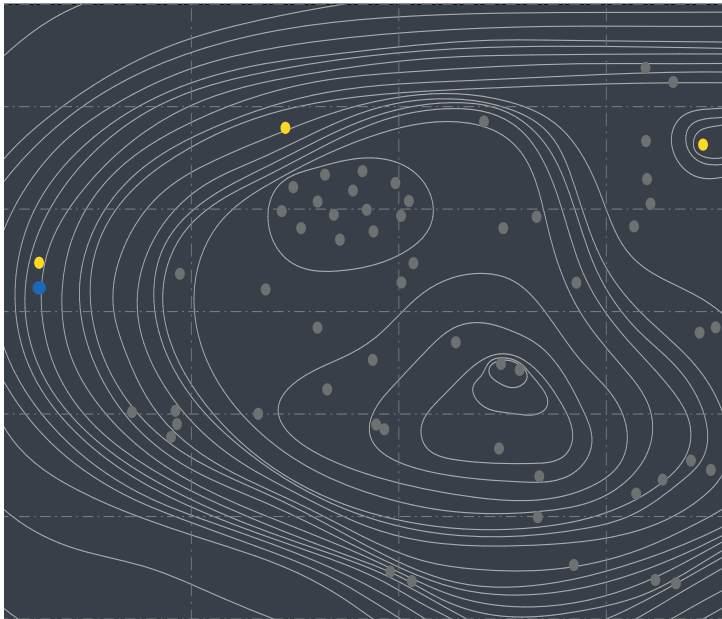


Designs by clients
2020
Platform



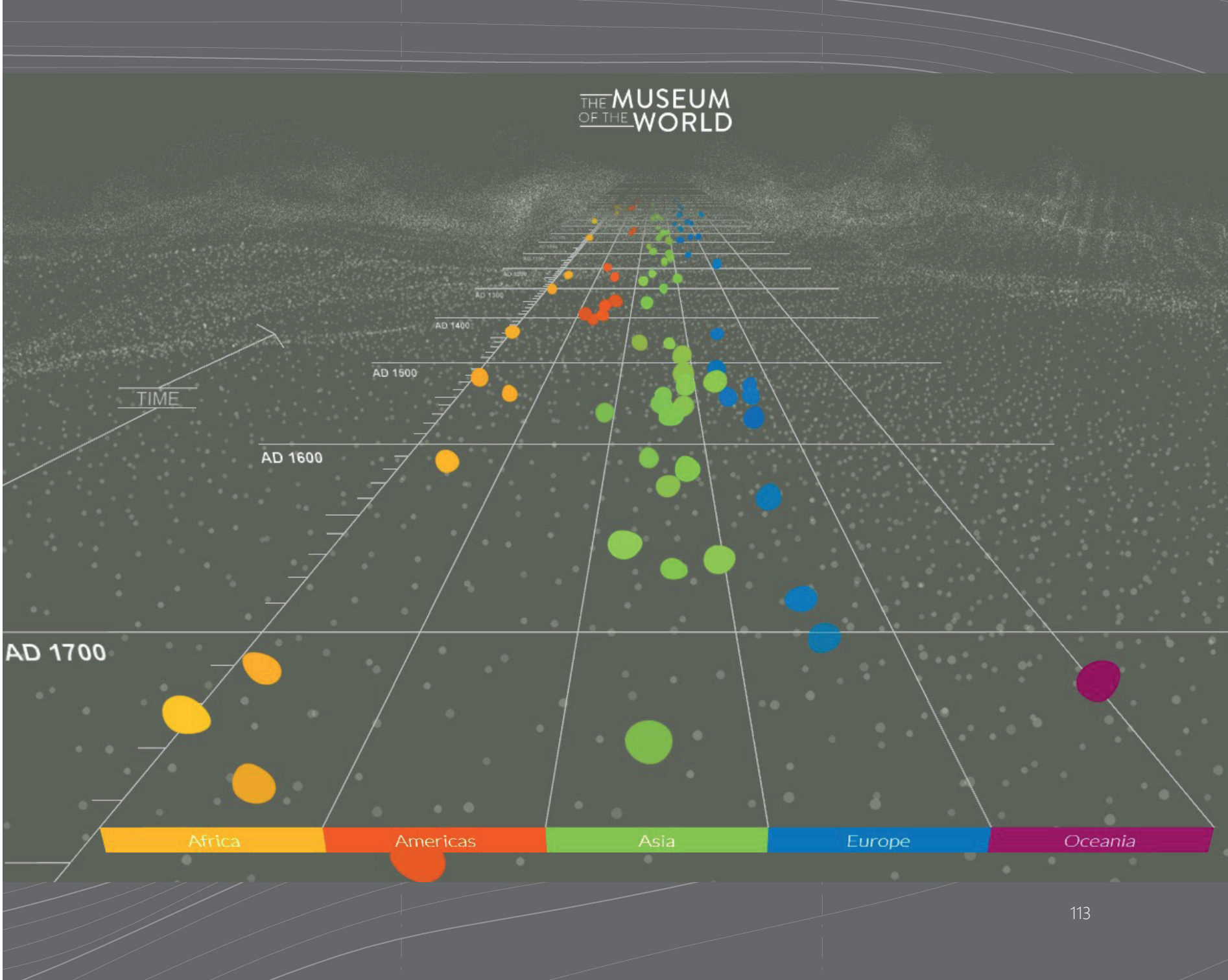
THE MUSEUM OF THE WORLD

The Museum of the World is a non-immersive interactive adventure that showcases some of humanity’s most amazing artifacts. It allows visitors to explore the British Museum’s collection of items from prehistory to the present in an interactive and entertaining manner. It was developed in partnership with the British Museum and the Google Cultural Institute. The platform employs the most advanced Web Graphics Library technology available, enabling high-quality 3D renderings of the artifacts and a seamless user experience. The collection may be explored by browsing through different divisions, such as ancient Egypt, Greece, and Rome, or by searching for individual objects by name or keyword. The opportunity to listen to curators of the British Museum providing commentary on the items while viewers examine them is one of the Museum of the World’s most distinctive features. This enables users to obtain a deeper knowledge of the objects and their creation context. It also enables users to obtain a greater knowledge of the artifacts and the environment in which they were created, as well as to discover previously unknown links between the past and present.



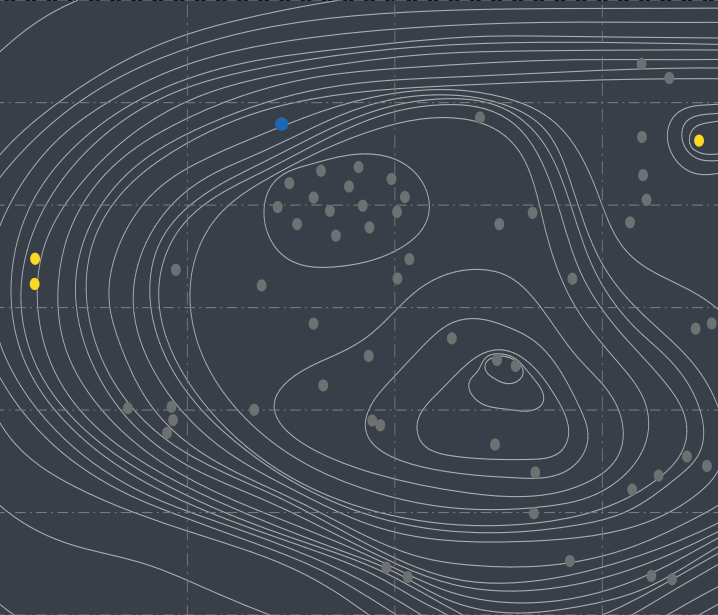
#Heritage #OpenAccess

WEIR+WONG
2020
Platform



META-TUVALU

As rising sea levels threaten the tiny Pacific island country of Tuvalu, the government is investigating innovative methods to preserve its culture and heritage. The creation of a digital twin of the country, including its islands, monuments, and other significant cultural places, is one of the solutions under consideration. During the COP27 climate meeting, Tuvalu’s Foreign Minister Simon Kofe stated that the nation must examine other survival options, including the prospect of becoming the first digital nation in the metaverse. This concept is considered as a method to ensure that future generations would have access to the country’s culture and history, even if the actual islands become uninhabitable. Visitors would be able to discover and experience the country’s history and culture in a manner that would otherwise be impossible.



“The idea is to continue to function as a state and beyond that to preserve our culture, our knowledge, our history in a digital space” (Kofe, Simon. 2022. Tuvalu turns to the metaverse as rising seas threaten existencePhotographs. <https://www.reuters.com>.)

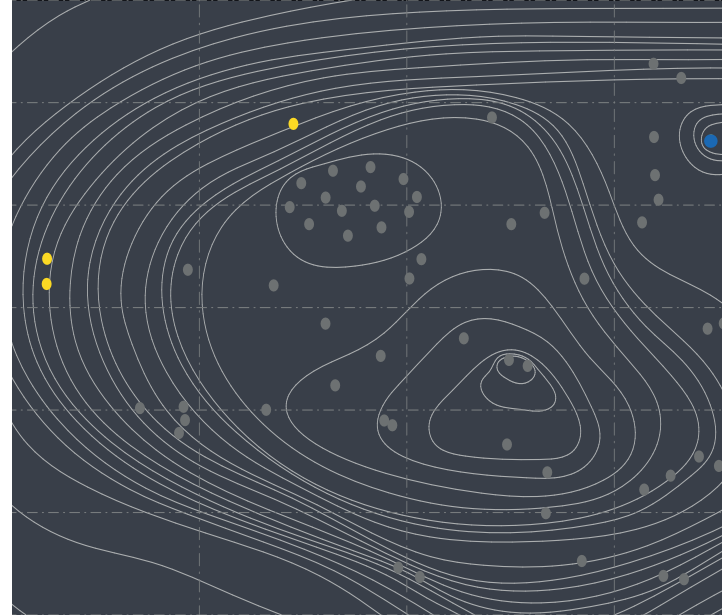
#Immersive #Metaverse #CommunitySpaces #Heritage
#OpenAccess #Real Physics #Simulation #CreatedByDesigners

Designers unknown
2022
Platform

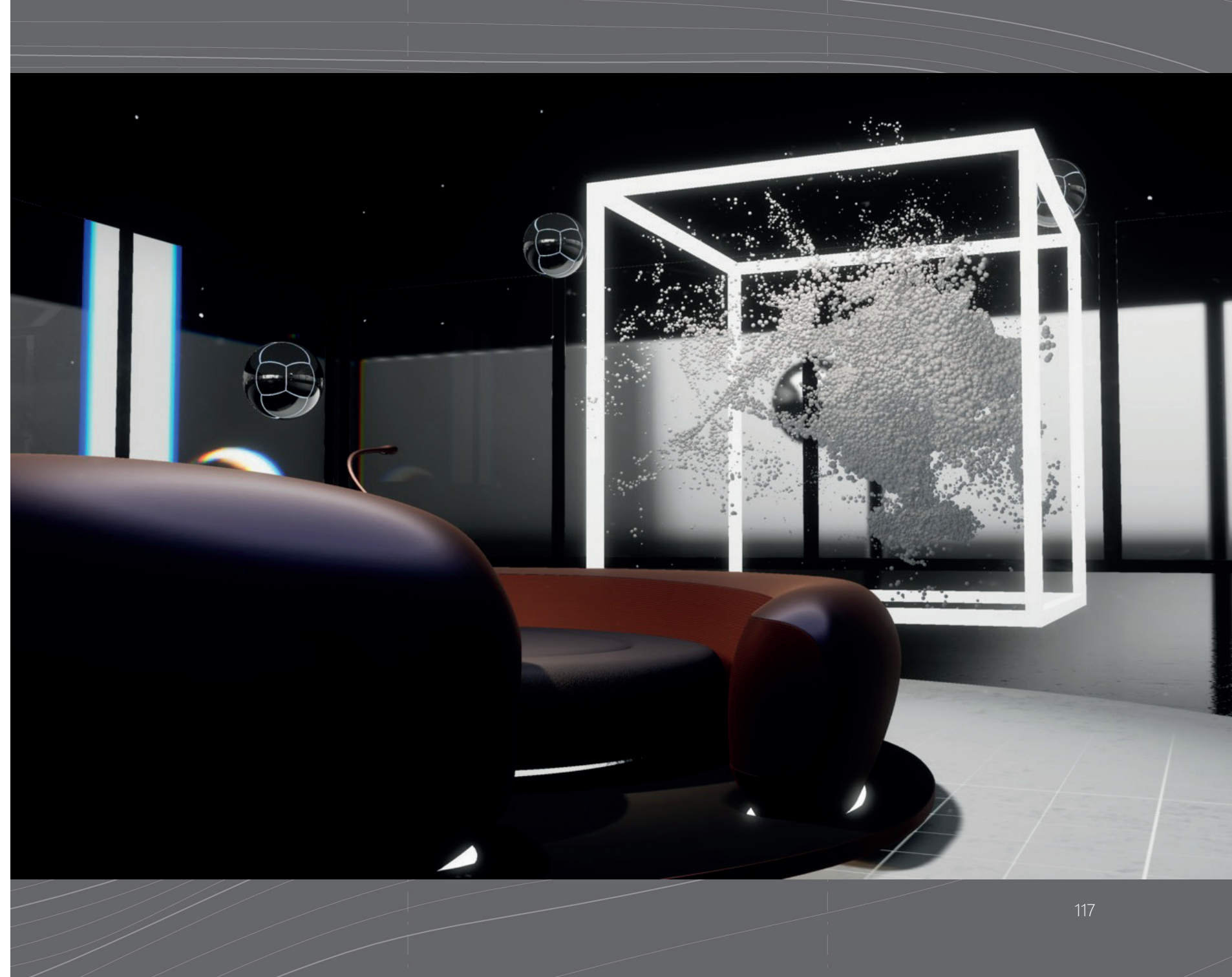


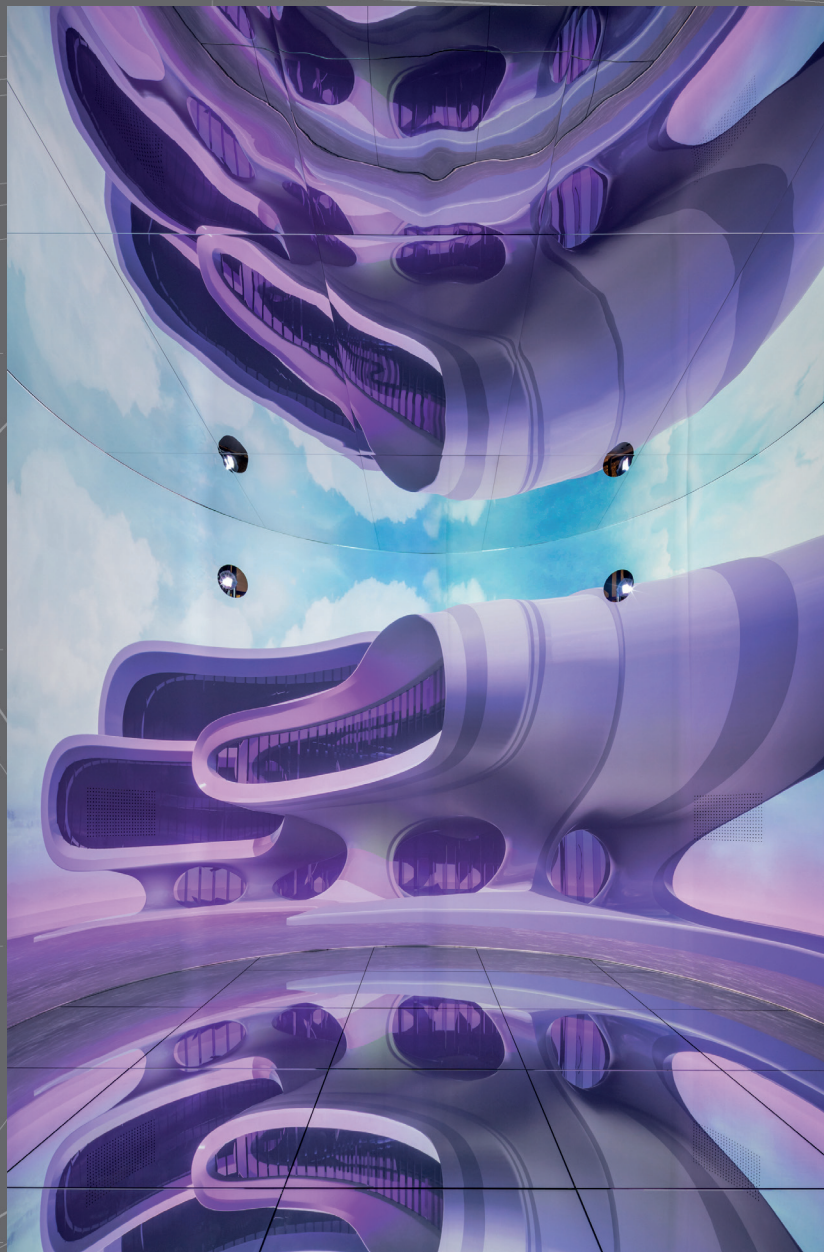
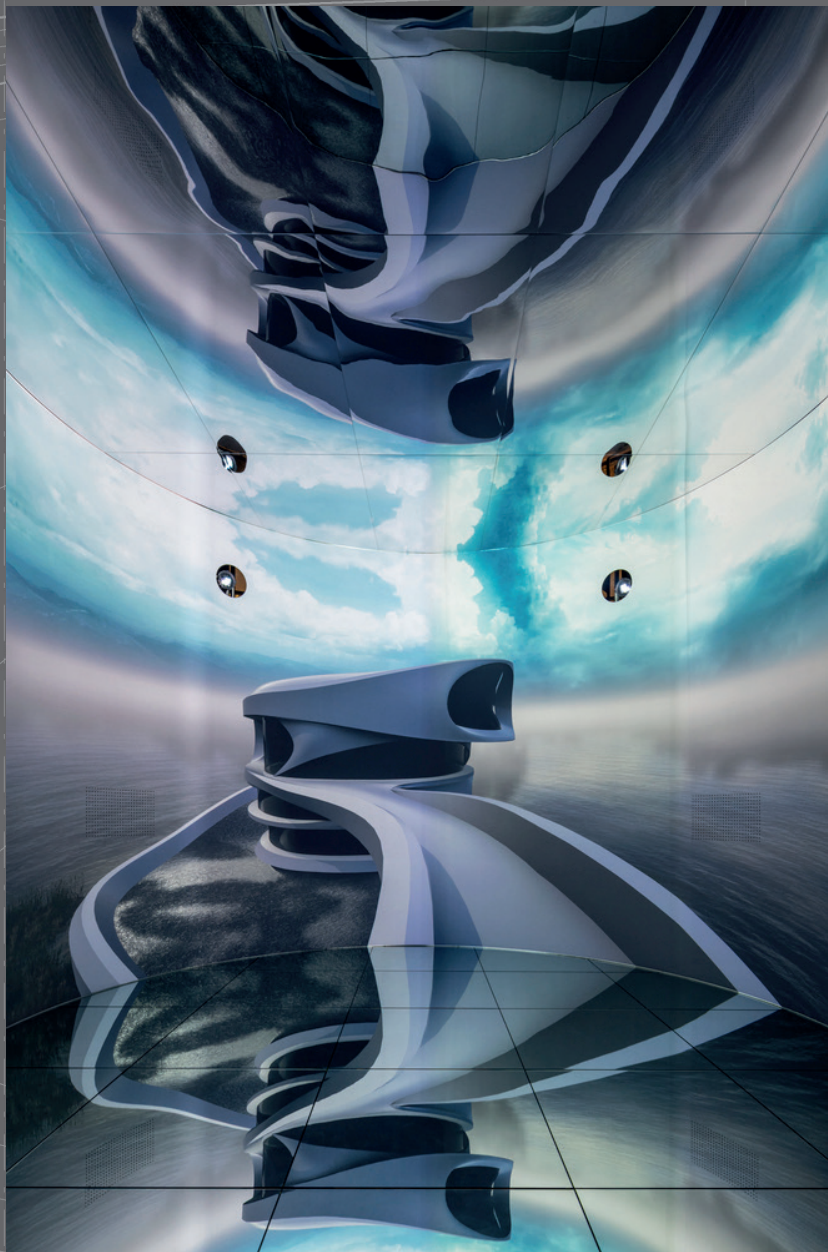
META-HORIZONS: THE FUTURE NOW

The exhibition at the Dongdaemun Design Plaza (DDP) in Seoul, South Korea, examines the work of Zaha Hadid Architects (ZHA) in numerous sectors, such as digital technology, artificial intelligence, and virtual reality. The exhibition highlights the practice's most recent ideas, processes, and research that use immersive technology and novel manufacturing techniques. The exhibition takes an in-depth look at ZHA's collaborative, interdisciplinary approach to producing digital design tools, showcasing the advantages of working simultaneously in the virtual and physical worlds. It provides visitors with a framework for studying the work of the four research teams at ZHA. In the Innovation zone, visitors may learn about ZHA's cutting-edge technologies and techniques, including 3D printing, parametric modeling, and virtual reality. The Imagination zone demonstrates the creative process underlying ZHA's designs, from preliminary sketches to final representations. Lastly, the Interaction zone allows visitors to interact with ZHA's designs using virtual reality and other immersive technologies to examine the firm's projects in a more dynamic manner. This zone highlights the ability of virtual reality to produce more immersive and engaging experiences for visitors, as well as the influence of digital technology on the future of architecture and design.



Zaha Hadid Architects & DDP
2022
Virtual Design





The section on outliers in the atlas raises some intriguing challenges pertinent to talks about virtual practice and its possible effects on the actual world. As the virtualization of our lifestyle continues to expand, it is only inevitable that new platforms such as Gather and the Museum of the World emerge. These platforms give wonderful possibilities to study and experience virtual settings, but they also raise crucial considerations regarding the potential for these technologies to change our view of the physical world. The potential for architectural interfaces to blur the barriers between the virtual and the real is a particularly intriguing subject to investigate. The technical breakthroughs outlined in sections 4 and 2 of the atlas, such as mixed reality, haptic technology, and smart materials, provide new opportunities for designing architectural interfaces that create a form of superposition between the virtual and real worlds. Such interfaces would enable us to engage with virtual surroundings in a more natural and intuitive manner, opening up new design and exploration possibilities. They might also be utilized to build new public spaces in which the virtual and actual worlds coexist and interact. In addition, it would be intriguing to investigate how these interfaces may be utilized to improve the user experience in real-world settings such as museums, amusement parks, and public areas. In addition to supporting scientific research and data visualization, they might be utilized to build more immersive and engaging educational and training environments.

Overall, the section on outliers in the atlas gives an intriguing opportunity to investigate the potential of architectural interfaces to blur the borders between the virtual and the real and improve the user experience

in real-world settings. For the huge extension of the metaverse, it is essential to provide interfaces that can superimpose the virtual and actual worlds.

DISCUSSION

Outliers

This research delves into the concept of the metaverse and its accompanying terminologies to provide a thorough grasp of the subject. It provides a wide range of case studies to the ideas discussed. The research highlights the significance of architecture to the healthy and sustainable growth of the metaverse. It is argued that architectural practice may be applied to both physical and virtual worlds, and that the metaverse provides architects new chances to design environments unrestricted by physical, economic, and structural restrictions. The findings also imply that as technology continues to progress, architects and practices will devote more time and resources to researching, experimenting, and constructing in the metaverse. The possibility for architects to construct environments unrestricted by the constraints of the physical world is a major focus of this study. It emphasizes the opportunities for architects to explore new concepts and push the boundaries of design in a way that was previously impossible. The research show that the metaverse is the next stage in architectural practice and that architects play a crucial role in influencing and developing this new environment. The objective of the research is to equip architects and other professionals with a clearer understanding of the metaverse and the opportunities it presents, so encouraging them to devote time and resources in the sector.

This research emphasizes the significance of architects and architectural practice giving particular attention to metaverse public places since these are the locations where people congregate, communicate, and establish social ties. Communal spaces have the ability to alter our perception and experience of the world around us,

and architects must keep this in mind when creating them. It acknowledges that concerns about the virtual housing and its function remain important because the insights gained though this exploration may be applied in the physical reality. As such, we should move further than simply design trophy homes but really think about what it means inhabiting those spaces of tomorrow. And this doesn't only apply for virtual housing but for all architectural endeavours, architects should use the potential presented by the metaverse in order to push the limits of their work and investigate new forms of design that can be transmitted to physical reality.

Quite a counter-intuitive concept when I started this study is the relative influence those two realities have on each other. The Outliers section has shown that it would be worthwhile to investigate the possibility for architectural interfaces in the real world that blur the border between the virtual and the physical, and connect the metaverse to the physical world, allowing for a seamless integration of the two and creating a new kind of "superposition" between the virtual and the real. This sort of investigation and experimentation might result in new methods of designing and experiencing architecture, which would ultimately help not only our industry but i think our whole society.

CONCLUSION

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Appendixes

Full Table

Title	Case studies nature	Virtual Architecture	Cryptocurrency	Urban planning	Sustainable	Immersive	AI
Low Carbon farms	1	●	○	○	●	●	○
What is a Digital Twin?	3	●	○	●	○	●	●
Mars House	1	●	●	○	○	●	○
Steampunk Pavillion	1	●	○	●	○	●	○
Zaha Hadid Architects Presents Virtual Gallery Exploring Architecture, NFT's, and the Metaverse	1	●	●	○	○	●	○
Meta-Horizons: The future Now	1	●	○	○	○	○	○
Metamundo's Villa	1	●	●	○	○	●	○
SOLIDS	1	●	●	○	○	●	●
Rights to rebuild Nakagin Capsule Tower for sale	1	●	●	○	○	●	○
CitizenM to become "first hospitality company to build in the metaverse"	1	●	●	○	○	○	○
Planet City	1	●	○	●	●	●	○
Roar to open Meta Space studio to design property in the metaverse	3	●	●	○	○	●	○
Mona's Renaissance competition	3	●	○	○	○	●	○
PLP Architecture launches collection of 5,000 skyscraper NFTs	1	●	●	○	○	○	○
BIG designs virtual office in the metaverse for Vice Media Group	1	●	○	○	○	●	○
Voxel Architects designs "mystic" virtual arena to host Metaverse Fashion Week closing event	1	●	●	○	○	●	○
Liberland	1	●	●	●	○	●	○
Metaverse real estate community The Row launches with six architectural designs by artists	3	●	●	○	○	●	○
Cuervo Metadistillery	1	●	○	○	○	●	○
Winter House	1	●	○	○	○	●	○

Metaverse	Community spaces	Heritage	Open Access	Real Physics	simulation	Real Estate	Conceptual architecture	Business-oriented Spaces	Created by designers
●	○	○	○	●	●	○	●	●	●
●	○	●	●	●	●	●	○	○	●
●	○	○	○	●	○	●	●	○	●
●	●	○	●	○	○	○	●	○	●
●	●	○	●	○	○	○	●	●	●
●	●	●	●	○	○	○	●	●	●
●	●	○	○	○	○	●	●	○	●
●	●	○	○	○	●	●	●	○	●
●	○	●	○	●	●	●	●	●	●
●	●	○	○	○	○	●	○	●	●
●	○	○	○	○	○	○	○	○	●
●	●	○	●	○	○	○	●	○	●
●	○	○	○	○	○	○	○	○	●
●	○	○	○	○	○	○	○	○	●
●	○	○	○	○	○	○	○	○	●
●	○	○	○	○	○	○	○	○	●

Title	Case studies nature	Virtual Architecture	Cryptocurrency	Urban planning	Sustainable	Immersive	AI
The Impossible Architecture of Dreams	1	●	○	○	○	○	○
Metamansion	1	●	○	○	○	●	○
Noor Studio	1	●	○	○	●	●	○
Babel 4.0	1	●	●	○	○	●	○
Urban Links: Suspended Habitable Bridges Above Existing Cities	1	●	○	●	●	○	○
Flux Real Design Collective releases Intelligent Data	1	●	○	●	●	○	○
Virtuous City; Manufacturing Open-source Urbanism	1	●	●	●	●	○	○
Sandbox	4	●	●	○	○	●	○
Decentraland	4	●	●	○	○	●	○
Cryptovoxels	4	●	●	○	○	●	○
Somnium	4	●	●	○	○	●	○
Gather	4	○	○	○	○	○	○
Meta-Tuvalu	1	○	○	○	○	●	○
Ana-neo	2	○	○	○	○	●	○
Cyark	1	●	○	○	○	●	○
Museum of the World	4	○	○	○	○	○	○
OpenHeritage 3D	1	●	○	○	○	●	○
Metaverse Seoul	4	○	○	○	○	●	○
Wellington Digital Twin	1	●	○	●	●	●	○
Buildmedia	4	●	○	●	●	●	○

Metaverse	Community spaces	Heritage	Open Access	Real Physics	simulation	Real Estate	Conceptual architecture	Business-oriented Spaces	Created by designers
●	○	○	●	●	○	○	●	○	●
●	○	○	○	○	●	●	●	○	●
●	○	○	●	●	●	○	●	○	●
○	●	○	○	○	●	●	●	●	●
○	○	○	●	○	●	○	●	●	●
○	○	○	●	○	●	○	●	●	●
○	○	○	●	●	●	○	●	●	●
●	●	○	●	○	○	●	○	●	○
●	●	○	●	○	○	●	○	●	○
○	●	○	●	○	○	○	○	●	○
●	●	●	●	●	●	○	○	○	●
●	●	○	○	○	○	○	●	●	●
○	○	●	●	○	○	○	○	○	○
○	○	●	●	●	●	○	○	○	●
●	●	○	●	○	●	○	○	●	●
○	○	●	●	●	●	○	○	○	●
○	○	●	●	●	●	○	○	○	●

Title	Case studies nature	Virtual Architecture	Cryptocurrency	Urban planning	Sustainable	Immersive	AI
Virtual Singapore	1	●	○	●	●	●	○
The Mirage	1	●	●	○	○	●	○
Daniel arsham	1	●	●	○	○	●	○
Quagmire's Karst by Misha Kahn	1	●	●	○	○	●	○
The Pearl by Hard	1	●	●	○	○	●	○
Make Room For Us by Six N. Five	1	●	●	○	○	●	○
supervillain House	1	●	○	○	○	●	○
Metamansion concept 8	1	●	○	○	○	●	○
Octa Tower, Ayoub Ahmad	1	●	●	○	○	●	○
Metaxibit, Ayoub Ahmed	1	●	●	○	○	●	○
Antireality	1	●	○	○	○	○	○
New Reality Space, between the walls	1	●	○	○	○	●	○
The Spiral House, AANTIREALITY	1	●	○	○	○	○	○
The meeting place	1	●	●	○	○	●	○
Blueberry house, Huge Fournier	1	●	●	○	○	○	○
Minecraft	2	●	○	●	○	●	○
Simcity	2	●	○	●	○	●	○
Second life	2	●	○	●	○	●	○
GTA	2	●	○	●	○	●	○
Project Aurora	1	●	●	○	○	●	○

Metaverse	Community spaces	Heritage	Open Access	Real Physics	simulation	Real Estate	Conceptual architecture	Business-oriented Spaces	Created by designers
○	○	●	●	●	●	○	○	○	●
●	○	○	○	○	○	●	●	○	●
●	○	○	○	○	○	●	●	○	●
●	○	○	○	○	○	●	●	○	●
●	○	○	○	○	○	●	●	○	●
●	○	○	○	○	●	●	●	○	●
●	○	○	○	○	●	●	●	○	●
○	○	○	●	○	○	○	●	○	●
●	○	○	○	○	○	●	●	○	●
○	○	○	○	○	○	○	●	○	●
●	●	○	○	○	○	●	●	●	●
●	○	○	○	○	○	●	●	○	●
○	●	○	●	○	○	○	●	○	○
○	●	○	●	●	○	○	●	○	○
○	●	○	●	●	○	○	●	○	○
●	●	○	○	○	○	●	●	●	●

Title	Case studies nature	Virtual Architecture	Cryptocurrency	Urban planning	Sustainable	Immersive	AI
The Architectural Design of Virtual Environments	5	●	○	●	○	○	○
Virtual Environment Design – Defining a new direction for architectural education	5	●	○	○	○	●	○
On architectural design in virtual environments	5	●	○	○	○	●	○
Designing Virtual Architecture	5	●	○	○	○	●	○
Modelling virtual space in architecture	5	●	○	○	○	●	○
Designing digital space - an architect's guide to virtual reality	5	●	○	●	○	●	○
The architectural aspect of designing space in virtual environments	5	●	○	●	○	●	○
The Building as the Interface: Architectural Design for Education in Virtual Worlds	5	●	○	●	○	●	○
An Architectural Perspective for the Design of Educational Virtual Environments	5	●	○	●	○	●	○
Designing Virtual Worlds as Architecture 1 Designing Virtual Worlds as Architecture	5	●	○	○	○	●	○
On the design of architectural spatial experiences using immersive simulation	5	●	○	○	○	●	○
Challenges in Virtual Environment Design	5	●	○	○	○	●	○
Being There: Architectural Metaphors in the Design of Virtual Place	5	●	○	○	○	●	○
Toward Virtual Reality in Architecture:Concepts and Scenarios from the Architectural Space Laboratory	5	●	○	○	○	●	○
Architectural designers and the interactive audience	5	●	○	●	○	●	○
A virtual environment for conceptual design in architecture	5	●	○	○	○	●	○
A critique of virtual reality in the architectural design process	5	●	○	○	○	●	○
Rediscovering Virtual Reality in the Education of Architectural Design: The immersive simulation of spatial experiences	5	●	○	○	○	●	○
Hybrid design environments: immersive and non-immersive architectural design	5	●	○	○	○	●	○
Immersive Simulation of Architectural Spatial Experiences	5	●	○	○	○	●	○

Metaverse	Community spaces	Heritage	Open Access	Real Physics	simulation	Real Estate	Conceptual architecture	Business-oriented Spaces	Created by designers
○	○	○	○	●	●	○	○	○	●
○	○	○	●	●	○	○	○	○	●
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○	●	○	●	●	○	○	●	○	●
○	○	○	●	●	○	○	●	○	●
○	●	○	●	●	○	○	●	○	●
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●	●	○	●	●	○	○	○	○	●
●	●	○	●	●	○	○	○	○	●
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●	●	○	●	●	○	○	○	○	●
●	●	○	●	●	○	○	○	○	●

Title	Case studies nature	Virtual Architecture	Cryptocurrency	Urban planning	Sustainable	Immersive	AI
Virtual Space Design: A Flexible Learning Model: Respecting Fragile Places in Virtual and Physical Realities	5	●	○	○	○	●	○
A Phenomenological Framework of Architectural Paradigms for the User-Centered Design of Virtual Environments	5	●	○	○	○	●	○
IMPACT OF COLLABORATIVE VIRTUAL ENVIRONMENTS ON DESIGN BEHAVIOUR	5	●	○	○	○	●	○
Architectural Design Thinking in Virtual Reality	5	●	○	○	○	●	○
Virtual Reality in Architectural Education: Defining Possibilities	5	●	○	○	○	●	○
Augmented Virtual Studio for Architectural Exploration	5	●	○	○	○	●	○
Establishing virtual design environments in architectural practice	5	●	○	○	○	●	○
A study on architectural design cases and the latest trends in the virtual world	5	●	○	○	○	●	●
Using Virtual Worlds as Collaborative Environments for Innovation and Design: Lessons Learned and Observations from Case Studies in	5	●	○	○	○	●	○
The Virtual Architectural Studio – An Experiment of Online Cooperation	5	●	○	○	○	●	○
Interactive Simulation in Virtual Environments - A Design Tool for Planners and Architects	5	●	○	○	○	●	●
Shared Virtual Space for Architectural Education	5	●	○	○	○	●	○
Which way is up? Space and place in virtual learning environments for design	5	●	○	●	○	●	●
More Than Meets the Eye: What Can Virtual Reality Reveal to Architects?	5	●	○	●	●	●	○
To go where no man has gone before: Virtual reality in architecture, landscape architecture and environmental planning	5	○	○	●	●	●	○
Making a Liveable 'Place': Content Design in Virtual Environments	5	●	○	○	○	●	○
SPATIAL REPRESENTATION OF DESIGN THINKING IN VIRTUAL SPACE	5	●	○	○	○	●	○
Integrating Virtual Reality During the Architectural Design Process: a Survey to Identify Practitioner Needs	5	●	○	●	○	●	●
Cyberarchitecture : the virtualisation of architecture beyond representation towards interactivity	5	●	○	○	○	●	○
Immersive virtual studio for architectural exploration	5	●	○	○	○	●	○

Metaverse	Community spaces	Heritage	Open Access	Real Physics	simulation	Real Estate	Conceptual architecture	Business-oriented Spaces	Created by designers
●	●	○	●	●	○	○	○	○	●
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●	●	○	●	○	○	○	○	○	●
●	●	○	●	○	○	○	○	○	●
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Title	Case studies nature	Virtual Architecture	Cryptocurrency	Urban planning	Sustainable	Immersive	AI
Algorithmic architecture in virtual spaces	5	●	○	○	○	●	●
Building virtual cities	5	○	○	●	●	●	●
Architectural Design for Online Environments	5	●	○	●	○	●	○
Exploring Media Architecture Design in Virtual Design Environments	5	●	○	○	○	●	○
Boosting up Architectural Design Education with Virtual Reality	5	●	○	○	○	○	○
Building Virtual Worlds: A City Planning Perspective	5	●	○	●	○	●	○
Complementary Virtual Architecture and the Design Studio	5	●	○	○	○	●	○

Metaverse	Community spaces	Heritage	Open Access	Real Physics	simulation	Real Estate	Conceptual architecture	Business-oriented Spaces	Created by designers
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○	●	○	●	●	●	○	●	○	●
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●	●	○	●	●	●	●	●	●	●

