## ZHVR Group: Zaha Hadid Architects' Journey into Virtual Realiy

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## Abstract

This paper presents the work of the ZHVR Group, an immersive technologies research team within Zaha Hadid Architects (ZHA), alongside research conducted in academic settings at the Architectural Association School of Architecture's Design Research Lab (DRL) and the Bpro postgraduate programs at UCL Bartlett. The focus is on advancements and applications related to the Metaverse and Mixed Reality technologies, highlighting emerging innovations within these fields.

Keywords: Zaha Hadid; VR Architecture; Metaverse; Metrotopia

## Abstract

Questo articolo presenta il lavoro del gruppo di ricerca ZHVR, specializzato in tecnologie immersive all'interno di Zaha Hadid Architects (ZHA), e le ricerche svolte in ambito accademico presso la Architectural Association School of Architecture (Design Research Lab - DRL) e i programmi post-laurea Bpro di UCL Bartlett. L'analisi si focalizza su tematiche legate al Metaverso e alle tecnologie di realtà mista, esplorando le innovazioni e le applicazioni emergenti in questi contesti.

Parole chiave: Zaha Hadid; VR Architettura; Metaverse; Metrotopia

Zaha Hadid Architects (ZHA) has long been synonymous with architectural innovation, continually pushing the boundaries of design and technological integration. One of the firm's most revolutionary undertakings has been its transition to a fully digitized 3D design process, positioning ZHA as a leader in digital design coordination and production. In 2014, ZHA established the ZHVR Group as a dedicated research team with the primary goal of exploring the integration of virtual reality (VR) technology into its design practices. This marked the beginning of a paradigm shift in how architecture is conceived, experienced, and interacted with—laying the groundwork for a profound transformation in both the profession and its relationship with space.

The integration of VR within ZHA is more than just a technological enhancement; it represents an ontological shift in architecture. As the boundaries between physical and digital spaces blur, the ZHVR Group has been instrumental in leveraging VR to go beyond traditional visualization and presentation. VR offers immersive spatial experiences and fosters new design methodologies that transcend the limitations of conventional architectural practices. In this respect, ZHA's use of VR is a form of *poiesis*, an act of creation that opens new pathways for understanding and interacting with spatial environments.

At the heart of ZHVR Group's work are three key areas:

- 1. the adoption of VR as an essential design tool,
- 2. the development of VR platforms and applications for both design teams and clients
- 3. the exploration of the aesthetic and formal potentials of virtual environments.

Through collaborations with the extended reality (XR) industry and the construction sector, ZHVR Group continues to pioneer new forms of collaboration and spatial experimentation. This drive for innovation is evidenced in a range of projects, each contributing to the ongoing evolution of architecture as an interactive, immersive, and democratized process.

One of ZHA's earliest ventures into VR was a collaboration with Google Arts & Culture, aimed at developing virtual reality experiences based on Zaha Hadid's early paintings and drawings. These VR experiences translated Hadid's abstract, visionary artworks into three-dimensional spatial narratives. This project illustrated the power of VR to transcend traditional architectural representation, allowing users to explore Hadid's work in a manner that bridges the gap between art and spatial design.

The Danjiang Bridge VR Experience is another project that exemplifies VR's potential in architectural visualization. Developed for the Global Design Laboratory Exhibition in Taipei, Taiwan, this project allowed users to virtually explore ZHA's Danjiang Bridge from multiple perspectives, highlighting key design elements and lighting scenarios. Such immersive experiences are not just informative but offer experiential insights into the interplay of form, function, and aesthetics in a way that traditional renderings cannot match.

In 2018, ZHVR Group further expanded its exploration of real-time rendering in VR through a collaboration with Epic Games and Line Creative. The project focused on the Heydar Aliyev Centre in Baku, Azerbaijan, using Unreal Engine 4 to create a real-time VR experience that emphasized the immersive qualities and visual intricacies of ZHA's iconic design. This collaboration high-lighted the synergy between architectural vision and cutting-edge gaming technologies, showcasing the potential of VR to not only visualize architecture but also engage users in deeply interactive spatial experiences.

ZHVR Group's innovative spirit continued with Project Correl 1.0, an interactive VR installation developed for the *Design as Second Nature* exhibition in MUAC, Mexico City. This project allowed multiple users to collaboratively sculpt and manipulate virtual environments in real time, pushing the boundaries of collective creativity and underscoring VR's role in democratizing the design process. The experience demonstrated how VR can transform the design environment into a shared space of experimentation, where users can engage in an active dialogue with the architectural form.

In 2022, ZHVR Group unveiled the SuperChalet, a cybernetic architecture concept developed in collaboration with NASA astronaut Scott Kelly and FUTURLOGIC. This project represents a shift in architectural thinking—where architecture, communication technologies, and feedback mechanisms merge to create new modes of inhabiting space. The SuperChalet exemplifies ZHVR Group's commitment to redefining architecture in light of emerging global lifestyles and technological advancements.

One of the most ambitious projects undertaken by ZHA, with contribution from the ZHVR group is the launch of Metrotopia, a metaverse platform that serves as a virtual hub for the global design community. Developed in partnership with ArchAgenda in Chicago, Metrotopia bridges multiple design disciplines, including architecture, urban design, fashion, and product design. Metrotopia is now a metaverse company with an open access model and a curated community, Metrotopia fosters collaboration, cultural exchange, and design discourse on an unprecedented scale. It brings together creative professionals, educational institutions, museums, galleries, and media outlets, creating a nexus for innovation in both the virtual and physical realms.

Metrotopia made its debut at the 2023 Venice Architecture Biennale with the virtual exhibition *Knowledge Transfer* as part of the *Students as Researchers: Creative Practice and University Education* exhibition. The project featured works from renowned architecture studios, including OMA, Morphosis, Coop Himmelb(l) au, UnStudio, and ZHA, as well as contributions from artists such as Kenny Schachter and faculty from Sci-Arc. This exhibition underscored Metrotopia's role as a platform for creative experimentation and the dissemination of architectural knowledge in the digital age.

As Zaha Hadid Architects continues to explore the potentials of extended realities (XR), it is clear that the fusion of architecture and VR is not merely a technological novelty. Rather, it is a catalyst for redefining how we conceive,

design, and experience the built environment. By embracing virtual reality, ZHVR Group is paving the way for a future where architecture is no longer bound by physical constraints but can evolve as a dynamic, immersive, and participatory medium, transforming the way we engage with space, history, and culture.



Figure 1. Zaha Hadid, Early Paintings and Drawings Exhibition, courtesy of ZHVR Group.



Figure 2. Zaha Hadid, *Early Paintings and Drawings Exhibition*. The Great Utopia (1992), courtesy of ZHVR Group.



Figure 3. ZHVR, Danjiang Bridge. Virtual Reality Experince, courtesy of ZHVR Group.



Figure 4. Heydar *Aliyev Centre*. Collaboration between Zaha Hadid Architects, Epic Game, and Line Creative, courtesy of ZHVR Group.



Figure 5. Heydar *Aliyev Centre*. Collaboration between Zaha Hadid Architects, Epic Game, and Line Creative, courtesy of ZHVR Group.



Figure 6. Project Correl 1.0, courtesy of ZHVR Group.



Figure 7. *Project Correl 1.0*, courtesy of ZHVR Group.



Figure 8. SuperChalet by ZHVR Group, courtesy of ZHVR Group.



Figure 9. SuperChalet by ZHVR Group, courtesy of ZHVR Group.



Figure 10. Metrotopia Metaverse by ZHVR Group, courtesy of ZHVR Group.



Figure 11. Metrotopia Metaverse by ZHVR Group, courtesy of ZHVR Group.