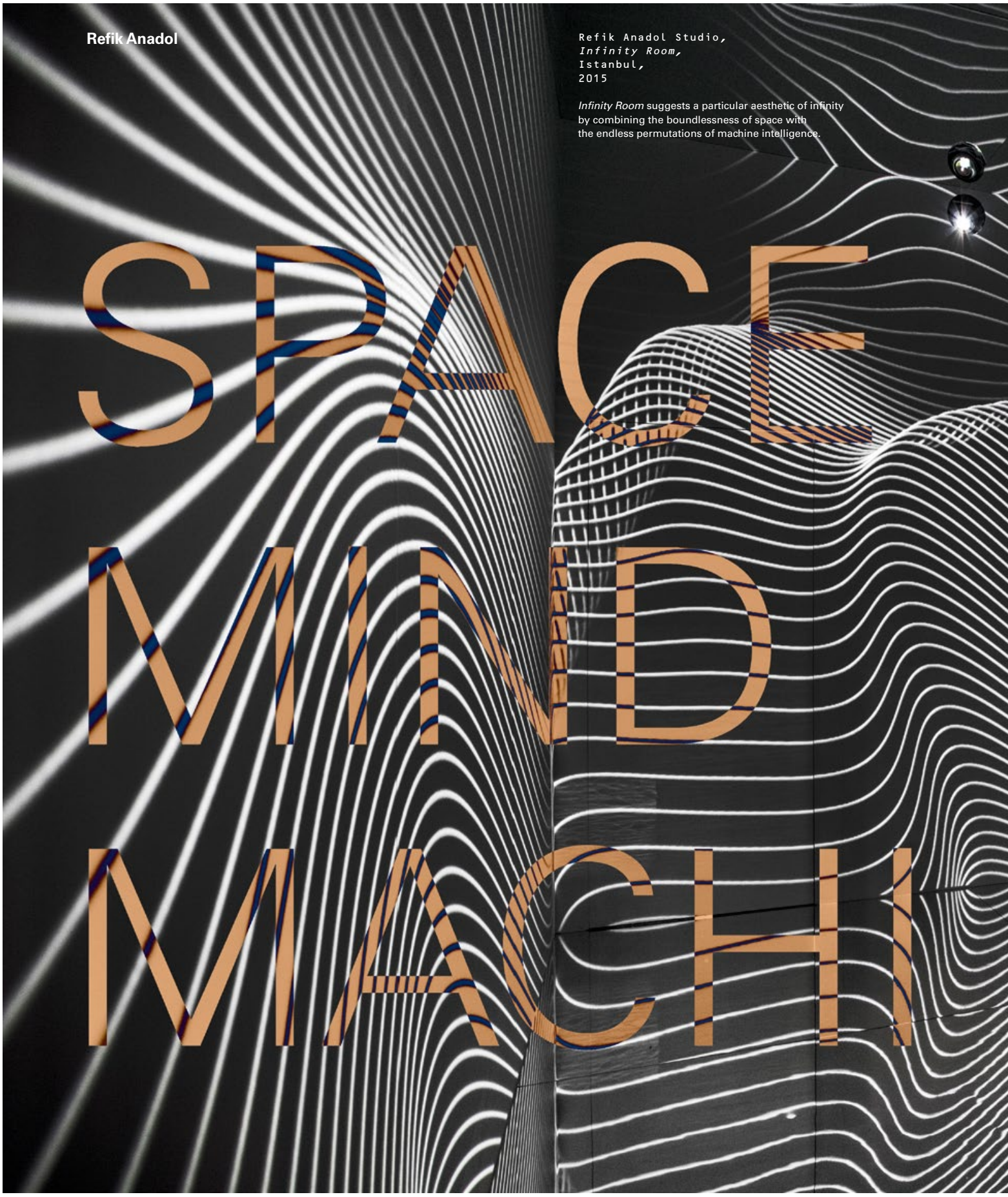


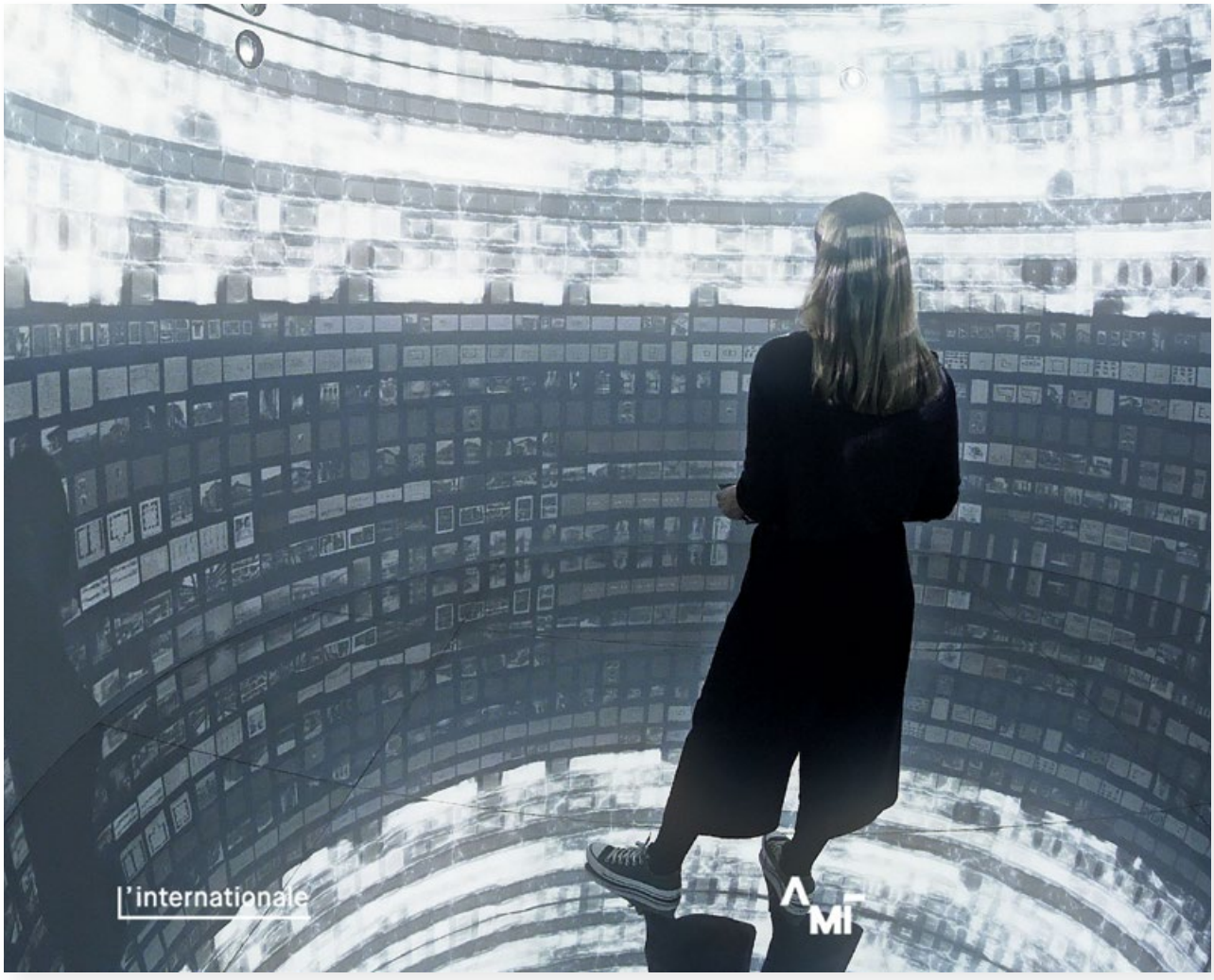
Refik Anadol

Refik Anadol Studio,
Infinity Room,
Istanbul,
2015

Infinity Room suggests a particular aesthetic of infinity by combining the boundlessness of space with the endless permutations of machine intelligence.

Director and founder of Refik Anadol Studio in Los Angeles and researcher in the Department of Design Media Arts at the University of California, Los Angeles (UCLA), **Refik Anadol** collaborates with machine intelligence to create multi-sensory immersive environments that reinvigorate the public realm, animate surroundings and explore the non-linearity of time. His works are colourful, thoughtful, experimental and engaging.

If machines can 'learn' or 'process' individual and collective memories, can they also dream about them? Does being an AI in the 21st century simply mean not forgetting anything? What does it mean to be human in the age of artificial intelligence when time-spaces can be expanded and transformed into *multiverse* experiences in the mind of a machine? When I walked into Google's Artists & Machine Intelligence Program in 2016 to start my residency on a research project at the intersection of neuroscience and architecture, these were the primary questions that later became the building blocks of my 'Machine Hallucinations' series – an ongoing exploration of data aesthetics based on collective visual memories of space, nature and urban environments. In my mind, 'the future of being human' confronted the complex question of quantifying consciousness through AI-based digital aesthetics. My goal was to collaborate with the machine-mind to redefine consciousness with a new vocabulary of world-making. With the establishment of Refik Anadol Studio (RAS), we began exploring how the perception of time and space were radically changing now that machines dominated our everyday lives and how the digital age and AI allowed for new aesthetic techniques to create enriched immersive environments.



Refik Anadol Studio,
Archive Dreaming,
SALT Galata, Istanbul,
2017

opposite: By training a neural network with images of 1,700,000 documents at the SALT research centre in Istanbul, Refik Anadol Studio created an immersive installation to reframe the memories, histories and cultures of the city.

Refik Anadol Studio,
Pladis: Data Universe,
Istanbul,
2018

below: In this project, RAS explored the concept of infinity by transgressing the boundaries of a traditional viewing experience and transforming the conventional flat cinema projection screen into a three-dimensional kinetic and architectonic space.

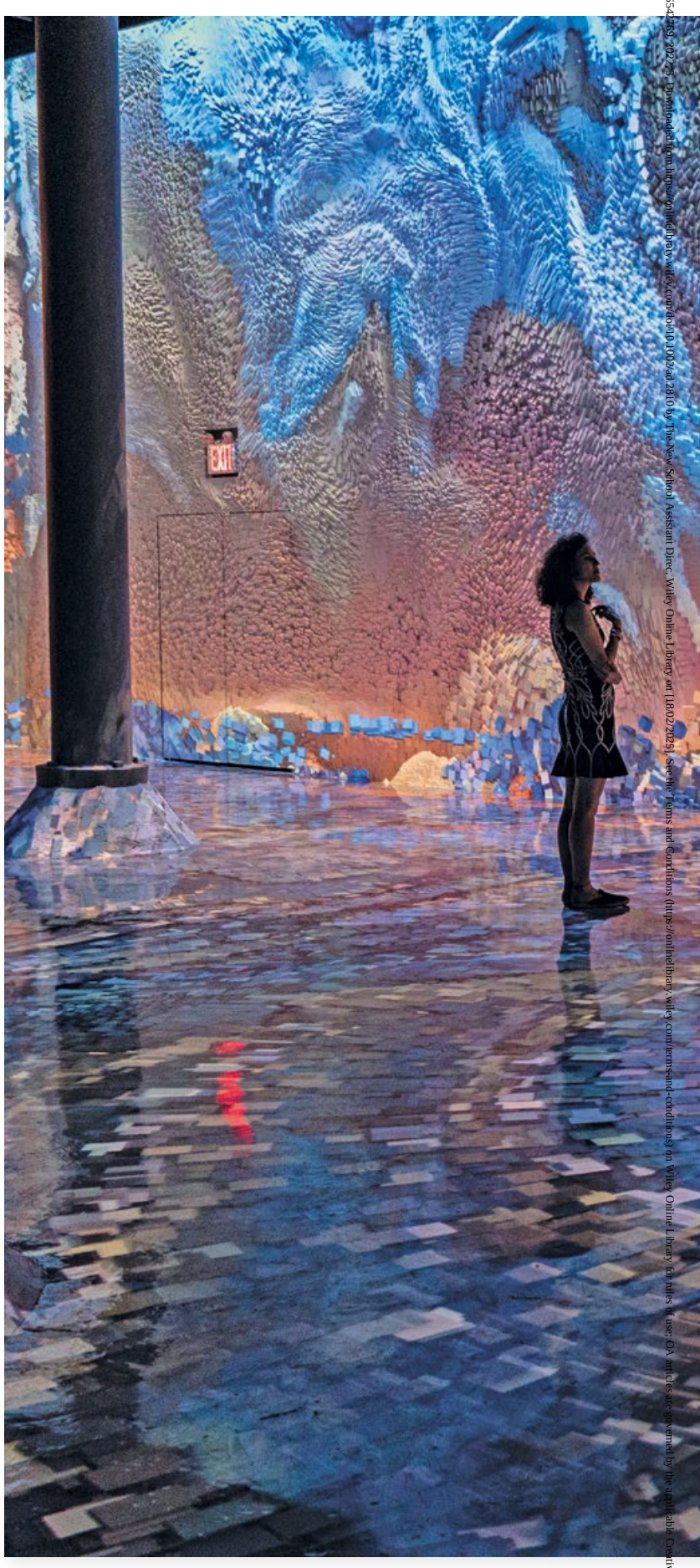
Since 2016, RAS has been conducting interdisciplinary research on the relation between the human mind, architecture, aesthetics and new media forms to speculate computational and representational concerns about the perception of environment(s). These inquiries have centred around a pioneering concept that emerged from our art practice to become a research unit: Latent Cinema. Thinking and producing at the intersection of AI, aesthetics and architecture, the studio has been reflecting on new forms of narrating collective memory and history by creating immersive spaces and interactive artworks that would transform traditional understandings of the public sphere. Experiments with synaesthesia, networked media and interconnectivity through interactive, site-specific installations are used to represent machine-based, latent data universes in urban locations that enable deliberation on what media art scholars Janine Marchessault and Susan Lord call 'cinema's expanding architectures'.[1]

Machine Hallucinations

Simulating non-linearity of time and experiences in immersive environments comes with the interdisciplinary question of how new media art and post-digital architecture can help artists speculate new definitions of consciousness and intelligence. From this perspective, cognitive neuroscientist Anil Seth's research on consciousness and hallucination poses inspirational challenges to define the scope of such immersive art projects. Seth proposes that normal perception can be seen as a kind of 'controlled hallucination', and that the brain uses predictions and models 'to best anticipate the flow of noisy and ambiguous sensory signals in which it is continually immersed'.[2] What the 'Machine Hallucinations' series seeks to uncover is the possibility of creating a similar immersion experience through art to feel like we are in the mind of a machine-brain that hallucinates based on the data that it artificially 'perceives'.

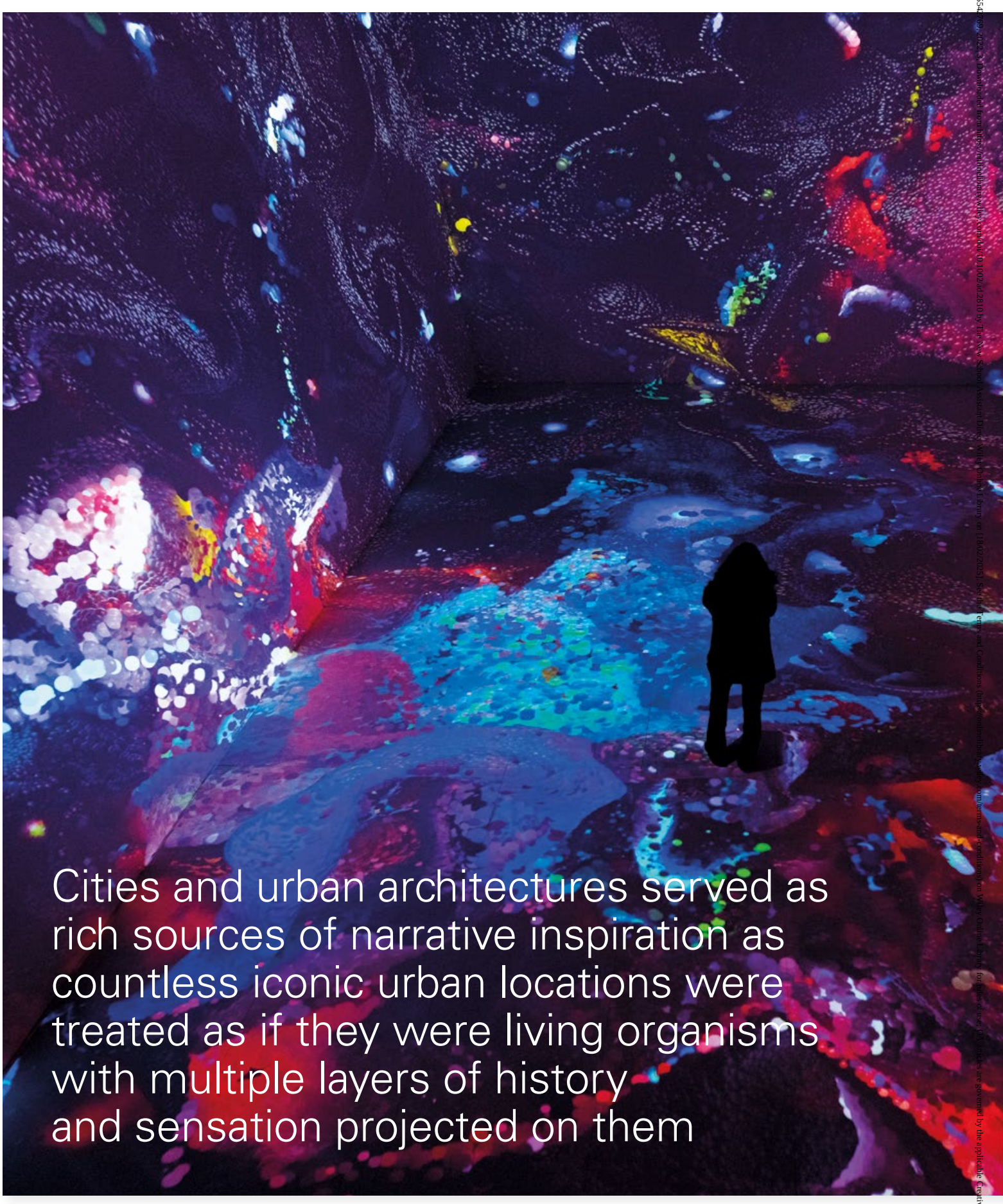
Since the inception of 'Machine Hallucinations' in 2016, I have been utilising machine intelligence as a collaborator with human consciousness, specifically deep convolutional generative adversarial network (DCGAN), personalised general adversarial network (PGAN) and StyleGAN algorithms trained on vast datasets to unfold unrecognised layers of external realities. Collections of data from digital archives and publicly available resources are processed with machine-learning classification models to filter out people, noise and irrelevant data points. The sorted image datasets are then clustered into thematic categories to better understand the semantic context of the data universe. This expanding data universe not only represents the interpolation of data as synthesis, but also becomes a latent cosmos in which hallucinative potential is the main currency of artistic creativity.

As a masterfully curated multi-channel experience, 'Machine Hallucinations' brings a self-regenerating element of surprise to the audience and offers a new form of sensational autonomy via cybernetic serendipity. For ARTECHOUSE's New York City location, a special edition was created in the form of a data universe in 1,025 latent dimensions by deploying machine-learning algorithms on over 100 million photographic memories of New York City found in social networks. *Machine Hallucination: NYC* thus generated a novel form of synaesthetic storytelling through its multilayered manipulation of a vast visual archive beyond the conventional limits of the camera and existing cinematographic techniques. The resulting artwork was a 30-minute experimental cinema, presented in 16K resolution, that visualised the story of New York through the city's collective memories which constituted its deeply hidden consciousness.



Refik Anadol Studio,
Machine Hallucination: NYC,
ARTECHOUSE, New York City,
2019

Machine Hallucination: NYC is a 30-minute experimental cinema, presented in 16K resolution, that visualises a data-based narrative of New York City by deploying machine-learning algorithms on over 100 million photographic memories of the city found publicly in social networks.



Cities and urban architectures served as rich sources of narrative inspiration as countless iconic urban locations were treated as if they were living organisms with multiple layers of history and sensation projected on them

Refik Anadol Studio,
'Machine Memoirs: Space',
Istanbul,
2021

'Machine Memoirs: Space' was a free public art exhibition that brought together the studio's richly diverse works on the theme of space exploration, inspired by a recent collaboration with the NASA Jet Propulsion Laboratory.

From *Latent Being* to Latent Cinema

On 23 November 2019, RAS launched *Latent Being* – a site-specific, immersive art experience in a former East Berlin power plant called Kraftwerk. For this debut solo exhibition in Germany, we transformed the cathedral-like, vast concrete space of Kraftwerk into a dynamic, temporary, interactive human–AI ecosystem that operated on biofeedback technology. Ten million publicly available visuals as well as sonic and architectural memories of the city were processed through machine-learning algorithms. The installation's interactive component invited the audience to submerge themselves into this synaesthetic cinema experience by simply moving in this historically, culturally and architecturally palimpsest space.

Perception of space – whether it is physical, digital, topological, quantum or hyper – requires various kinds of interactive and cognitive processes through which the audience becomes aware of the relative positions of the *things* around them. Our techno-aesthetic inquiries into how the human mind makes sense of spaces focus on the symbiotic relationship between architecture, neuroscience, technology and machine learning. Stretching beyond a linear understanding of time, movement and causality, *Latent Being* suggested a new sense of space-making through architectural narratives.

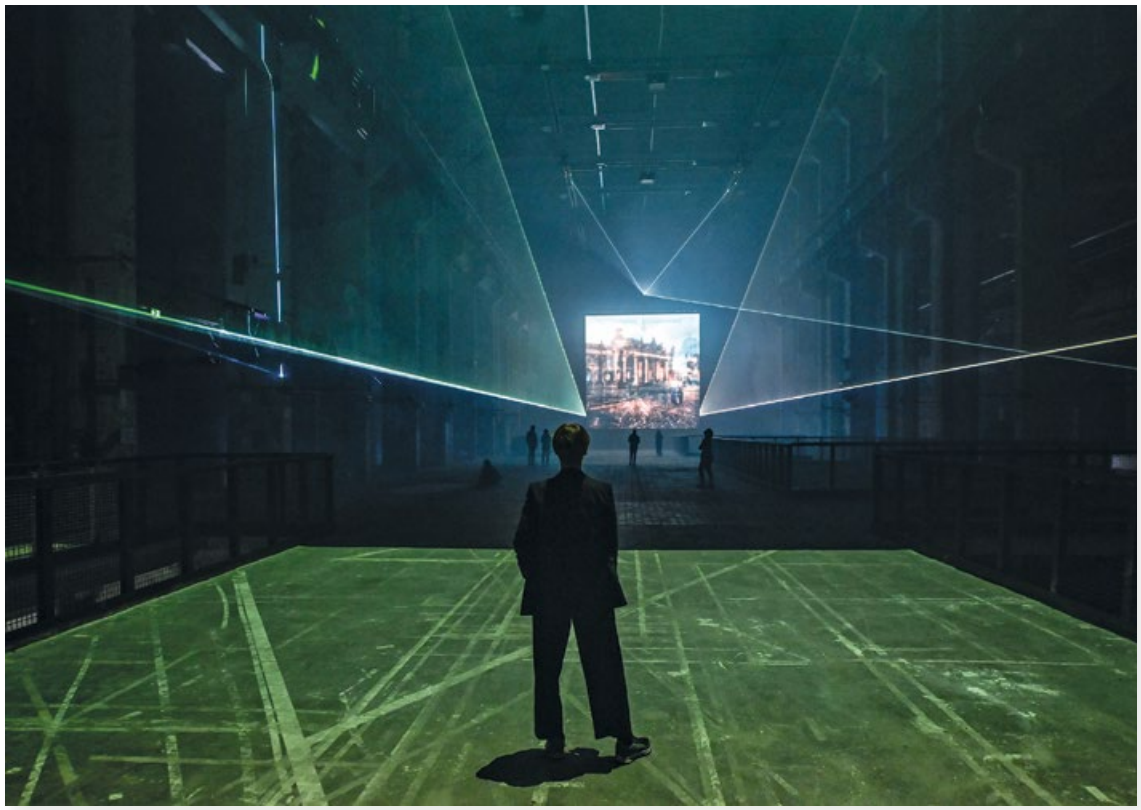
Central to the artwork was the ingestion of vast amounts of Berlin-related digital data, like the radical and fully immersive data visualisations of digitised collective memories that were accomplished in the *Infinity Room* series (begun 2015) and in *Machine Hallucination: NYC*. In all three works, cities and urban architectures served as rich sources of narrative inspiration as countless iconic urban locations were treated as if they were living organisms with multiple layers of history and sensation projected on them. Thus, 'data poetics' became a recurrent phrase and a seemingly incongruous way to describe the machine's espousal of the lyrical yet objectified traces of human memories, such as photographs, maps, documents and recorded sounds.

'Connecting with an audience is the point of any story. The question is, how? And how do you know when you've done it?' asks digital anthropologist Frank Rose in his 2021 book *The Sea We Swim In: How Stories Work in a Data-Driven World*.[3] In *Latent Being*, different from our earlier works in the same vein, interactivity took the project to an unprecedented level of theatrical and poetic representation. As the audience found themselves walking through abstract representations of the AI's neural networks, the machine simultaneously learnt about the elements that made up the building's form – not just its physical structure, but also the life inside it. Visitors were observed and became physically connected to the artificial neural process. Eventually, the constant data input – representations of movement, social interactions and space – got transformed into a hallucinogenic large-scale LED screen painting. The artwork was accompanied by a sound piece based on AI-processed field recordings of Berlin also found on the internet.

What visitors of Kraftwerk contributed to was the artwork's continuity, its constantly unfolding narrative in time, representing the ways in which effective human–machine interactions might play a role in shaping the future. The visitors were provided with a tracking device as part of the exhibition. The machine collected location data in addition to recording the amount of time each visitor spent in the installation space. This data, in turn, changed the pace and shape of the AI cinema narrative which the audience was watching and manipulating. The controversial use of the word 'narrative' in relation to an immersive work emerging from a database – a cultural form that represents the world as a list of items without obeying any cause-and-effect trajectory – is intentional. If, as media archaeologist Lev Manovich suggests, both data and narrative 'claim an exclusive right to make meaning of the world',[4] in their respective ways, the intention in *Latent Being* was to speculate what consciousness and perception of space might mean in a post-digital world.

Architecture as Narrative

The principal architectural statement of *Latent Being* depended on its aesthetic and cinematic qualities, mainly the ways in which the city's, the building's and the visitor's collective memories merged in the mind of a machine to achieve an example of 'synaesthetic cinema through multiple superimpositions'.[5] In addition to evoking a sense of dynamic and expanded consciousness with its strong emphasis on multiplication of spaces and times, the installation pioneered a cinematic storytelling innovation that resulted in an audio-visual, decentred and disorienting space. Following Manovich's theorisation of 'narrative as network', this space could be defined as a fluid architectural sensation where 'a simultaneous flattening and deepening of narrative' took place, turning the interactive installation into an incessant storytelling machine based on unbroken data inflow. 'On the one hand, a narrative is "flattened" into a database. A trajectory through events and/or time becomes a flat space. On the other hand, a flat space of architecture or topology is narrativized, becoming a support for individual users' trajectories.'[6] The idea of narrativising architecture was one of the main elements of the artwork. Equally important was the process through which the audience became part of the narrative by



Refik Anadol Studio,
Latent Being,
Kraftwerk,
Berlin,
2019–20

right: The Kraftwerk building acts as a symbol of a larger narrative which Anadol explores, reminding us that our relationships with other minds – human or artificial – are what we make of them.

opposite: As the machine processes the gigantic visual dataset using the VGG16 neural network, an ocean of images, light and layers of neurons fills the space.

being simultaneously exposed to a hallucinatory level of fragmentation and an expanding (yet enclosed) network of unimaginable connections. Thus, their unpredictable (yet trackable) movements became emblematic of this productive tension, furthering the artwork's central theme about the multi-directionality of collective history.

In his 2001 article 'Towards an Immersive Intelligence', Joseph Nechvatal defined immersive art as 'positing itself as a meta-symbol of and for expanded human potential', because 'aesthetic immersion is about simulation of our internal perceptual circuitry through excess'.[7] *Latent Being* was designed as a space of contemplation where such excess was multi-directional, like the memory itself. A significant feature that public data and stories share is the fact that they do not belong to anyone – they either have to be embedded into a context or projected onto one in order to gain meaning. That context, for *Latent Being*, emerged within the virtual, latent, multidimensional space between the moving body, static architecture and ever-changing intensity of light.

In this way, the Kraftwerk building acted as a symbol for another, larger narrative that the studio explored, namely the transformation of light into meaning with the help of machine intelligence. While the dominant narratives concerning AI in our society tend towards a rather reductive model in which the machine-mind becomes a slave to the human-mind for the advancement of human life only, both 'Machine Hallucinations' and *Latent Being* speculate a subversive narrative of collaboration which, in the long run, might bestow more meaning on how humans connect with their various physical environments.

Latent Being was also a speculation of how the digital age was changing the way we tell visual stories in architectural spaces. The subtitle of Frank Rose's 2012 book on new media and immersive narratives, *The Art of Immersion*, is 'How the Digital Generation Is Changing Hollywood, Madison Avenue, and the Way We Tell Stories'.[8] The list of changing entities that he uses is interesting, as it starts with real (and metonymic) place names and ends with storytelling. It almost indicates that the digital generation changes spaces and institutions in order to change how we tell stories *in* them and *for* them. This is precisely what I seek to uncover by making buildings, institutions and cities tell their own stories with the help of an artificial mind that has the capacity to make connections between memories (data points) in the form of immersive and site-specific visual narratives. ⌂

This article was written with the research support of Pelin Kivrak, Senior Researcher of Refik Anadol Studio.

Notes

1. Susan Lord and Janine Marchessault, *Fluid Screens, Expanded Cinema*, University of Toronto Press (Toronto), 2008, p 27.
2. Anil Seth, 'What In The World Is Consciousness?', *ScienceNordic*, 26 October 2018: https://sciencenordic.com/biology-denmark-forskerzonen/what-in-the-world-is-consciousness/1459648.
3. Frank Rose, *The Sea We Swim In: How Stories Work in a Data-Driven World*, Norton (New York), 2021, p 45.
4. Lev Manovich, *The Language of New Media*, MIT Press (Cambridge, MA), 2005, p 225.
5. Gene Youngblood, *Expanded Cinema*, Studio Vista (London), 1970, p 111.
6. Manovich, *op cit*, p 284.
7. Joseph Nechvatal, 'Towards an Immersive Intelligence', *Leonardo* 34 (5), 2001, p 418.
8. Frank Rose, *The Art of Immersion: How the Digital Generation Is Remaking Hollywood, Madison Avenue, and the Way We Tell Stories*, WW Norton (New York), 2012.