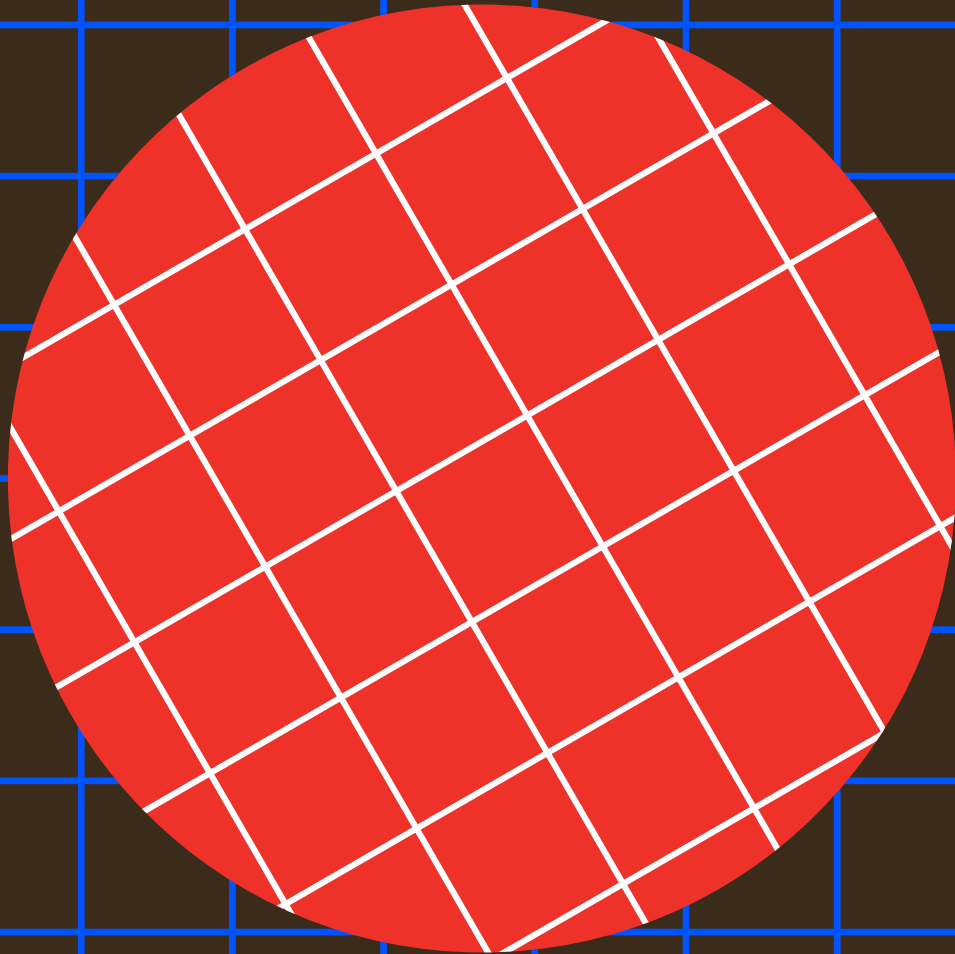


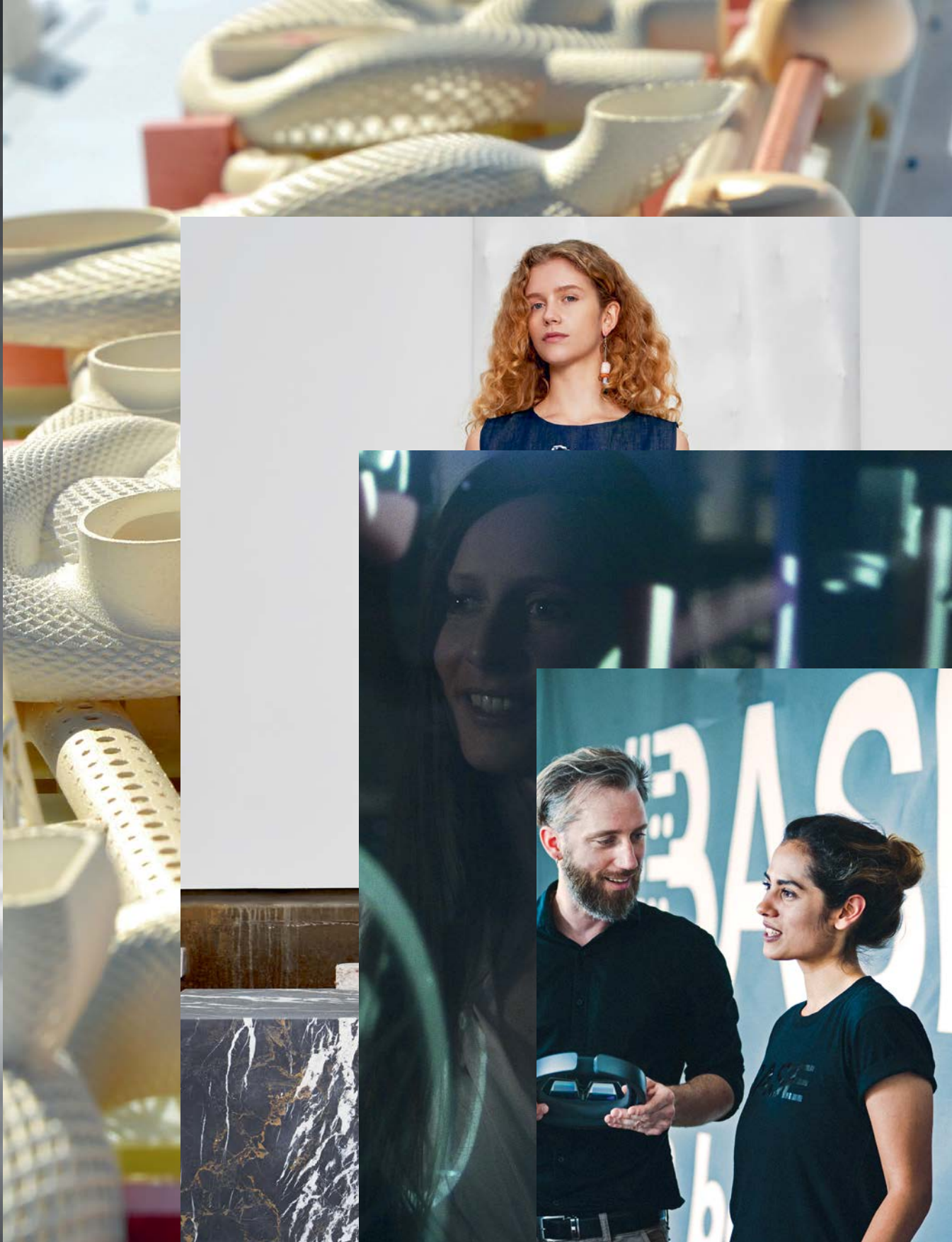
# DIGITAL REALITIES



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WHITE PAPER



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# DIGITAL REALITIES POTENTIALS OF IMMERSIVE TECHNOLOGIES IN THE CREATIVE INDUSTRIES

Analogue is only half the story. Virtual (VR), augmented (AR) and mixed reality (MR) are currently trending, and astounding announcements from the global technology incubators and development laboratories are continually promising extraordinary innovations. Both industrial enterprises and research centres are increasingly delving into these technologies. All the more reason for creative professionals to sound out the spectrum of what is currently available and to reinterpret it for their work.

With this white paper, the Vienna Business Agency looks into the role currently played by virtual and augmented reality in the creative industries and the direction these technologies will take in the future. It draws a highly varied picture of the creative industries and the many possible applications of digital realities, ranging from multimedia, games and film, music, sound design and publishing, through to architecture, fashion and cultural education.

The many different facets of VR, AR and MR are shown — as immersive experiences or live experiences, as new tools in the creative-artistic process, as art and culture mediators, and as innovative interfaces between humankind and the digital world.

These theoretical considerations also aim to inspire creative professionals to realise ideas: This white paper accompanies the “Digital Realities” funding competition, which has EUR 1 million in funds at its disposal to help projects be implemented.

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## TECHNOLOGY AND CREATIVE INDUSTRIES — RECIPROCAL IMPULSES

Creativity and technology stimulate each other. These reciprocal effects drive design processes and product innovations. Innovative added value is created when creative content is communicated in a new way and technological services add a virtual dimension to the creative products. The “Digital Realities” funding competition addresses the possible applications of VR, AR and MR for creative work. The Vienna Business Agency sees itself as a link between the different economic sectors. The aim is to overcome the boundaries between disciplines and to foster qualities through crossover constellations.

VR, AR and MR create new levels of experience and have the potential to open up unexpected perspectives. They make co-creation and inter- and trans-disciplinary communication — even with non-experts — easier. In the creative design process, the new digital tools are put to a variety of uses in prototyping and product design. New forms of marketing and customising arise; for example, virtual showrooms or VR product configurators.

How a society embraces and uses innovative technologies is the result of a variety of assimilation and testing processes. If one sees the creative industries as a driver and catalyst, the added value could be extremely far-reaching. In connection with digital realities, creativity can have an enriching effect not only socially but also

individually, functioning almost like a kind of “empathy engine” that facilitates a change of perspective, encourages us to interact with the unfamiliar, thus also promoting emotion.

In any case, the new digital realities harbour a wealth of potential for creative enterprises.

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### VR GOGGLES ARE NOT JUST ROSE-TINTED

Where there is great enthusiasm there is also skepticism. Whether with regard to the limits of physical movement and perception that come to bear in a virtual experience, a lack of confidence in these new worlds, or the absence of community formation — because, at least for the moment, users remain (largely) alone with their experience in the digital reality: These points are crucial and must be dealt with in order to advance the developments. In addition, codes of conduct and rules, i.e. key ethical issues, and also the gap between digital and real perception are topics that call for social, creative and technological debate.

It is also possible that some people are mistrustful of a field in which there is so much happening at the same time and the changes seem overwhelming. On top of that, production involves a lot of effort and high costs, especially in virtual reality.

The aim of the Vienna Business Agency’s “Digital Realities” funding competition is to help companies from all areas of the creative industries to implement their VR, AR and MR projects, and thus to leverage existing potentials in Vienna. This white paper also hopes to inspire creative professionals to look into these new technologies and use them in their work, because their creative services and content are essential to the success of the medium.

The hardware is becoming more diverse and more readily available, the VR/AR software is often available for free and with open data in open source programs, cross-media collaborations are yielding results, and storytelling, which is so essential to designers, is coming to the fore.

How can interested creatives now effectively make use of VR, AR and MR — be it in the design or work process, or for marketing and distribution purposes?

This white paper takes stock of the possibilities and explores these and other questions. To this end, numerous conversations with players and representatives of the Viennese scene took place: Several Creators Labs and round table discussions were the inspiration for the content and examples in this paper. At the same time, this paper, intended as a stimulus for new strategies, services and products in the Viennese creative industries, is a framework for the “Digital Realities” funding competition, a compass for the development of future examples of innovation and a sensorium for the status quo in Vienna and beyond.

Players from a variety of sectors give an account of their experiences and expectations. Selected products and services provide insight into the tools that are already available and that can be used by creative professionals to realise their own innovations.

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### IN THIS WHITE PAPER

The [first chapter](#) sets the tone for the application of immersive technologies. How easy is it for creatives to incorporate VR, AR and MR into their work? The paper discusses open source as a chance for innovation and addresses new forms of collaboration between creatives. Thomas Ragger examines the impact and potential of im-

**Virtual reality (VR)** is the term used for the presentation and simultaneous perception of reality and its physical characteristics in a computer-generated, real-time interactive virtual environment.

**Mixed reality (MR)** describes environments or systems that combine natural perception with an artificial (computer-generated) perception.

**Augmented reality (AR)** is that aspect of mixed reality in which reality is enriched with virtual information.

(Definitions based on Wikipedia)

mersive technologies for the creative industries. Issues relating to the democratisation of both knowledge and communication are also looked at. How can people with different background knowledge discuss technical content with one another and make informed decisions? What is the interface between experts and non-experts?

The creative design process is the main focus of [chapter two](#). The more intuitive and interactive work processes are, the shorter they become. Also, new digital tools enhance the creative process. Leo Lass asks how art can use VR to question established human perceptions. And Greg Lynn describes how a spatial discipline like architecture makes use of digital worlds.

A large number of innovative VR and AR products are constantly entering the market. [Chapter three](#) puts the spotlight on some of them. Fashion, music, games, film and art applications show innovative strategies, services and products, but also creative fields of application beyond the creative industries.

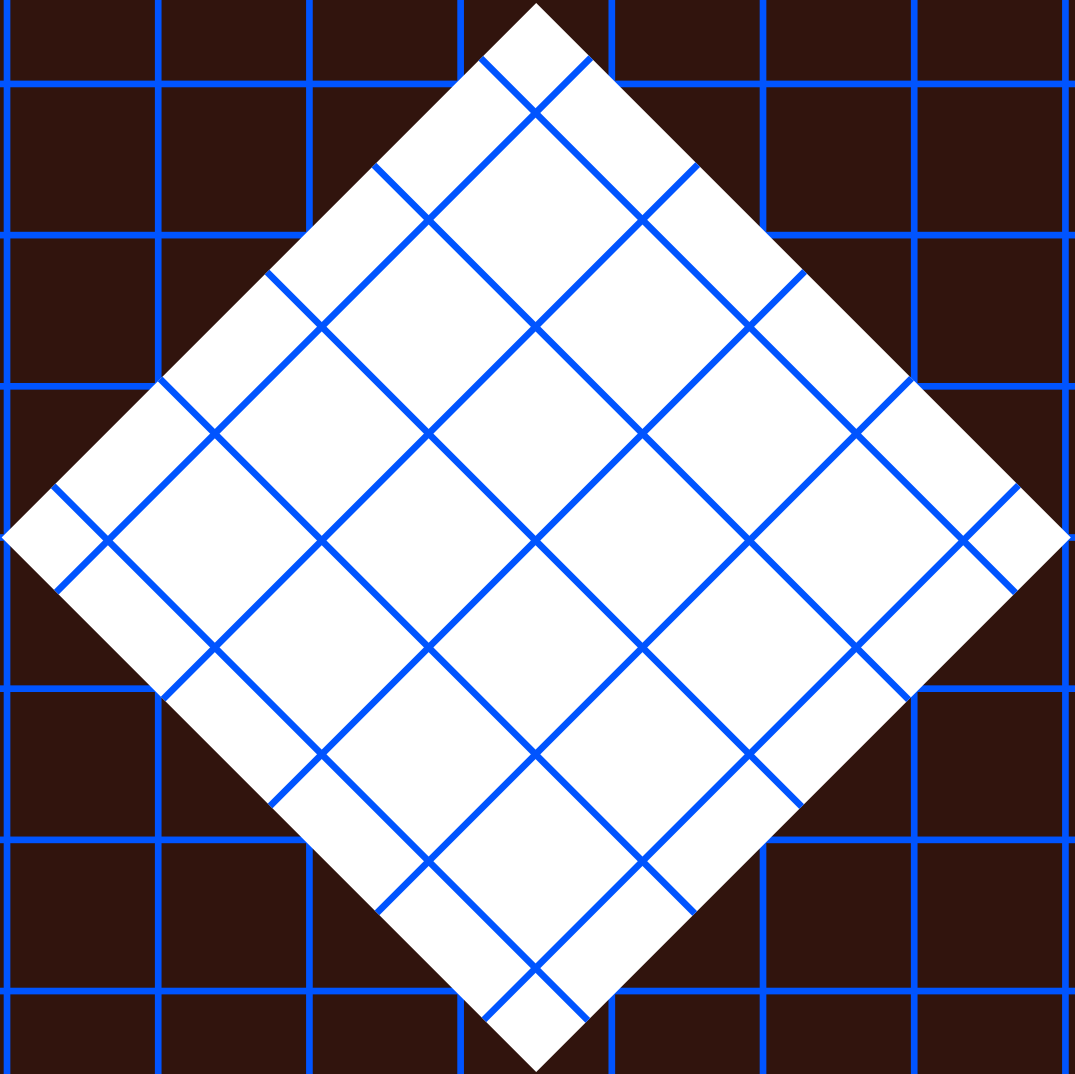
A newly shaped perception of reality also allows products to be experienced differently: in a more immediate, direct way and closer to the customer. [Chapter four](#) shows how mixed reality is taking fashion shows to the next level, and how these innovations are being employed in art education.

While everything up to here has revolved around the dimension of the conceivable and the possible, [chapter five](#) looks at the concrete requirements for new ways of working, product innovations and marketing strategies. Sara Lisa Vogl addresses the prerequisites for efficient work, such as networking and exchange of knowledge, as well as equipment and locations. Innovative funding and financing models are especially relevant in cases where the content and the creative component are the main focus, rather than technology being an end in itself. What could the next impulses in this field be for Vienna’s creative industries?

This white paper includes wide-ranging expertise from the intersection of the VR/AR scene and the creative industries. It is important to the editorial team to illuminate the subject from different angles, though there isn’t enough space for everything. Completeness is not the goal, because we are in motion.

The editorial team

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# THE LANGUAGE OF THE DIGITAL REALITIES

## NEW FIELDS OF WORK — NEW KNOWLEDGE

Which VR/AR/MR networks and resources can I use to benefit my business?

Where are cross-sector collaborations possible?

Which aspects of my VR/AR/MR work could be of interest to other sectors?

What possibilities do these technologies offer in terms of participatory processes and interaction?

# CREATING NEW REALITIES TOGETHER

## CONTRIBUTION BY THOMAS RAGGER

Immersive technologies such as virtual, mixed and augmented reality (VR, MR, AR) offer many interfaces in combination with language-based interaction and artificial intelligence. But the global trend toward virtual reality raises some issues.

How important is the hardware as opposed to the actual content?  
What are the implications of this development for the creative industries?

While the hardware is becoming less and less visible, the critical challenge now is in which form to actually integrate immersive technologies in our real life. Virtual reality (VR) offers us an example of this.

VR has been feeling the burden of high expectations for several years. At the beginning of 2017, shortly after winning an Emmy in 2016, the Oculus Studios were closed down by their new owner, Facebook. At the same time, the market is constantly seeing the introduction of new technologies that are expected to push the age of an immersive digital future. Augmented reality (AR) and mixed reality (MR) aim to increasingly break down the boundaries between real and virtual reality. And the first attempts in that direction have already proved to be quite

promising. Magic Leap, the VR goggles presented at the end of 2017, make use of a newly developed light field technology that allows our perception to perceive digital objects in a similar way to real objects. So great is the confidence in this technology, that Google and Alibaba, among other companies, have invested close to USD 2 billion in it.

VR was also the focus at CES 2018, the world's largest trade fair for consumer electronics held in Las Vegas. The gradual disappearance of the physical barrier was conspicuous, as more and more VR, AR and MR headsets no longer need bulky cables and massive hardware resources. Countless products that explore the possible applications for VR in an unprecedented



For all the rapid development, one still has the feeling that the technologies are in their infancy.



bandwidth were presented at the event. These include an indestructible VR headset for children and an efficiency-enhancing MR headset that supports logistics employees working in warehouses. And despite the rapid developments, one gets the feeling that these technologies are still in their infancy.

#### A COMMON CAUSE: NETWORKING & OPEN SOURCE

Hardware isn't the only sector making progress. On the software side, where most virtual worlds of experience could previously only be experienced alone, they are now being connected. Google and Facebook share the vision of virtual spaces as meeting points between which one can move via portals. This idea has already been implemented in new approaches like WebVR and WebAR, which allow VR/AR to connect to the Internet. Because VR/AR content can be experienced instantly via the Web and does not need to be purchased and downloaded on manufacturer platforms such as the Oculus store, small studios can now distribute their content inexpensively.

*Google Konterball* was one of the first experiments of this kind. It was designed and developed by our agency in collaboration with the Google Creative Lab in New York. The mechanism was simple: friends can compete against one another in an online ping-pong game. The innovation, however, was that you could only take part by visiting a website using Oculus Rift, Google Cardboard or Samsung Gear VR.

There are always exciting synergy effects between the many new technologies—also beyond VR. Speech recognition is constantly being optimised with the help of machine learning and is now finally also becoming feasible. Although VR users are completely cut off from their real environment, voice control gives them auditory access, which works entirely intuitively. With the help of platforms such as Dialogflow, it is possible to cre-

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ate interfaces that are based on conversation, without writing a single line of code. The complex topic of AI (artificial intelligence) is becoming more intuitive, simpler and more experiential.

With all these rapidly changing subdivisions, the open source method can fully exploit its strengths. The collective learns faster than the individual—large corporations have recognised this potential. Google, for example, not only made TensorFlow, a specially developed software library for machine learning, available, but also created Google Poly, an open source content platform for 3D objects that can be used license-free, for example in VR and AR experiences.

#### THE CONTENT IS THE INNOVATION DRIVER

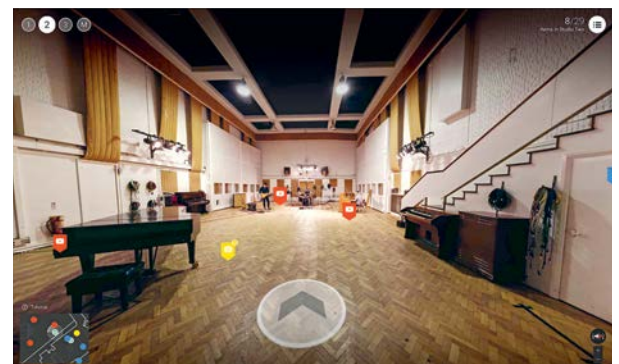
Although hardware and software are becoming more and more intuitive, the main component is still the content. This is how truly immersive reality can be transported and introduced to a large audience. In the course of a development in which the obstacles to experiencing virtual realities are gradually disappearing, the tools for the creative use of virtual technologies are also becoming increasingly affordable and more readily available.

Innovations such as Google's 3D Tilt Brush allow artists, who have mostly illustrated two-dimensionally up to now, to fully benefit from the depth and tangibility of virtual space in the creative process. The Vienna-based studio Salon Alpin and its director, Lip Comarella, are pioneers in this regard.

Artists are not the only ones who benefit from this development; the experimental approach and the combination of design, technology and storytelling also lead to exciting new applications in architecture, advertising, fashion and cultural education. In 2008 Dvein, a design collective from Barcelona, incorporated holograms into a Diesel fashion show, which formed part of the overall experience and were able to interact with the physical world. In 2012 this idea was taken even further when Tupac was brought back to life as a surprise guest at Coachella. →

Playing ping-pong together in VR: *Google Konterball*

Dive into the world of the Abbey Road Studios: a VR experience created by the London-based Stink Studios



**A** In 2016 the digital agency Stink Studios in London digitalised the famous Abbey Road Studios and created an interactive VR experience. This allows users not only to move through the iconic recording studios that have seen the likes of the Beatles, Oasis and Adele, but also to interact with them. They can experience past recording sessions in the virtual space or actively operate the mixer console themselves. A few months later, the same agency worked with *Drive* director Nicolas Winding Refn to create a completely immersive VR world for the cognac brand Hennessy.

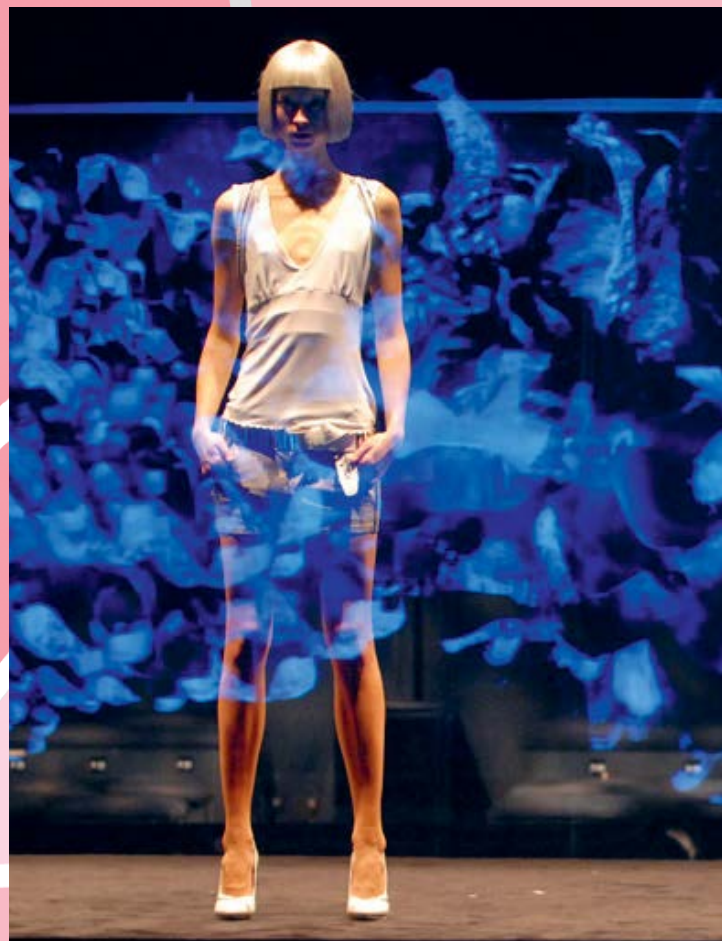
In early 2018, Google's Arts & Culture app gained greater visibility thanks to an AI application. The app takes users' selfies and searches an enormous database of historical portraits for resemblances, to determine whether they look more like Henry VIII or Louis XVI. Thanks to this simple idea, downloads skyrocketed. Google also dominates the topic of experiential AI elsewhere, whether with Google Experiments such as Quick Draw or with Google Assistant.

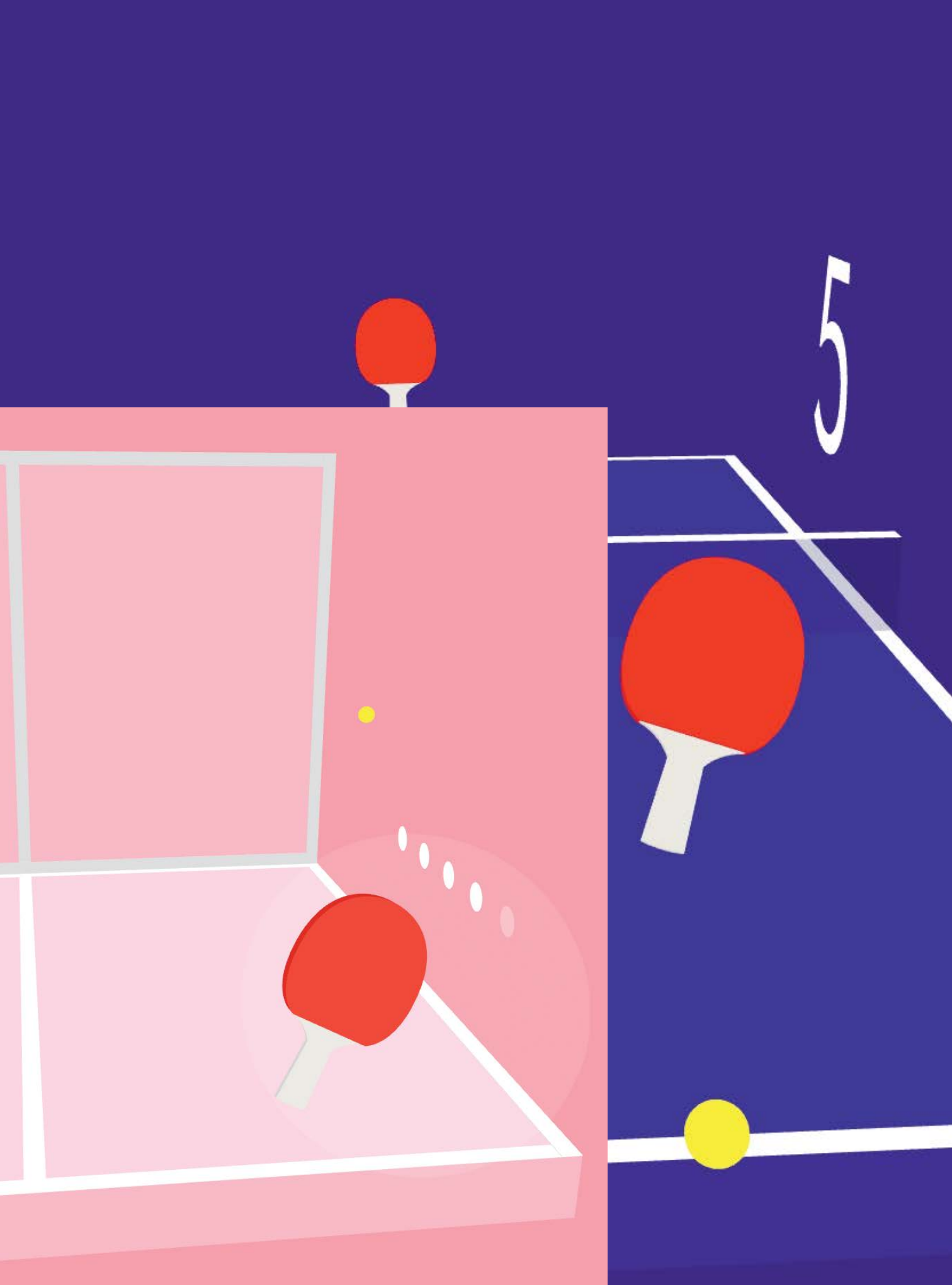
### SUMMARY

The hardware and technologies are becoming ever less complex, allowing them to disappear into the background. It is up to the content to make an impression and to invite users to take part in the concept of an immersive reality. The "right" approaches for this have however not yet been fully formulated and can only be developed through new experiments and prototypes. This is the challenge for the creative industries. For this it is important not to limit oneself to a niche, but to work across disciplines and to enter into an exchange between design, architecture, culture (education) and many other fields. We have reached a point where we are literally able to create new realities, and together we should make use of these possibilities as designers, developers and, above all, as implementers.

**Thomas Ragger** is one of the three managing directors of wild, a digital branding agency based in Vienna. After completing his studies in Information Design (BA) and Media & Interaction Design (MA) in Graz, he spent several years in Paris, London and New York. There, he was involved in developing digital campaigns for brands such as Adidas, Wrangler and Google. In 2013 he returned to Vienna, where he has since been working for national and international clients with his company wild.

In 2008 the design collective Dvein incorporated holograms in a fashion show for the Diesel brand.





# TESTING AND EXCEEDING LIMITS IS AN INTEGRAL PART OF THE ACT OF PLAYING

## INTERVIEW WITH JOGI NEUFELD

Jogi Neufeld, an expert in digital gaming culture, founded SUBOTRON in 2004. SUBOTRON serves as a port of call and meeting point for all things relating to the theoretical and practical discourse on the subject of “digital games”. In 2017 Jogi Neufeld organised PLAY AUSTRIA, the first Austrian gaming trade fair, with a focus on virtual reality.

**The gaming industry is a major driver for VR, AR and MR hardware and software. Many experiences are developed on game engines. How does this trend impact the gaming industry?**

In the 50 years of its existence, the gaming industry has always embraced experimentation and provided impulses for new technological and creative developments. It is only logical that game engines are now the decisive tool for the most innovative technology, and this in turn encourages developers to explore and exceed further limits — which is itself an integral part of the act of playing.

**Does this open up new fields of activity for studios and in the area of game development?**

Many protagonists of the scene are still unaware of the value of their knowhow beyond products for the games market. They still need to recognise and find the potential of cooperation partners and clients from areas such as health-care, architecture, tourism and art. The first basic requirement for interdisciplinary work is a portfolio that is open in terms of both form and content. A playful trial and error approach on both sides is most productive in this regard.

**Are these developments already noticeable in the local scene?**

Game developers acquire skills that allow them to do what they love: create games. The volatile global market almost always proves to be an obstacle for free creative spirits, at least at the beginning. For this reason, in this country too, they are compelled to broaden the scope of their business plans in order to try monetise their knowhow outside their original economic habitat.

**Game engines such as Unity or Unreal are mainly used because of their relative ease of use and low threshold. Have the means of production been democratised?**

Since the first big wave of indie games at the end of the noughties, this democratisation has not only been happening in product development, but also in financing (e.g. crowdfunding), marketing (e.g. influencers) and distribution (e.g. PC and mobile platforms). Free software is fueling the pioneering spirit of hobbyists and ambitious bedroom producers as well as student projects. At best, it leads to professional companies or postgraduate training within and without the industry.

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Visitors had the opportunity to test VR games at the PLAY AUSTRIA trade fair.  
[subotron.com/playaustria.com](http://subotron.com/playaustria.com)



# DESIGN IS A MATTER OF COMMUNICATION

## CONTRIBUTION BY EFA DORINGER

In the course of architectural or planning projects, the question of how to convey the design to various groups of people is a recurring issue. These include residents or users, planners or partners from other disciplines, or the competent authorities, who need be able to understand the plans, views or models in order to be at eye level in discussions.

While it is relatively easy for those involved in planning to talk about technical details — not least because they have similar competences and overlapping basic knowledge — it is much more difficult to grasp aspects of the design, composition and perception.

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### THREE CHALLENGES

First: Urban planning is a complex field. Different professional competences collide, and the communication between the many professions is sometimes difficult at the interfaces. Interdisciplinary work across borders takes a lot of time, communication and willingness—factors that are often missing in the day-to-day planning process. The parameters and requirements with regard to planning differ, depending on whether the field is landscaping or urban design, transport planning or architecture. Still, there is one common goal: to realise high-quality projects.

Second: The ability to read and understand plans is crucial to having a say in planning decisions. But it is often the general public or non-experts who are directly affected by these decisions. In a democratic society, participation, and thus also the simple communication regarding planned projects, must be possible for everyone.

Third: It's all about things that do not yet exist. Assessing future realities as if they were already built requires visual, three-dimensional thinking, knowledge of materials and an understanding of light, shading and dimensions. But since not every citizen is also an urban planner and not every resident a landscape architect, we need other ways of communicating about future solutions across disciplines.

It makes sense to utilise the possibilities of virtual and extended reality to make communication about plans easier and more intuitive. And that is exactly what planners have been hoping for for quite some time anyway. Various providers of CAD programs use virtual elements to enhance their 3D visualisation services. Creators of architecture can focus on the design process, while the software takes over the tedious visualisation work. But can these virtual experiences also facilitate a more intersubjective and cooperative design process?

Can they include those people who don't know the first thing about layers and height indications?

Swiss construction law stipulates that, in the course of construction or extension projects, marker frames must be erected to show the volume of the planned project. In this way, everyone involved can see a three-dimensional depiction of the proposed change in real space and assess the new structure's effect on the environment. Couldn't VR, AR and MR be used for this?

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### TAKING PART IN MAKING DECISIONS: VR PLANNING

In Vienna, the VR Planning project, which is funded by the Austrian Ministry for Transport, Innovation and Technology as part of the "Mobility of the Future" programme, is currently conducting research on these issues in the context of future-oriented street spaces. When designing public spaces, in particular, the interests of many different people must be taken into consideration. It is therefore vital to have innovative, interactive approaches in planning processes that are suitable for experts and citizens alike. VR, AR, MR make it possible to promote empathy by easily putting users into the shoes of children or wheelchair users. When a structural change can be experienced virtually, it is easier to voice criticism, feedback or suggestions.

Although it is possible—as with any other form of presentation—to embellish things in VR and manipulate opinions, there is also the expectation that it will reinforce confidence (on the part of the citizens) in the virtually presented planning solutions as well as the coordination of design and technical details with related planning disciplines. In urban development projects, for example, cooperation beyond the site boundaries could take place in virtual space. Coordinating the landscape design between the sites and thus creating a high-quality urban space, designing connective elements such as paths

and squares interactively, designing buildings not as restricted to their plot but as a whole, and as interactive, cooperative and responsive structures: The virtual space could be the unifying voice between those involved in the planning.

### THE DILEMMA OF PROGRESS

Virtual planning and design do, however, (still) have their own share of weaknesses. The immersive experience of planning projects is time consuming and requires a great deal of maintenance. VR, AR, MR often seem less suitable for the discussion in larger groups. But these technologies may facilitate better communication between individuals and small groups than analogue plans. As the technology keeps spreading and the everyday use of virtuality becomes increasingly natural, its use in different communication settings will also become more diverse.

It is also noticeable that a high degree of detail in VR distracts from the actual question. The Swiss example of analogue construction frames is primarily intended to make the size dimensions of a building project and the effect on viewing axes or lighting conditions tangible. However, if this project can be experienced immer-

The Swiss use marker frames to depict a future reality.



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When designing public spaces, in particular, the interests of many different people must be taken into consideration. It is therefore vital to have innovative, interactive approaches in planning processes that are suitable for experts and citizens alike.

sively, such design-related questions as the facade, storey heights and architectural quality can take centre stage. Depending on the specific planning problem, this can be useful or, by the same token, confusing.

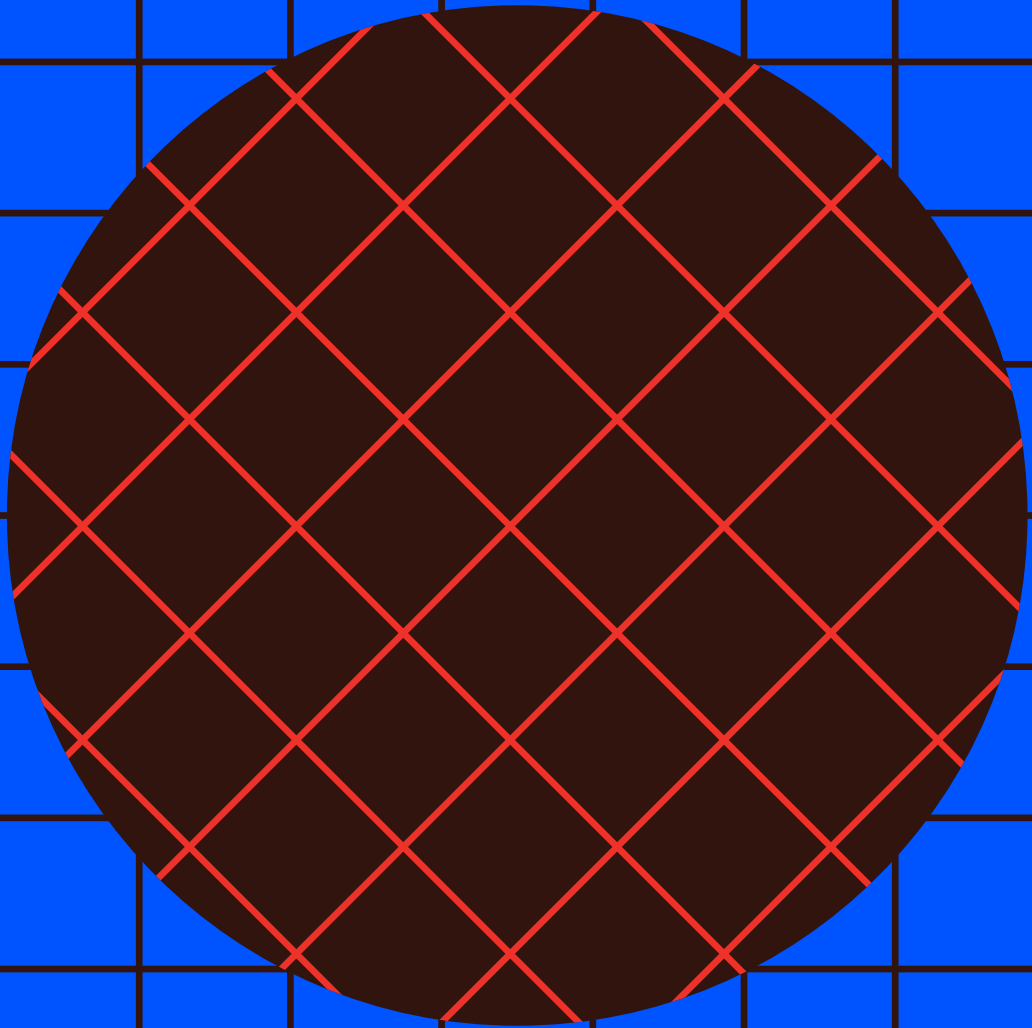
After all, the computer game style can also create an illusion of boundless feasibility, although the reality cannot be changed, or only to a certain degree, due for instance to legal requirements. Here, storytelling aspects of VR, AR, MR and the embedding of the virtual experience in a larger planning or participation context can contribute to more clarity and a resolution of this dilemma.

It is just a matter of time — and money — before VR and AR will be used to communicate urban development, participatory planning and interdisciplinary planning processes. At the moment, making 3D models for immersive experiences is still an intricate process and therefore expensive. And, as mentioned above, the supervision is also time consuming. So who could be interested in improving this communication and cooperation? And who could pay for it?

Planners generally abide by “business as usual”, as their results are usually not too bad. They prefer to stick to proven methods and tools for the complex challenges of planning. But this is precisely where innovative, creative impulses are needed. Virtual tools may be the key to not only managing the existing complexity, but also benefiting from it.

**Efa Doring** works at PlanSinn Planung & Kommunikation in Vienna, a firm that focuses on participatory projects in urban, mobility and landscape planning, among other things. In her work she deals with various aspects of science communication and stakeholder engagement and is active in the cooperative development of digital services in the area of AAL and mobility. One of her main areas is providing support for inter- and transdisciplinary (planning) processes.

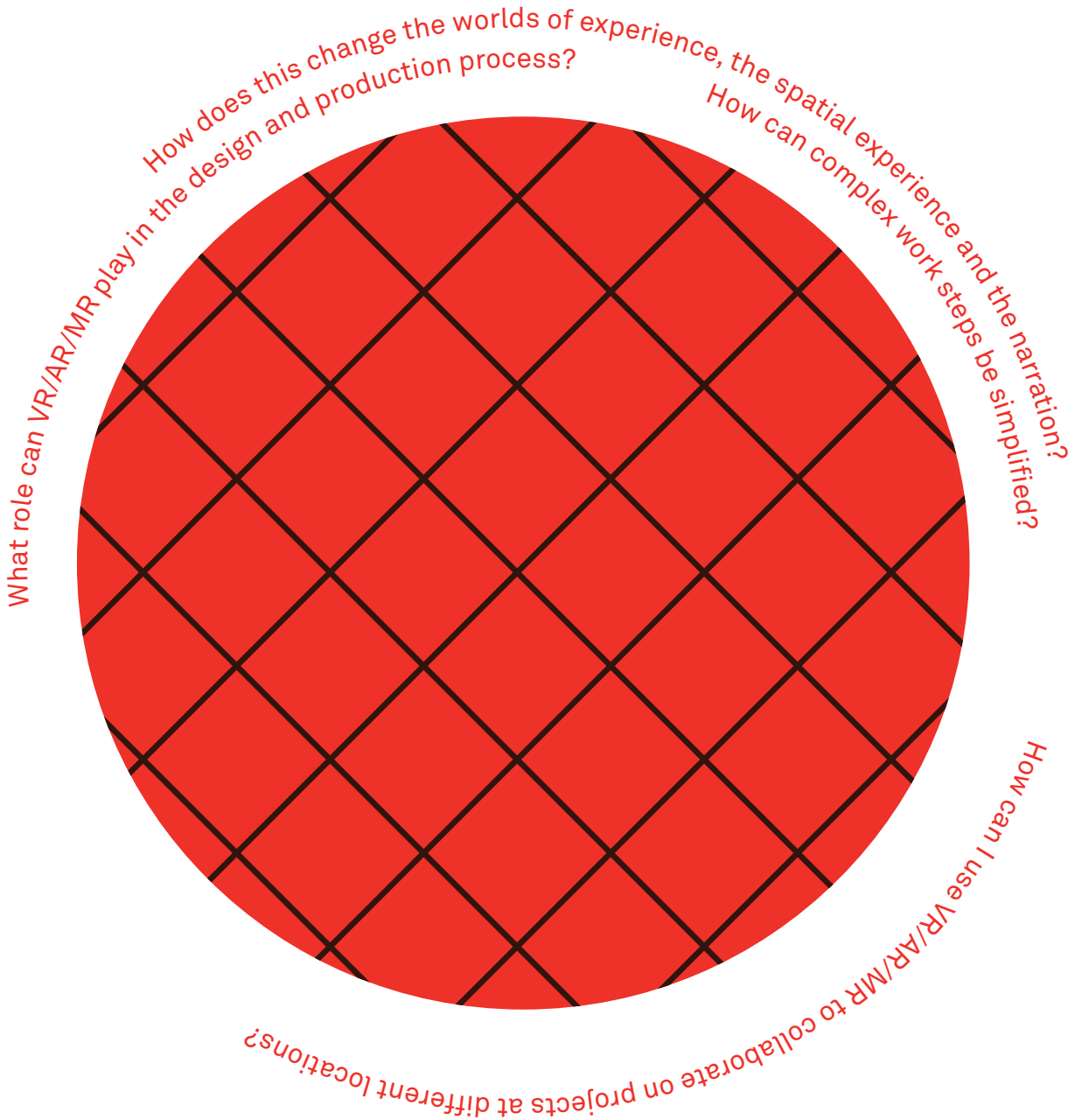
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# EXPERTISE THROUGH EXPERIMENTATION

## THE ARTISTIC-CREATIVE PROCESS



# AUGMENTING CONSTRUCTION

## CONTRIBUTION BY GREG LYNN

The last 40 years of digital technology in architecture have been leading towards the application of what is referred to as either “augmented” or “mixed” reality to building construction. This is accompanied by an interest in architecture and construction by some of the largest technology companies in the world such as Microsoft, who just announced an augmented reality construction helmet in partnership with Trimble; and Google, whose Sidewalk Labs is developing the waterfront of Toronto. Leading to the current state of the field are two sequential developments that are important to discuss in order to understand the meaning and impact of mixing the digital and the physical worlds through the use of augmented reality (AR) devices: virtual reality and digital fabrication.

Digital technologies were from the very first instance connected to screens and therefore the project of replacing drawings with digital visualisation was among the first for digital design and construction. Before software was designed to expedite the process of making drawings, there was a proposal to visualise design and construction on screens. The fact that screens were previously considered as intermediary devices on the way to paper could be due to the cost and size of moving screens off the desk and into the factory or on the job site. It could be because builders were fond of rolled drawings on job sites, because bureaucrats liked paper to stamp and file, or because architects thought creativity could only happen on paper and not on screen. So despite the shift from desk to screen implicit in digital software, most computer programs became methods of expediting the production of drawings rather than a new approach to design and construction. Two alternatives to this schema of digital tools being used to draft drawings were virtual reality (VR) and digital fabrication.

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### THE VIRTUAL COMPONENT

VR is very closely aligned with architects and architecture, because the very definition of architecture is the definition of a virtual construction used as an instrument for physical construction. These instruments have taken the form of a physical model to be measured from; a set of coordinated 2D drawings; written specifications; a high-fidelity 3D model used in the production and coordination of a set of 2D drawings; or a high-fidelity 3D model whose 3D entities are associated with meta data that would have previously existed as written specifications. Instead of defining a virtual building in order to document it in drawings and specifications, many architects became interested in modelling, adding textures and lighting and experiencing spaces virtually in both digital projection caves and wearing headsets with small monitors in place of lenses for glasses. The desire was for full digital immersion and the representation of reality or realistic virtual experiences. VR is defined as being apart from or distinct from the real world. The computer is

used to generate imagery and sounds that are spatially defined and can be experienced in motion, whether by moving the camera(s) related to a headset or physically moving in an immersive cave. The kinesthetic problem of what to do with your body when moving (often flying initially) through these immersive digital environments became a problem that gained lots of attention and inventions ranging from treadmills to hamster balls to chairs. VR was a digital medium confined to either the previsualisation of designs for use by architects or for alternative experiences much like a video game. There were examples of rehearsing training and previsualising construction logistics using VR, but it never gained traction as an element in the construction or fabrication process.

### THE ASPECT OF DIGITAL FABRICATION

At the other end of the spectrum, architects discovered that the construction industry was in fact industrial and that the drawings they were producing were often being converted back into digital files and then used to program the operations of CNC (computer numerically controlled) machines in factories for the production of building components. Architects became interested in learning how to give instructions directly to machines used in fabrication and manufacturing in order to unlock new potentials in construction. They rapidly reached a high level of sophistication in terms of form generation that anticipates digital fabrication. There have been several decades of intelligence and creativity applied to how to use digital technology as an alternative to supplying drawings to builders for fabrication and construction. Architecture offices such as Frank Gehry, Architectonica, Foster and Partners and many others launched companies besides their design practices to focus on fabrication, construction logistics and documentation. Software companies such as Autodesk realised the opportunity they were missing and quickly pivoted from being the tool to help architects to make drawings and specifications (what is often referred to as BIM or building information modelling) to becoming a tool that would assist in making and building things by talking to machines. It was a very low-hanging fruit to capture the relationship to a fabricator and contractor by talking to machines used in the production of building components.

### THE CONNECTING LINK: MIXED REALITY

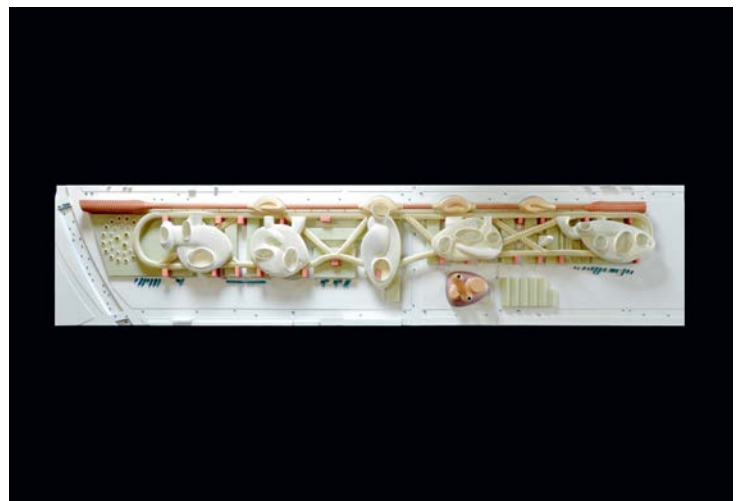
For the last two decades these trends of VR previsualisation and digital fabrication have been the dominant innovative directions for architecture. What is curious is how these two disparate activities are to some extent bridged by Augmented Reality (AR). AR overlays digital information on real-world elements with positional accuracy. This can be done on images from cameras on smartphones or tablets (such as the Google Tango™) or it can be done on transparent headsets, such as the Microsoft HoloLens™.

The critical technology to this is often overlooked and this is “localisation”. Visual SLAM (simultaneous localisation and mapping) is a common method of localising 3D content in the physical world for representation on either tablets or lenses. This method uses cameras to build three-dimensional maps of the world in which devices are situated as well as locating the cameras, and therefore the person wearing them, in that three-dimensionally mapped space. Once this 3D digital facsimile of the world has been built, a point of view is located in it. Then digital content can be overlaid into this “local-

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ised” scene and it can stay anchored in space so that, as one walks around, through and within it, the digital content changes along with the point of view of the environment. What is so new in all this is the ability to locate machines in space visually rather than by dead-reckoning to GPS satellites or by other methods. Similar technologies are allowing vehicles to be autonomously piloted as they too are seeing changing environments from which they

Architecture is the definition of a virtual construction used as an instrument for physical construction.



Greg Lynn used Trimble's mixed reality solution and Microsoft HoloLens to develop his vision of a reanimated Packard plant, a former automotive factory in Detroit.

build 3D maps. VR needs to know the position of a person in order to avoid kinesthetic conflict and motion sickness, but it does not need the same degree of localisation as AR. Now, one can load a high-fidelity 3D BIM file, anchor it to a physical space and have a digital overlay of a structure in situ.

To return to the recent announcement of the Trimble/Microsoft Hard Hat with AR glasses, one can now imagine a builder on site without drawings but with

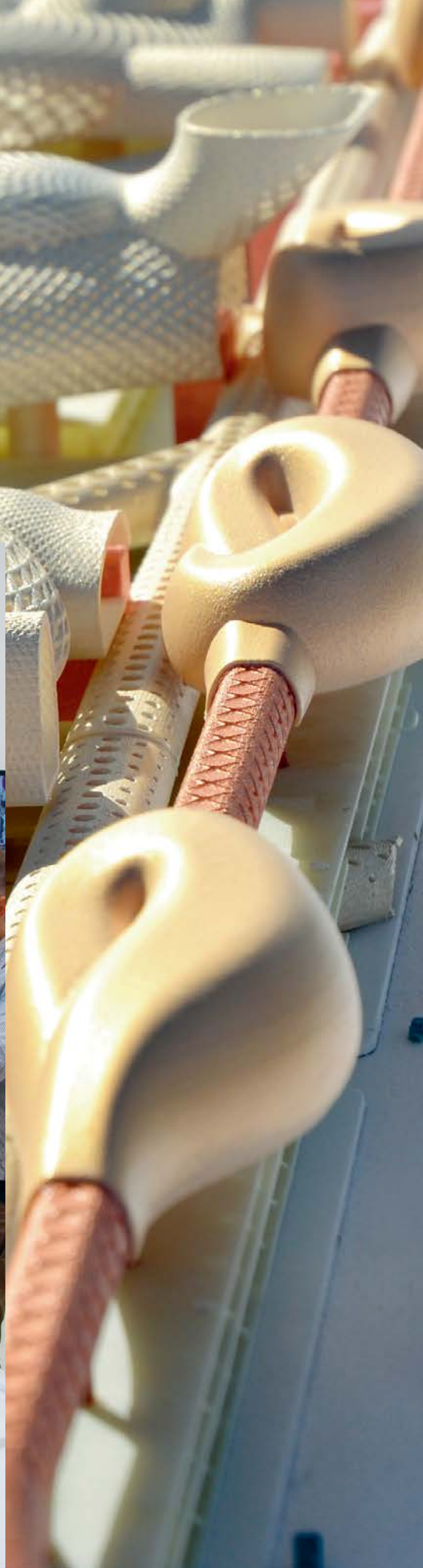
the 3D information for construction located in space on the construction site. The same can be done with a tablet that, instead of having PDF drawings on screen, now has 3D information loaded on it, so wherever the screen is pointed in space several people can see structure and systems overlaid on a physical space on a job site. For several years now, our students at the University of Applied Arts in Vienna's Institute of Architecture have been using HoloLens and Google Tango tablets for the construction of models. The advantage of doing so is increased accuracy and a drastically expedited speed of construction due to the fact that a construction is not just previsualised but also localised in situ. This overlay of the physical and the digital suggests a new approach to a manual, where the instructions and final assembly are overlaid in physical space at the location of fabrication and construction.

In this way architects may increase their scope and agency on job sites, while illuminating the waste and mistakes associated with producing 2D drawings from 3D models to be interpreted on site by builders and contractors.

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**Greg Lynn** is the principal of Greg Lynn FORM and co-founder and Chief Creative Officer of Piaggio Fast Forward, a company focusing on new forms of urban mobility connected to physical and information infrastructure. He is currently a professor of Architecture at University of Applied Arts Vienna, UCLA School of the Arts and Architecture and the GSD at Harvard University..



# NO LONGER A QUESTION OF SCALE

## INTERVIEW WITH JULIA KÖRNER

A multiple award-winning designer, Julia Körner works at the interface of architecture, product design and fashion design. Under her JK Design GmbH label based in Salzburg and Los Angeles, she experiments with new production techniques and robotics and specialises in 3D printing:

Julia Körner designs her own fashion collections with JK Design and also collaborates with haute couture labels in Paris as well as entertainment production companies in Hollywood. She recently worked with costume designer Ruth Carter (MARVEL) to create 3D-printed designs for the successful movie *Black Panther*. Julia Körner currently teaches at the Department of Architecture and Urban Design at UCLA. She lives and works in Salzburg and Los Angeles.

**Technology and fashion is a contradiction in terms for most people. But not for you. What do you find so interesting about combining these two areas?**

I'm generally interested in textiles and handicrafts, and being able to generate digital three-dimensional designs and 3D prints has given me a whole new perspective on fashion. I find it exciting to scan bodies in 3D and then design garments three-dimensionally on the computer. I can create customised clothing and develop digital textures that don't even exist in traditional manufacturing. Combining fashion and technology allows me to work with new flexible materials and develop structures and patterns digitally that are inspired by nature. My projects often deal with the marriage of organic designs and synthetic manufacturing processes.

**To what extent was and is technology an inspiration for your work?**

I learned to produce models at the University of Applied Arts in 2005 using the Institute of Architecture's very first 3D printer. I found it thrilling to experiment with the new

technology — as I still do now. Greg Lynn taught me to use the technology as an instrument in the design process, instead of regarding the idea created on the computer as the final result. When I studied further at the Architectural Association in London, emerging technologies and the repeated testing of materials and manufacturing processes were also central to my design. But it was working with Ross Lovegrove that influenced me the most. I had the opportunity to try out how architectural design processes can be applied to product design in his London-based design studio.

**Architecture, design, fashion. You have an impressive range of active disciplines. Is technology a connecting element for you?**

Yes, in a sense. The different disciplines are always about colour, form and rhythm. Materials and technologies vary according to the scale. Digital design allows me to develop my aesthetics regardless of scale. It is crucial, though, to be good at imagining things in 3D as well as having aesthetic sensitivity.

With our “Digital Realities” funding competition, we are examining to what extent technologies like VR, AR, MR play a role in creative work. You mentioned utilising these technologies in your work with Greg Lynn at UCLA. What can you tell us about your “Machine Vision” project?

“Machine Vision” was a suprstudio where I taught with Greg Lynn at UCLA. We worked with the students using VR, AR, drones and large KUKA<sup>◇</sup> robot arms, as well as other things. Our industrial partner was Boeing and we looked at how technologies can promote collaboration between teams located in different locations, for example, between aerospace technicians on site and the design team on another continent. The students worked on architectural designs for both virtual and real space and how they overlap and connect. The focus was on these spaces supporting the co-operation. Different methods in processing and measuring visual material were used to give the students inspiration for their design ideas.

**In the field of fashion, where do you see these technologies having the greatest potential?**

I find it exciting to see how some progressive designers are trying to influence the fashion industry using innovative technologies. I believe that digital design and 3D printing are the future of fashion and that the potential lies in combining traditional techniques and craftsmanship.

Three-dimensional printing is a particularly forward-thinking idea, as it is an additive process that doesn't generate waste: it only uses as much material as is actually needed. The printing material is plastic or made of recyclable raw materials. Old material can be melted down and processed into new printing material. And there is no need to ship clothing as the digital file is sent globally and the dress is printed locally. A good example of how combining fashion and technology changes our understanding of fashion.

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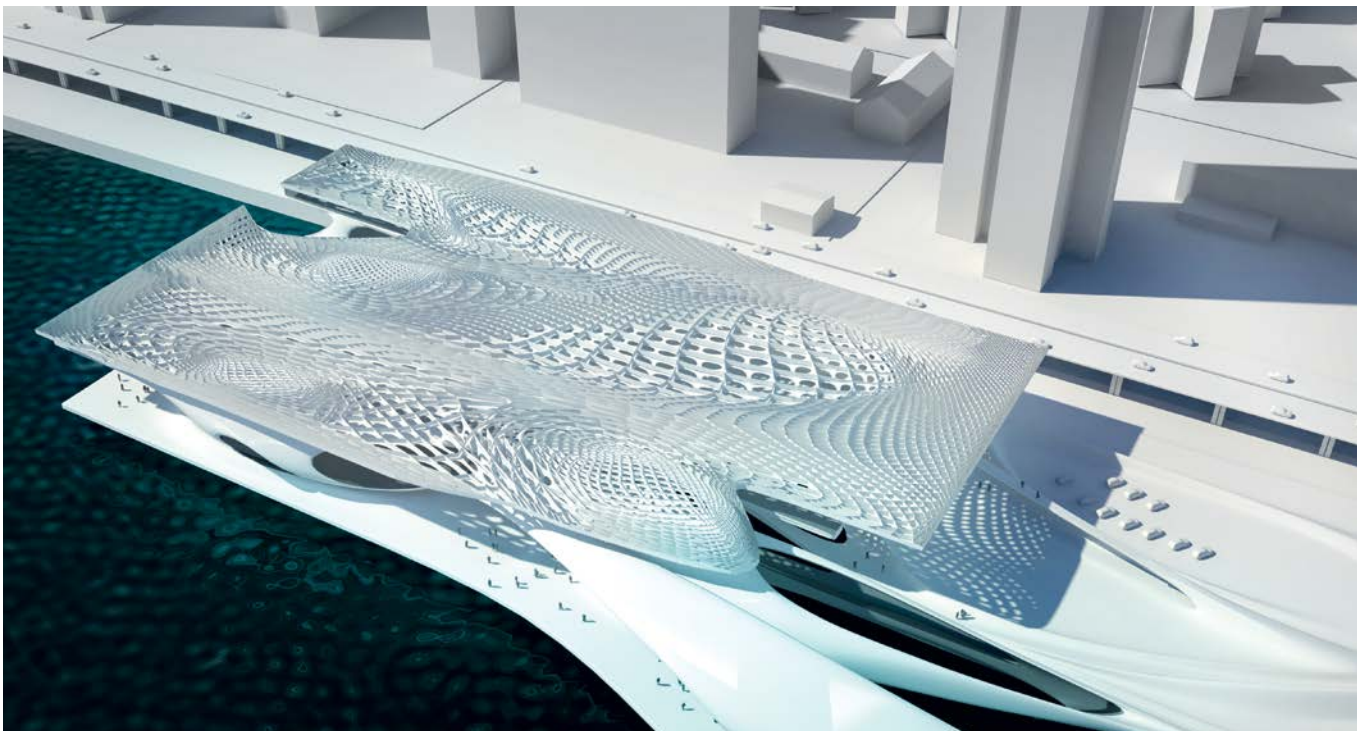
◇ KUKA

The KUKA Roboter company specialises in robotics and automation technology. Besides manufacturing (mostly bright orange) industrial robots, they are leaders in the field of human-robot collaboration (HRC).



3D-printer clothing — interweaving fashion and technology as a trend-setting and creative strategy

Superhuman Enticement: a building design created in the Greg Lynn Studio at the University of Applied Arts, Vienna, 2009



# THE UNCAPTURED IMAGE — VR AS AN ARTISTIC MEDIUM

## CONTRIBUTION BY LEONHARD LASS

Virtual reality (VR) represents the abolishment of the artistic tradition of framing. The spectators' natural freedom of gaze puts them at the centre of the work. Denied a purely passive role, they are nevertheless generously rewarded by a previously unattainable sense of presence. The totality of the image leads to their isolation, which represents both the challenge and potential of the medium and demands a complex, new approach in terms of narration and spatial experience.

Since the 1980s, VR has persistently returned, each time with utopian promises and each time, to ultimately (as it seems) fail due to technical shortcomings. Every failure inevitably brought with it the disappointment of the users, leading to the rejection of ideas followed by a period of indifference. So even the current boom feels more like a new start than the continuation of a long history. VR once again finds itself in a phase of spectacle, mimesis and skeuomorphism<sup>o</sup>. The still “inexperienced” VR audience is already overwhelmed by the credibility of the virtual experience itself.

In this text, I refer to virtual reality (VR), which, unlike augmented reality (AR), is completely immersive and — unlike the 360° video — is computer-generated in real time. For now, we can name three distinguishing features that set VR apart from other media:

- 1) The virtual takes up the spectator's entire field of vision. It is total. (display)
- 2) The virtual can be observed with a “natural” freedom of gaze (interface). Its perspective is constantly aligned to the moving head of the spectator and it can be perceived in a stereoscopic fashion.
- 3) The gaze is present! The viewer's gaze is general knowledge in the VR world. What's more: it can be used to construct and change it.

This means the HMD (head-mounted-display) is not only a display medium, it is also always an interface. Interaction is therefore not a choice, it's unavoidable.

### THE SELF IN BETA METAMEDIUM

VR describes the ideal of the total medium. Once the HMD has been put on, it becomes invisible; the technology disappears. As such, it is potentially the beginning of the ultimate medium that can simulate and absorb the rules of all others — the virtual living room with a simulated television, the virtual visit to a museum, etc.

VR represents the logical end of a path that has long since been trod in our society: the quest for an omnipresence of our media and, at the same time, their full transparency in the sense of an invisibility of interfaces, technologies and (the denial) of the act of mediation.

The abolishment of spatial boundaries (immersion), immediate actuality (presence) and physical perception (embodiment) are the key strengths of VR. In addition to the total display, these qualities result primarily from the direct reference to the viewer's body.

Firstly, this is done by keeping the proportions in relation to the audience. While the film is forced to scale from the mobile phone to the IMAX format, in VR the viewer remains the direct measure of things. Secondly, the medium ensures the perspective is adjusted in a synchronised manner — the viewer always remains in the vanishing point of the world and is therefore at its centre. The auditory component should not be underestimated here either, since sound can also use these viewer-centric spatial relationships.

This first person perspective leads to the fact that viewers can embody practically any entity in VR — from living beings to lifeless objects:

*“You might as well be a mountain range or a galaxy or a pebble on the floor. Or a piano ... I've considered being a piano. I'm interested in being musical instruments quite a lot.”*  
Jaron Lanier, (Interview in: *Whole Earth Review*, Fall 1989).

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**○ Skeuomorphism:**  
is a stylistic direction used mainly in design, in which objects mimic another material or a form of an older, familiar object, without this being justified by its function.

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### SPATIALITY, ORIENTATION SHOCK AND PORTABLE CATHEDRALS

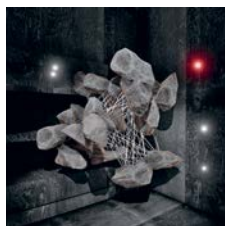
Virtual reality is to an overwhelming extent architectural — both in terms of its experience and in its design. So, it is hardly surprising that architects have a keen interest in VR for pre-visualisation work. Conversely, however, this very expertise is necessary for any VR work. VR needs virtual architects and their long tradition of psychology and poetics of space. If we look at VR in the sense of the ancient labyrinth myth, would the artist then be Daedalus, the architect? Would the viewer then be the imprisoned Minotaur or Theseus, the hero? Who or what would take over the role of Ariadne and her thread?

As soon as we enter a building, we begin to read and decrypt it. We look for routes, exits, assess our



## USE CASE

### THE LACUNA SHIFTS



The interactive VR installation *The Lacuna Shifts* by the Austrian duo Depart (Leonhard Lass and Gregor Ladenhauf) was inspired by Lewis Carroll's *Alice's Adventures In Wonderland* and *Through The Looking Glass*.

Putting on the VR goggles starts a journey to a place "behind the mirror" that is continually shifting and that is different every time — thanks to real-time 3D environments. Controlling this experience is literally in the eye of the beholder, as the eye plays a leading role in this intense adventure, in the wonderland of speaking things and moving walls.

ability to move around—in short: we orient ourselves. While there are spatial transitions in consensus reality that facilitate this decoding work, the entry into VR starts with orientation shock. The unexplained “Who am I?” is stressful. Transpose this idea to VR and scene-setting potentially begins before the viewer puts on the HMD. How can we weave the transition from real to virtual space into the entire narrative? Does it make sense to bind the virtual to an actual place in order to absorb this disorientation?

Umberto Eco speaks of the cathedral as a kind of permanent and immutable television programme providing people with advice for their daily lives and their salvation. This literary function of architecture and the spatial and sculptural design of information is combined in VR with dynamic and interactive possibilities. VR as a portable place of refuge, contemplative cultural space and a sanctuary for private reflection, relaxation or intellectual activation.

The staging of Michelangelo's *The Creation of Adam* and the context in the Sistine Chapel—having to tilt one's head upwards, becoming aware of one's own insignificance—are lost. The two index fingers salute from mugs and T-shirts, in remixes and collages, books, smartphones, magazines and living rooms including meta-information and as part of an eclectic flood of images.

Through its almost total isolation, VR offers the purest clean slate achievable for the first time in media history. There are no non-work-related set pieces or reactions from fellow human beings in the entire field of vision. Each element is part of a total artistic design—the ultimate, virtual *gesamtkunstwerk*.

Immersion in virtual reality also leads to an extraction from consensus reality. In VR, I am alone. This deprives the audience of one of man's most essential experiences as a social being: the shared experience. The HMD acts as a blindfold, which further promotes a sense of vulnerability and a loss of control. Many users cannot completely turn off their thoughts about their appearance to bystanders.

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## NARRATION

The comparison with film as a media narrative is very problematic. Firstly, film is based on a linear sequence of fixed (designed) images, which is immediately undermined by the freedom of vision in VR. The viewer becomes an (amateur) camera and thus takes over a part of the direction.

Secondly, in classical narration, action unfolds retrospectively in scenic sequences. The central method to storytelling is based on jumps in space and time (cuts). Owing to the sense of presence in VR, the two can only be achieved indirectly. In many aspects, this reveals a closer relationship to performing arts.

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## IDENTITY CRISIS IN THE FIRST PERSON SINGULAR, PRESENT TENSE.

Uptake of VR is still in its infancy, so there is a lack of generally accepted genre conventions such as the fourth wall<sup>Δ</sup> From an artistic perspective, this freedom is naturally extremely exciting. However, the absence of reception standards can also lead to uncertainty and frustration among viewers.

Coupled with the orientation shock and the partial loss of one's own physicality, an identity crisis arises that poses the following existential questions: Who am I (here) and how did I get here? Where is my

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body and do I even need one? Does the world acknowledge my presence or do I have a ghostly existence? Am I a spectator or a protagonist?

The virtual embodiment becomes an integral part of the narration and the overall experience. The narrative technique of jumps in time and space or the externally-controlled camera is therefore often inadequate. Another strategy focusing on spatial coherence and a contemporary experience is closer to the nature of the medium. VR offers immediate, individual experiences that are happening now. Instead of recounting a story, it can create experiences that invoke their own stories as the events unfold—every one of them different for each viewer.

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## STEPPING OUT OF THE FRAME

It is obvious that VR is ready for emancipation: it strives to become an artistic medium in its own right, adding to the canon of film, theatre, architecture, literature and such forth. VR needs its own avantgarde movements to find its place and establish its genres.

My artistic practice is mainly concerned with audiovisual systems, which always give rise to the unexpected by means of cross-modal emergence<sup>∇</sup> and which aim for a complex, poetic individual experience. This real-time experience demands a degree of attention that is hardly achievable within the tight boundaries of the screen.

For me, VR is the long-awaited medium that allows a digital work to be experienced directly. It promises nothing less than to give the digital medium a phenomenological quality similar to nature, making it equal to the genuine experience in several respects.

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### ∇ Crossmodal emergence:

New properties or structures arise as a result of the interplay of elements from different sensory modalities, for example, through the close interaction between acoustic and visual impressions.

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### Δ The fourth wall

is a performance convention in which an invisible, imagined wall separates actors from the audience; Wikipedia: [en.wikipedia.org/wiki/Fourth\\_wall](https://en.wikipedia.org/wiki/Fourth_wall)

**Leonhard Lass** (1978) deals with the poetic potential of multimedia systems. His work explores the ritual character of the post-digital and strives towards a complex individual experience. Since 1999, he has been working with Gregor Ladenhauf as Depart on audiovisual installations and performances. He also teaches “Mapping the Data” at the University of Art and Design Linz and “Generative Art” at the FH Hagenberg.

## USE CASE

### GRAVITY SKETCH: PROTOTYPING IN FREE SPACE



With Gravity Sketch, the London-based start-up of the same name created one of the first design tools for mixed reality that might just change the product design process in a fundamental way. Gravity Sketch aims to democratise 3D design by enabling prototyping that doesn't require the

user to have in-depth knowledge of virtual reality.

Gravity Sketch users initially stand in an empty environment. By using a combination of VR headsets and HTC Vive or Oculus Rift controllers, they can model and freely modify three-dimensional objects with the aid of various tools through hand movements in mid-air. The resulting 3D models can then be transferred for further processing with CAD software (*computer-aided design*). Behind the product is an interdisciplinary team with a wide range of expertise ranging from industrial design to mechanical engineering and physics.

Previously, the product design workflow usually involved the creation of sketches, which were then visualised in 3D using complex CAD software. A tool like Gravity Sketch could simplify the design process by starting the design work directly in 3D. This would make two-dimensional concept sketches superfluous. Gravity Sketch demonstrates the possibilities of virtual and mixed reality by integrating the spatial and intuitive dimension into the digital design process.

# GIVING NEW ROOM TO IDEAS

## INTERVIEW WITH LIP COMARELLA

Salon Alpin, a visual production studio based in Vienna and Lisbon, spans a multi-faceted spectrum of visual art, typography, graphic design, illustration and animation to film and music. Lip Comarella (Vienna) and Simon Griesser (Lisbon) combine analogue techniques such as animation with digital processes. They also use virtual reality applications such as Oculus Medium.

**With its stop motion films and papercraft, Salon Alpin stands for meticulous craftsmanship and excellence in the analogue field. What role do digital technologies play in your design and production processes?**

Digital tools and modern technology play an extremely vital role in managing commercial projects efficiently. We want to demonstrate excellence and hand-crafted appeal in the final result, but at the same time remain competitive in terms of costs and production times. So, the flexibility and shortcut possibilities digital tools offer are essential — especially during the design and conception phase. Of course tools are just tools, but as such they help attain the end result. Our goal is to create a product that touches the viewer on an emotional level.

**You also use VR software. What can you tell us about that?**

VR takes us one step further in expressing our ideas in as unfiltered a manner as possible. In the virtual space, it is easier for us to literally create things and ideas around us. In comparison, visualisation through two-dimensional illusion requires a great deal of practice and abstractive abilities. Everybody is intuitively capable of designing and giving shape to things if they are not restricted by paper printouts or pixel rectangles. Especially in areas such as games, film and advertising, VR tools help us to communicate more quickly and find better design solutions.

**How have these technologies changed your design or production process?**

We are currently using programs such as Quill and Oculus Medium, especially in the brainstorming phase. These programs offer a range of digital tools for painting, sketching and modelling. This makes you feel like a wild mixture of sculptor, potter, carpenter and graffiti artist. You can quickly create a 2D or 3D basis and continue working on it using classic software. The quality of the hardware is still a bottleneck, as the pixel resolutions are too low and the



Salon Alpin tests its visualisation ideas using VR software such as Quill or Oculus Medium.

ergonomics are somewhat inconvenient, which is why we don't use the VR goggles more often and for a longer time. But that's about to change.

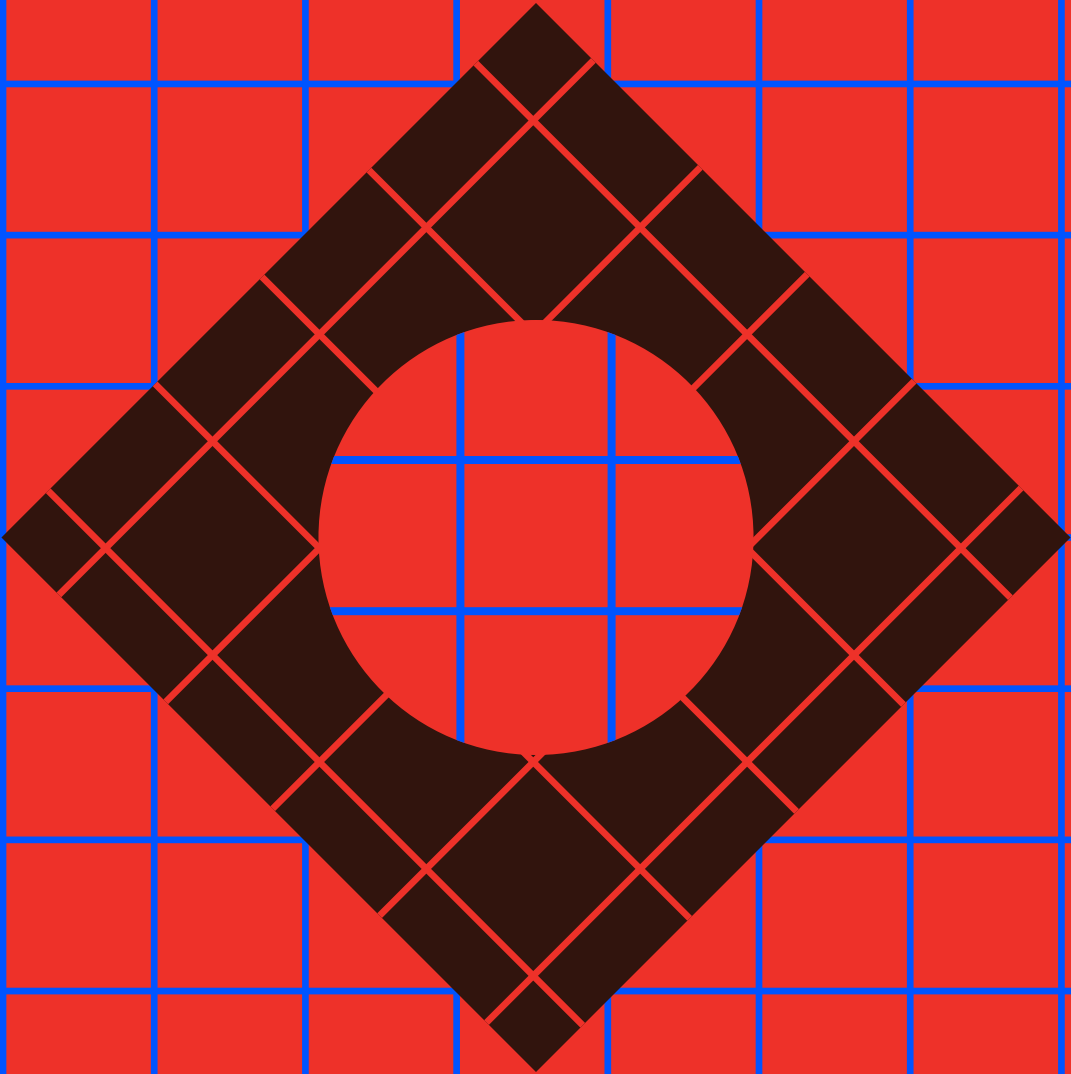
**With offices in Vienna and Lisbon, it makes sense to think about designing together in the virtual Salon Alpin studio. Have you already tried something like this?**

We've had a few good experiences with it already. We worked in the same virtual space in different locations and were able to give form to our thoughts. VR is especially useful when sketching and discussing scenes, set proportions and camera settings, because you can quickly show the others what you mean so that they can experience and understand it.

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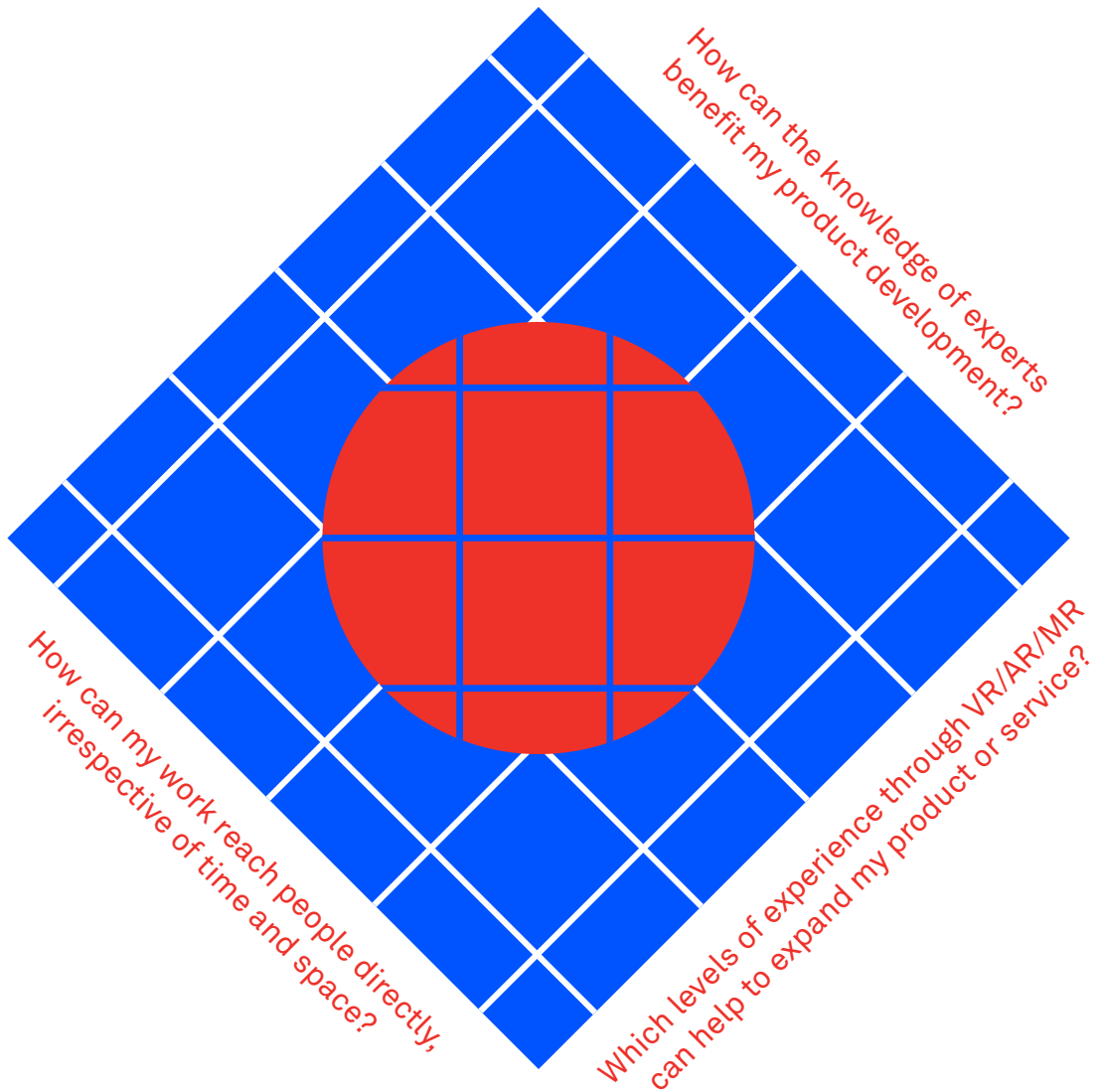


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# NEW REALITY WORKS

## PRODUCT AND SERVICE INNOVATIONS



# AUGMENTED FASHION: FASHION AT THE INTERFACE

## INTERVIEW WITH HANNAH GUTKAUF

Founded by Hannah Gutkauf from Vienna and Amanda Karijord from Norway in 2016, We Are The Faces is an innovative design studio at the interface of art, fashion and technology. The young company is active both in Vienna and Copenhagen. Working with renowned artists and designers, including Anny Wang and Tim Lahan, the company made a name for itself in the fashion scene under its WEARETHEFACES label.

Hannah Gutkauf holds a Master's degree in Digital Innovation and Management, Amanda Karijord studied Sustainable Fashion Design; the other team members Clemens Kopetzky, Nikolaj Stausbøl and Lilie Amudson bring expertise in the fields of art, interactive design and AR development. To launch its first collection, this interdisciplinary team joined forces with the world's first VR retail space Khora in Copenhagen in 2017 to create an immersive VR experience.

**Virtual reality brought a new level to the first WEARETHEFACES collection at last year's Fashion Week in Copenhagen. Could you explain what you did there and how the fashion world reacted?**

Our aim was to slightly break away from fashion conventions with WEARETHEFACES. We asked ourselves whether fashion should be an art form too, especially when you consider that clothing usually only ever enjoys short-lived appreciation, whereas art, on the other hand, has a much more sustainable and lasting impact. So, we joined forces with three artists (Anny Wang, Tim Lahan and Felix Pfäffli) and translated their art onto fabric. We created so many great things during this process that we collaborated with Khora to develop three virtual reality worlds — one for each artist. This meant our guests could explore the patterns on the garments in VR. On the one hand, the fashion world was intrigued, but on the other, it didn't quite know

where to place us. There were advantages and disadvantages in this. We didn't have any trouble getting the attention of the national and international press. Selling to major customers was more of a problem, as we aren't exactly easy to pigeonhole.

**Ms Gutkauf, you actually have a background in IT, which is rather unusual for the fashion industry. Do you think a reserve exists between fashion and technology?**

Absolutely. It's rare to see any exchange between these two fields. It mainly boils down to preconceptions and ignorance about the other industry. At technology fairs I often just had to mention the word fashion and I got a snooty reaction. And yet, there would be many ways to exploit synergies. Just consider the social and ecological impact of our fashion consumption behaviour, for example. And the technology field could deliver innovative solutions in this regard. →



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The Vienna Business Agency funded the first collection of We Are The Faces.





With its AR app *Incognito*, We Are The Faces aims to playfully protect the identity of its users by using QR-tagged garments.

### What are the biggest challenges when “creatives” join forces with “techies”?

The problem is often one of communication. Technology and fashion simply speak different languages, which can lead to misunderstandings and conflict. Often at this interface there isn't anyone with a basic understanding of both worlds who could act as a mediator.

### Are there any examples of AR/VR applications in the fashion and design sector that you find particularly inspiring?

The *Makeup Genius* app by L'Oréal Paris — a virtual makeup tester — was probably one of the first major successes for AR apps in the lifestyle sector. Burberry has an AR application for its online shop, Uniqlo has “Magic Mirrors” in its flagship stores to virtually try on different versions of a model, and the British fashion label RIXO has used holographic software to market its latest show. AR/VR is entering the world of fashion and its impact is slowly being felt.

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### You started out as a fashion platform. With *Incognito*, you are now working on a project that moves between fashion and augmented reality. Can you tell us more about that?

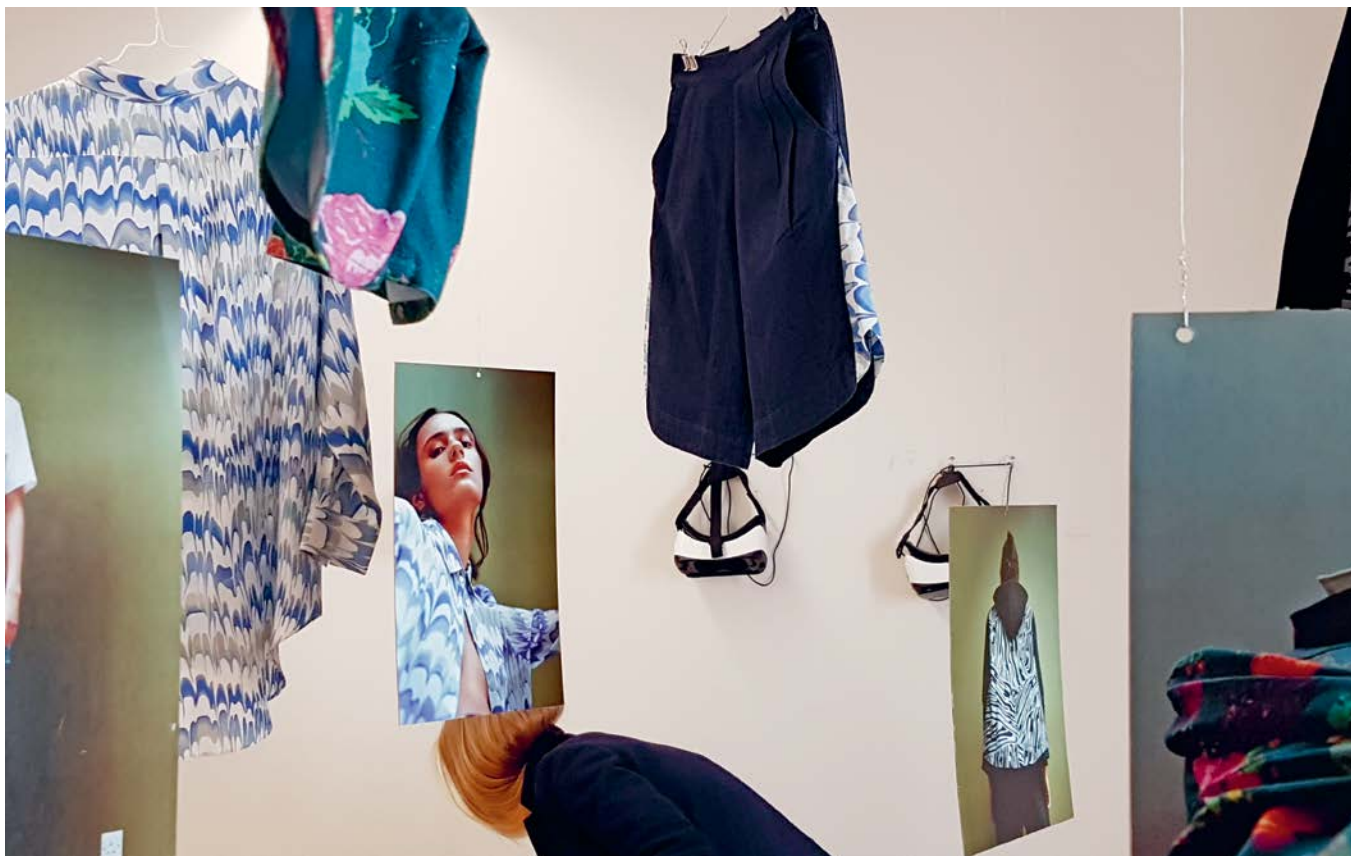
*Incognito* is a project for young people that is all about approaching technology and media competence in a playful way. We've just started developing beanie hats that transfer digital art to young heads. In conjunction with our AR app, the QR-coded headgear allows young people to generate videos that are all about creativity rather than identity because the app uses artistic animations to cover the faces. This preserves their anonymity. The background to the application is that children or young people often post pictures or video clips on the Internet without thinking about who has access to these videos.

### A prototype of your app was showcased at Copenhagen Fashion Week 2017. There's been quite a lot of technological progress since then. How do you keep on top of the constant new developments in this field?

Accessing augmented reality content via a web browser has been possible for some time. This is an exciting step in the right direction for us, as you don't need to download an app anymore. AR is becoming more accessible than ever. These technologies, as well as the AR development platforms Apple ARKit and Facebook AR Studio and such like, are still in their infancy though. This is why a lot of trial and error is still needed to get things to work.

### What advice do you have for creative professionals from the fields of fashion and design who would like to enter AR/VR?

Attend tech meetups and conferences and don't worry about not being tech savvy. The tech community is usually very open and helpful, so just go there and network. The Ars Electronica Festival in Linz or the Stockholm Fashion Tech Talks make a great place to start tackling art and technology.



## USE CASE

### THEWAVEVR: A NEW KIND OF MUSICAL EXPERIENCE



The American start-up TheWaveVR uses the virtual reality app of the same name to make music in a virtual space a shared experience. With a focus on electronic music, users can experience the DJs and acts “live” in the virtual club, try their hand at DJing and interact with the audience. Still at the

beta stage, TheWaveVR is currently available using HTC Vive, Oculus Rift, Samsung Gear VR and Google Cardboard, although you need Vive to become a DJ yourself. The virtual performance venues can be designed individually — either as a realistic club or as a fantasy world.

Adam Arrigo and Aaron Lemke founded the app in 2016, with the support of an interdisciplinary team and investments amounting to more than USD 4 million. Not only has Arrigo worked as a sound and game designer on the successful music console game *Rock Band*, he is also a multi-instrumentalist himself. Lemke is a musician too and specialises in transcendental experiences as a VR developer. The thinking behind TheWaveVR is to reinvent a way of experiencing music, rather than simulating the real music experience. Another key aspect for the founders is that TheWaveVR puts music centre stage. By fading out the background, the senses are fully focused on the enjoyment of music.

# WHEN THE HEADSET IS SUPERFLUOUS

## INTERVIEW WITH MARKUS DORNINGER

The Vienna Office for Media and Arts International (OMAi) was founded in 2007. It has been combining artistic services with the development of innovative software ever since and represents a spontaneous and collaborative approach to digital creativity. The combination of analogue sensibility and digital technology plays a key role in bringing new forms of visual communication to streets, stages and living rooms through projection paintings.

Patented in the USA in 2012, the *Tagtool* app has helped the start-up founded by the brothers Josef and Markus Dorninger and Matthias Fritz to build up a global community for collaborative real-time design of visual content. OMAi is internationally known for its fantastic animated worlds, thanks to numerous performances and festival events.

The company now plans to use its current *Animaker* project to move further towards mixed reality. *Animaker* will be a permanent interactive installation at the Tech Museum of Innovation in Silicon Valley. By combining machine perception with interactive virtual painting, it aims to connect the physical and digital worlds, while largely dispensing with technological barriers such as headsets. Markus Dorninger explains how this will work in the following interview.



OMAI presented a prototype of an immersive and interactive environment at the Ars Electronica 2017.



**You have been creating mixed reality worlds as part of your artistic work for more than a decade now. How do you experience the hype around virtual reality (VR) and augmented reality (AR)?**

The current dynamics in this area are very high. We adapt our way of working, of course, but the focus remains the same: to create authentic, spontaneous digital art that touches people without gimmickry or technological fetish. In any case, it is extremely important to take a creative approach that allows the content to be perceived without technological barriers.

**Your current project *Animaker* also aims to make the latest developments in the fields of AR and VR a tangible experience—but without using headsets or similar equipment. How does that work?**

Using projection art, *Animaker* transports the audience into a prehistoric jungle temple built by a long-lost civilisation. Their technology, which is indistinguishable from magic, still works in this place today. Visitors are invited to build animals from building blocks. A 3D scanner detects these creations and brings them to life in the jungle world as animated 3D models.

**How different is the user experience when the headset becomes superfluous and the interface “invisible”?**

The interaction is more natural. Interpersonal communication and shared experiences are not affected in any way. The aim is to broaden the range of what can be experienced without limiting the freedom and sensual perception of the visitors through technological crutches.

***Animaker* is a joint collaboration with the Israeli start-up Resonai commissioned by the Tech Museum in Silicon Valley. How did this international collaboration come about and how do you work together across borders?**

The collaboration came about after a curator from the museum experienced one of our installations at the Ars Electronica Center in Linz, Austria. He suggested partnering up with Resonai. Resonai provides the technology—using artificial intelligence, among other things—that detects which animal a visitor has built from the Duplo bricks. We work with the development team to integrate this technology into our *Tagtool* engine. We are responsible for the artistic aspects and the programming of a large part of the installation. The Tech Museum, on the other hand, manufactures the hardware consoles and provides the technical equipment. We have now got used to working across time zones, but we are still looking forward to meeting the team in person—non-virtually that is.



**How did you design the installation at Ars Electronica and how did the general public react?**

We realised the installation using our *Tagtool* software, which allows you to paint interactive images live. The evening before the presentation, we created a jungle landscape with a mighty waterfall that flows into a whirlpool. When mostly adults were in the room, the atmosphere was mystical, almost reverent. The children, on the other hand, could hardly contain themselves—especially once they realised they could interact with the jungle inhabitants and even add their own drawings as well.

**Where and how is it possible to learn more about *Animaker*?**

Information about *Animaker* will soon be available on the Tech Museum of Innovation’s website ([www.thetech.org](http://www.thetech.org)), our own website [www.oma.at](http://www.oma.at) as well as on the *Tagtool* project’s social media (Facebook, Twitter, Instagram).

# TECHNOLOGY IS NOT THE BIGGEST CHALLENGE

## INTERVIEW WITH JULIA MURCZEK AND SIMON WALLNER

A weekend project laid the foundation stone for Vienna's Lost in the Garden indie game studio. The team consisting of Matthias Maschek, Julia Murczek, Raimund Schumacher and Simon Wallner developed the hyperfuturistic *Lightfield* from a racing game prototype in 2016. The full console version was released in 2017. *Lightfield* combines sophisticated design with game mechanics aside from ordinary racing games. Parkour elements are combined with free flying and classic arcade racing — a setting that would also make sense for virtual reality (VR).

The two CEOs of Lost in the Garden, Julia Murczek and Simon Wallner, explain why *Lightfield* couldn't be developed in a VR version right from the start and what the special challenges in designing VR games are.

**You started developing *Lightfield* in 2015 and considered releasing the game in a VR version. When and how did you start experimenting with VR?**

We presented *Lightfield* at various trade fairs in Germany and abroad from autumn 2016 and were often asked about a VR version of the game. Because of the considerable interest, we kept thinking about making a VR version while we were developing it. But we soon realised we could only work on its implementation after the game was released, owing to time constraints. After its release at the end of 2017, we started experimenting with a VR port [note: software that makes it possible to port the game to VR platforms] — using Steam as a target platform with Vive and Rift. A PSVR (PlayStation VR) port was also mentioned at the time, but with the greater uncertainty of whether we would achieve our performance targets for it.

**What would you say have been the most radical changes in terms of VR since the project started and how did they affect planning?**

When we started the project in autumn 2015, VR was still not very widespread and no particular progress in hardware had been made either. PSVR also wasn't around at that time. As there wasn't much to see in the way of VR hype yet (especially PSVR), we designed *Lightfield* for the classic TV/couch setup.

With more than two million consoles sold, PSVR has managed to establish VR among the gaming main-

stream. Listening to the community, you realise that the market for pure VR games is still very limited. We foresee the next major opportunity for VR in the stand-alone VR goggles announced for 2018. These are cheaper and do not require any additional hardware such as a mobile phone or a PC.

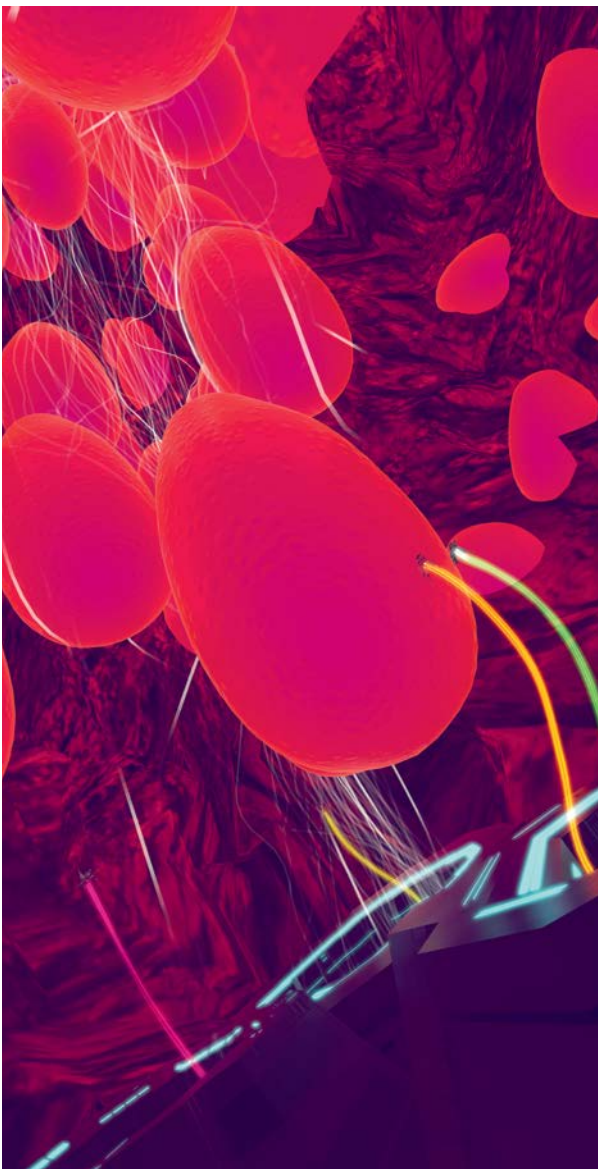
**For an indie studio like Lost in the Garden, what are the biggest challenges in developing VR games?**

The biggest challenge for us is definitely not the technology, it's finding a consumer market. Hardware distribution is constantly improving but it is still a comparatively small market.

Another major challenge is the right kind of marketing. It is difficult to convey the gameplay feeling in a classic trailer.

**An exciting aspect of the current VR hype is that most VR experiences are developed on game engines [note: a programming framework for computer games] — in other words, technologies that originally come from the gaming industry are now also used in creative sectors from other areas, such as films, for example. Do you see an opportunity for interdisciplinary exchange here?**

Fresh input and fresh perspectives are always important and very valuable for our work. In recent months, we have received several requests for interactive projects from other areas, which make interesting cooperations possible. The fact that the new areas of application are also



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changing the tools also holds promise for us. [The game engine] Unity, for example, has invested a lot of work in the lighting system thanks to its use for architectural visualisation. Of course, we game developers also benefit greatly from this.

**Are there any VR games and experiences that you are particularly impressed by?**

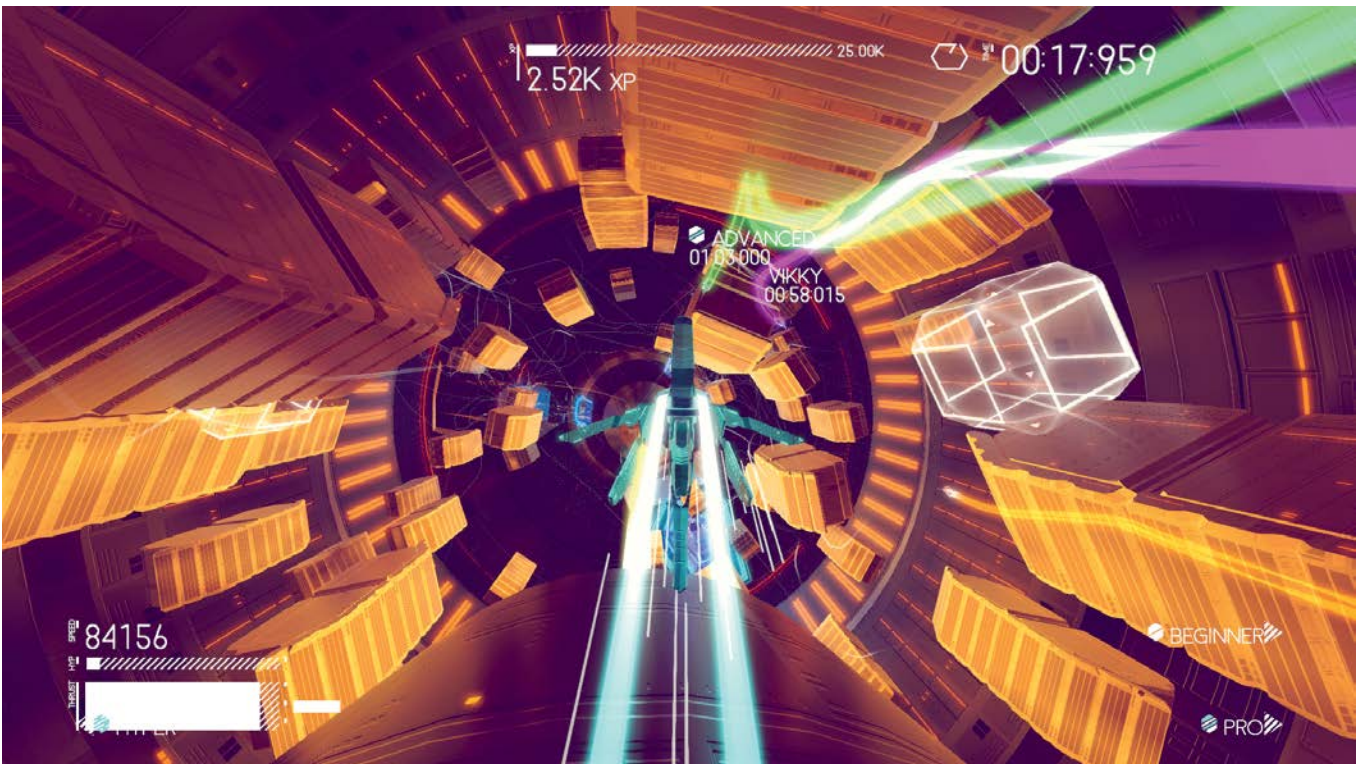
*The Lab* by Valve is a good introduction to the medium and offers a potpourri of high-quality experiences — and with a lot of humour. *Eagle Flight* on PSVR takes you on an eagle flight without the motion sickness [note: nausea while playing computer games]. Games like *Job Simulator* and *Accounting+* use the VR world to skew an everyday, actually boring office or work scene into a surreal experience. *The Lacuna Shifts* is also noteworthy. This artistic work by the Austrian duo Depart deals with the altered reality in VR. Spaces change constantly—especially in places where you don't look.

Stills from Lost in the Garden's *Lightfield* game funded by the Vienna Business Agency.

**What advice would you give to indie developers who would like to get into VR?**

Not to use the technology as an end in itself, instead use the technologies that best suit the project and its implementation. In our opinion, the days when projects were “cool” simply because they were implemented with VR are gone.

VR has many strengths, but also many limitations, and from our point of view it's always about dealing with both equally. The question is always: How can I use VR's strengths for my project and how can I best deal with its weaknesses so that, ideally, users won't even notice them?



# VR MEANS MORE THAN JUST GAMING

## INTERVIEW WITH MICHAEL TISLER

The Vienna-based game studio Black Cell was one of the first in Austria to specialise purely in the production of VR games and experiences. They use Unreal 4 software and Google Tilt Brush to create worlds and levels directly in virtual reality. Founded in 2016, Black Cell is not solely confined to the entertainment sector. The team is working in cooperation with the St. Anna Children's Hospital in Vienna to test alternative treatment methods for ADHD (attention deficit/hyperactivity disorder) using virtual reality and is proof of how a company developing games can initiate innovations in the medical sector as a service provider.

**Black Cell specialises in developing VR games. You work with the St. Anna Children's Hospital in exploring alternative treatment methods for ADHD. What does a project like this look like? And why is VR particularly suited to treating ADHD?**

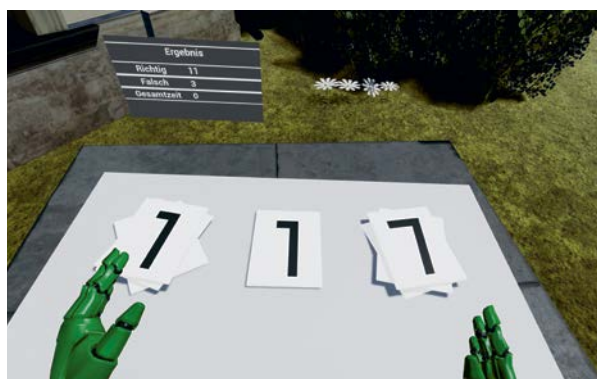
VR means much more to us than gaming. It's a holistic experience that offers a wide range of applications. Our speciality is in creating interactive experiences — these can be games, but they don't have to be. VR is particularly suited to diagnosing and treating ADHD for two reasons. First, the sensory input can be precisely controlled. One of the symptoms of ADHD is that it is difficult for those affected to process and evaluate the many sensory impressions. This makes them easily distracted. VR offers a customisable environment in which the input can be controlled. This makes controlling the diagnoses easier as well as creating exercises that are exactly tailored to the users. Second, it is much easier to motivate young people and children in particular to do playful exercises in VR than to do "boring" concentration tests on paper.

**Clinical trials were started last autumn. Are there already any results you can share with us?**

The results still have to be thoroughly evaluated and seen from a long-term perspective, of course — such therapy exercises aren't magic pills. But what has emerged though, is that thanks to the markedly greater motivation of the children and the fact that the exercises are designed together with the therapist, the therapies are more effective than comparable methods without VR. We hope the observations will be confirmed in the long-term study.

**What is special about this collaboration between medical experts and game designers?**

Working with other sectors is always rewarding. Of course, initially there is always the idea that you can quickly conjure something up and pull complete worlds out of a hat. But the special thing about our experience in the field of play is that, compared to medical therapies, we place much more emphasis on fun, user guidance and variance — something that is rarely considered in the therapeutic field. Ideally, users enjoy doing what they're doing and don't even notice that it's about promoting their health or a medical diagnosis. With ADHD, it is especially important



In cooperation with the St. Anna Children's Hospital, Black Cell is testing alternative treatment methods for ADHD with VR.

that the children behave "naturally" so to speak. This is much easier for them in VR. But we also learn a lot about which distractions affect people from the task in hand, in what way and how sensory input is prioritised. These so-called interferers can be sounds, things flying by or other distracting events. Children with ADHD find it difficult not to react to such external influences and to keep focused on their task. One of the exercises revolves around improving the ability to filter these distractions. We can also use all these findings for our future game productions.



**Your project shows how VR is opening up new fields of activity for game developers outside the entertainment sector. How do you think this kind of interdisciplinary cooperation could be promoted?**

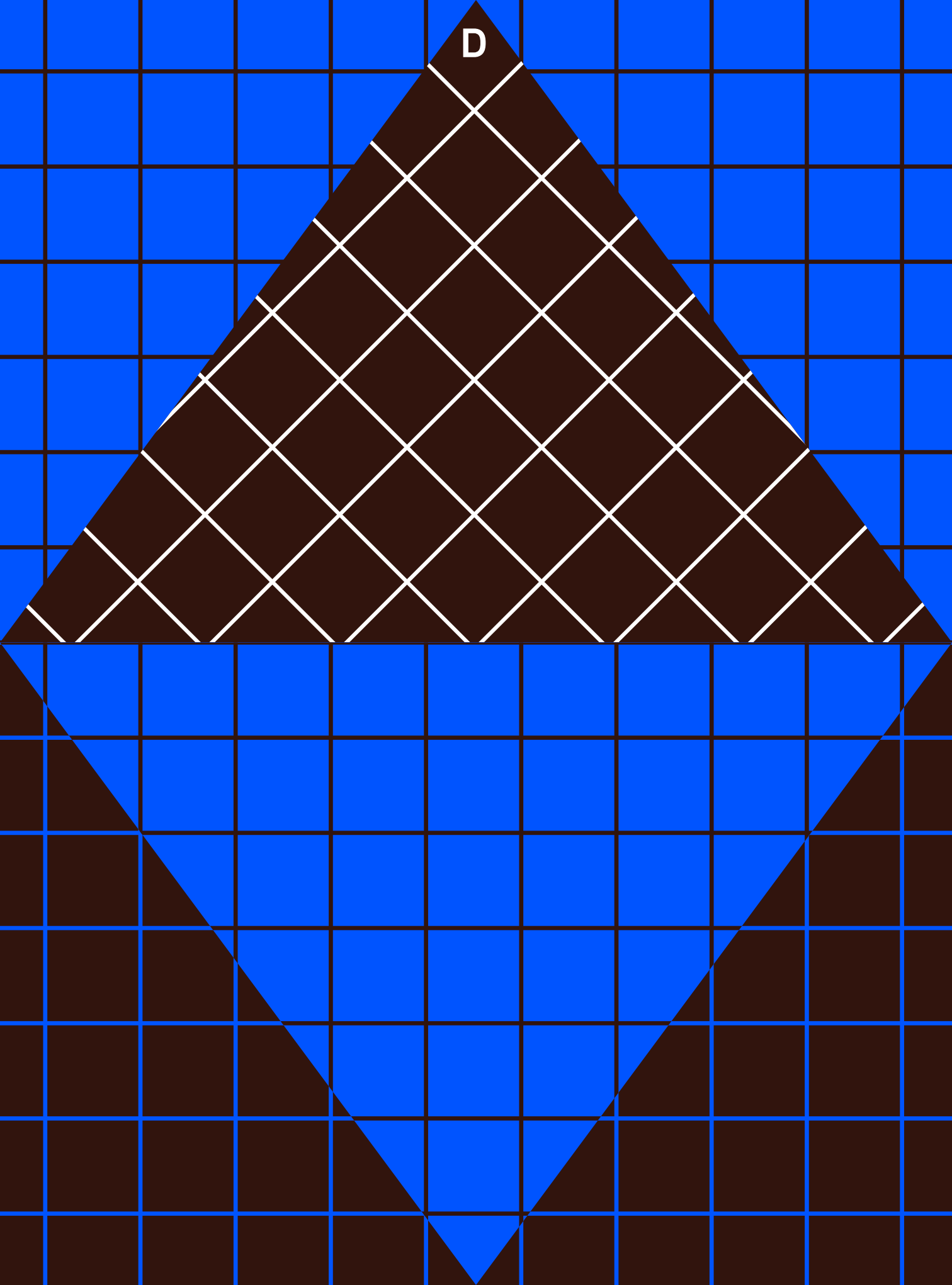
In our experience, there is often a general skepticism or lack of awareness when it comes to VR or game development. Gamification may have become a familiar concept to many people, but it is often reduced to “getting a high score”. We think industry-specific round tables with best practices from the application can be useful. Offering such pilot projects targeted support would certainly make sense — whether in education, therapy or addressing customers. All these areas can benefit from playful interaction.

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**What advice can you give developers and creative people working with VR who want to offer their services in the medical sector?**

Patience. The development cycles are long and approval hurdles are high — after all, it is about people’s health. And initially, there is no money to be made from research. We also started the ADHS project using only our own resources, as we thought it was important to explore this possibility.



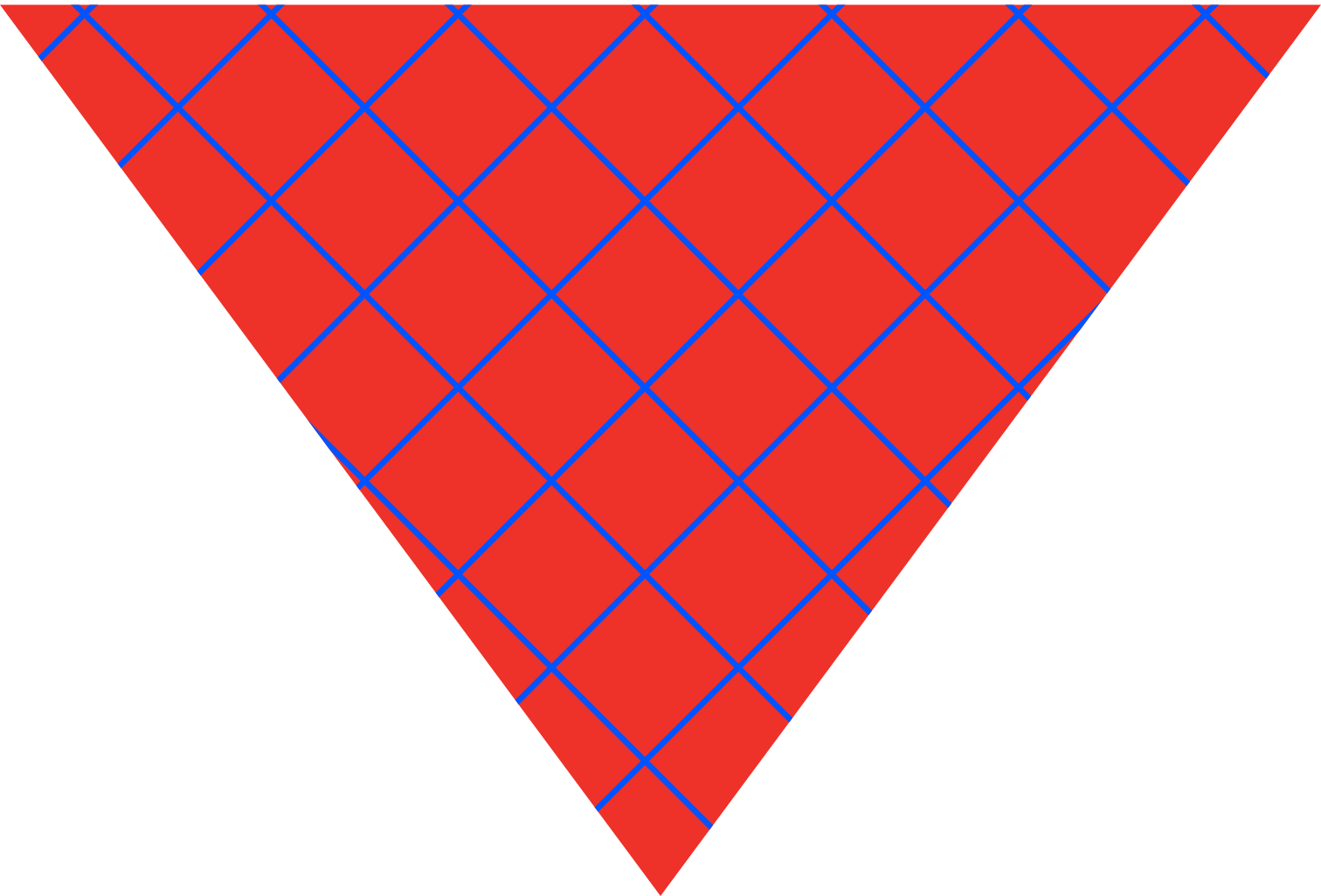


# ENABLING EXPERIENCES, ALLOWING INSIGHTS MARKETING AND DISTRIBUTION

How can I use VR/AR/MR technologies  
for my marketing and communication?

How can these media impact my  
storytelling?

What advantages do VR/AR/MR offer with  
regard to activating (new) target groups  
and entering into dialogue with them?



# FASHION MEETS TECHNOLOGY: NOT JUST A FLASH IN THE PAN

## INTERVIEW WITH SABINNA RACHIMOVA

Sabina Rachimova graduated from the Central Saint Martins College of Art and Design, has worked at fashion houses such as Christian Dior and Mary Katrantzou and in 2014 founded her fashion label SABINNA together with her partner David Reischer.

For London Fashion Week 2017 the Viennese fashion designer, who now lives in the UK, collaborated with the Graz-based app developer Pictofit to use AR technologies to present her collection in an interactive mixed reality show. Guests were given Microsoft HoloLens goggles with which they could change a model's outfits with the wave of a hand or try on and combine individual items themselves in a virtual fitting room.

### **How did the collaboration with the app developer Pictofit as part of London Fashion Week 2017 come about?**

In November 2016 my team and I were contacted by the Fashion Innovation Agency London (FIA). They had been following our previous activities and were intrigued by our approach to the digital world and use of technologies to reach customers more easily. They told me about Pictofit, a company that works with VR and had created a virtual fitting room. Of course I was immediately fired up, and I also felt honoured to have been chosen for such a great project. When I found out that Pictofit is also from Austria, I was even more excited. We had some Skype meetings, and in January 2017 my team and I took the entire collection to Graz, where we scanned all the garments and prepared the VR experience.

### **Had you been working with technologies like VR, AR, MR before?**

My only contact with VR, AR, MR had been in my private life and during my studies at Central Saint Martins. But we have had a digital presence since our first season. We have a strong e-commerce channel, and our entire business model is built around the use of innovative technologies. Nothing passes us by — whether it is an interactive website, sample sales via Instagram stories or 3D printing. David Reischer, my business partner and significant other, studied economics and computer science. Our combined

areas of studies and work experiences allow us to look at things from different angles, to analyse them and to develop new approaches.

### **How would you describe the production of the show? Can fashion and technology speak the same language and share a common vision?**

Producing a show costs a lot, in terms of both time and money. Last season we created a hybrid runway and presentation format. The SABINNA fashion show transitioned seamlessly into a static presentation. That gave the guests more time to take a closer look at the garments, take photos and share them on social media.

Fashion and technology need to speak the same language, but don't always do so. The fashion scene is still a bit reserved when it comes to collaborating with tech companies. But a lot has already changed, and at the end of the day the consumers will be part of setting the course. And the fashion industry will realise that technology is firmly fixed in fashion.

### **How did the audience respond to your "mixed reality fashion experience"?**

The response was absolutely overwhelming! And not just at the event itself — where the interest and demand were so big that the room was bursting at the seams! — but also afterwards. In May 2017 we won the Fashion Futures Award

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presented by the British Fashion Council and Decoded Fashion. We were nominated in the “Beyond the Runway” category together with the industry giants Burberry, British Vogue and H&M. Everyone from FIA, Pictofit and SABINNA was pleased as punch about this award.

### Is the use of these technologies to present fashion more than just a flash in the pan?

It was extremely important to us to minimise people’s reservations about the technology as much as possible. We wanted to appeal to a broad audience and prove that creativity, commercial success and technology can go together. To ensure that it wouldn’t be flash in the pan, it was important to create a so-called extension of the event. And that’s where the Pictofit app comes in. Since the beginning, we have implemented a “see now, buy now” strategy, which means that the customers can buy the collection straight off the runway. The Pictofit app makes this possible in combination with our online shop. Guests can take the show experience home with them on their own smartphones.

### What role can you see VR, AR, MR playing in the presentation and distribution of fashion in the future?

I’m sure that VR, AR, MR will be used more and more in the future, because they offer such great possibilities: fitting rooms (online and offline), shop windows, backstage insights — all these things can be enhanced through the use of VR, AR, MR.

“See now, buy now”: from the runway to the shopping experience



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### Do you also see potential for VR, AR, MR to be used in your design or production processes?

We already have applications in the production of the collection, but they are still in their infancy. A promising area is certainly the capturing of visual patterns and the evaluation of the data to optimise cuts and identify new potential. This is an idea that has been around for several years, but is presently only being applied to a small degree.

### The symbiosis of fashion and technology is firmly anchored in SABINNA’s DNA. Are there any projects in the pipeline that you can tell us about?

At the moment we are working on a digital showcase that is intended to replace the traditional fashion show in the future. We are living in an age where smartphone screens get the most attention — even at Fashion Week. Everything is seen through the camera lens and the screen. Guests want to share their impressions with their followers, so their focus is on recording every moment. Our aim is to build on this new approach and develop it further. I want to communicate with all consumers via their own screens and also make the “see now, buy now” concept more accessible and user friendlier. I want to overcome the geographical barrier and reach more people. Everyone who is interested should be able to see and buy the new collection.

So we are launching our new collection on Instagram over the entire Fashion Week season (NY, London, Milan, Paris); a new look for each day, presented by carefully selected influencers. A simple swipe will direct you to our online shop, where you can buy the garments you just saw.

In London, we will also be putting on one of our “see now, buy now” events. In future, we will probably have to change our location from “London-based” to “Internet-based”.

## USE CASE

### THISPLAY: THE VIRTUAL FITTING ROOM



Emanuel Andel is a developer of interactive media solutions best known for his work on the Austrian Pavilion at the EXPO 2010 in Shanghai, where guests threw snowballs at an interactive wall to retrieve information on Austria. His company THISPLAY offers innovative solutions for presentation systems, such as an interactive mirror or a shop window that communicates with passers-by.

In the TP.MIRROR fitting room, users can try on various styles, cuts and colours. They choose the garment they want to “try on” or they hold up the RFID-tagged item (*radio-frequency identification*) in front of the mirror. The system measures the users’ sizes and proportions and tells them which size they need. This makes it possible even for small companies to present a wide product range. In combination with modern logistics solutions, it can even serve as a stand-alone shop. Without the need for staff and a brick-and-mortar store, the TP.MIRROR just needs to be set up with an online payment option and can serve as a direct distribution channel. In this way, fashion can be tried on everywhere, whether at events or in a public space.

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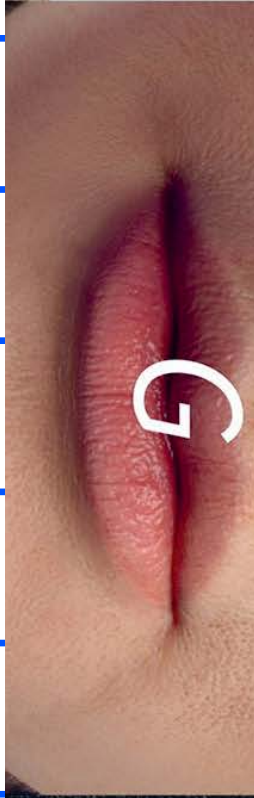


CHRISTINE

USE CASE

JEFF KOONS PRESENT

### ACUTE ART: VIRTUAL ART AND BIG NAMES



In the autumn of 2017, the London-based platform Acute Art opened its virtual doors as a gallery and exhibition venue for art in virtual reality (VR).

At the launch of the project, such renowned artists as Marina Abramovic, Jeff Koons and Olafur Elisasson presented VR works they had created especially for the platform. With subsequent exhibitions by Anish Kapoor, Nathalie Djurberg and Hans Berg, Acute Art wants to underline its desire to be a pioneering model for new forms of presentation for digital art in the future.

In addition to wanting to connect famous names from the world of art with VR, the project also seeks to give upcoming artists working exclusively with VR an audience and a platform through The Factory.

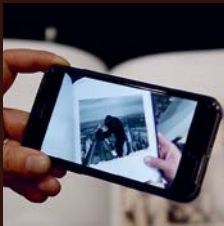
Acute Art's business model is based on a subscription system. At a cost of currently USD 9.99 per month or USD 29.99 a year, subscribers can visit the gallery via the virtual museum's app using a HTC Vive headset. Admission to The Factory is free.



## USE CASE



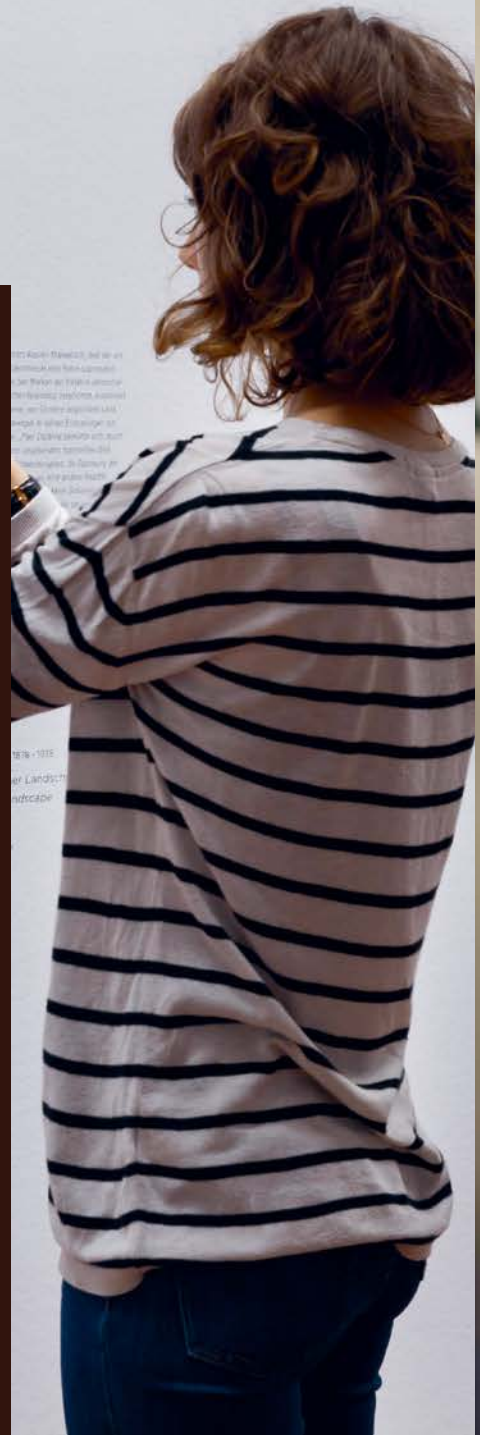
### ARTIVIVE: A NEW DIMENSION OF ART



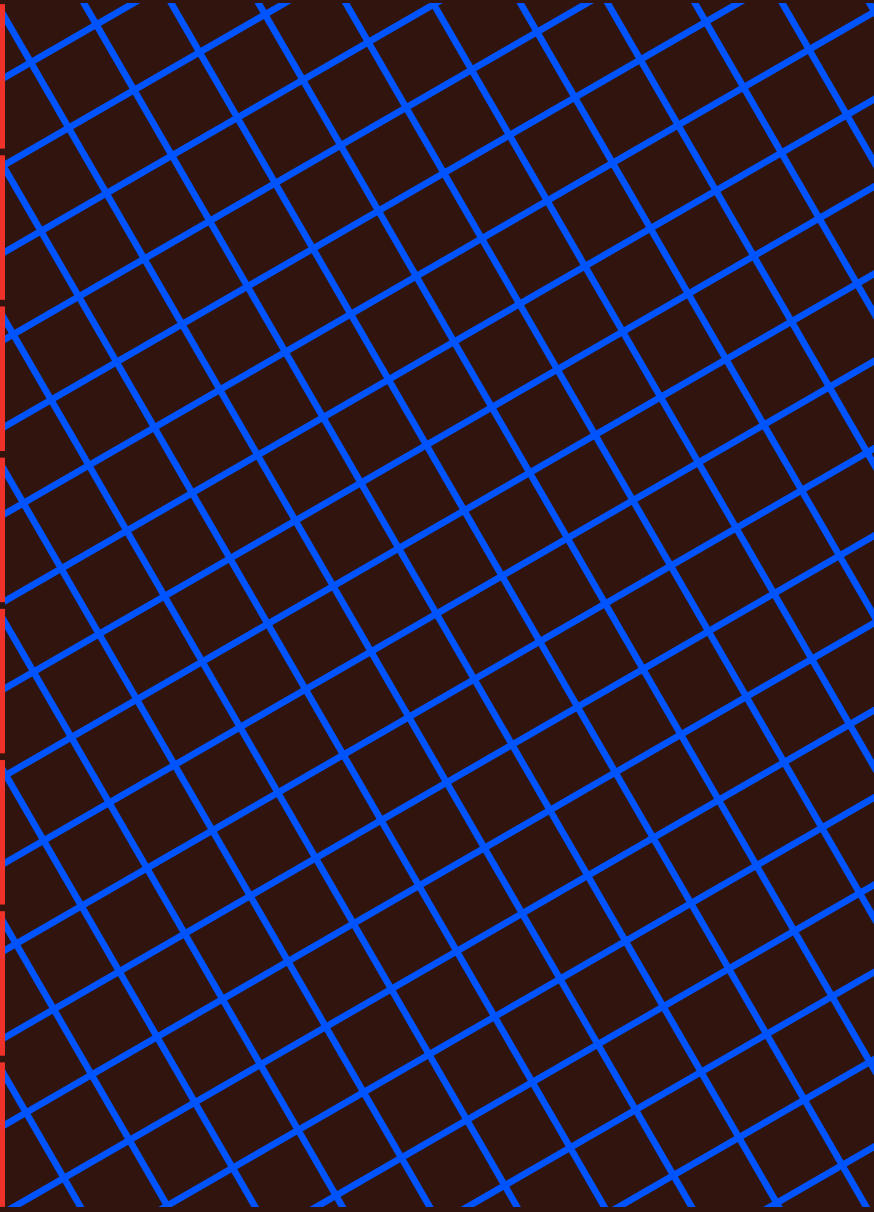
The Viennese company Artivive was founded in 2017 by Sergiu Ardelean and Codin Popescu. It gives artists, museums and galleries the opportunity to add digital content to artworks with the help of augmented reality (AR). The real artwork in this case always serves as the gateway to the

digital experience. Users of the Artivive app, which is available free of charge from Google Play or the App Store, get information about an exhibit by pointing their smartphone or tablet at it.

In this way, Artivive opens up completely new possibilities for artists: It digitally expands the exhibition space—which is usually too small in real life—and allows for narrative connections. For instance, the app gives insights into the creative process and can be used for art education.

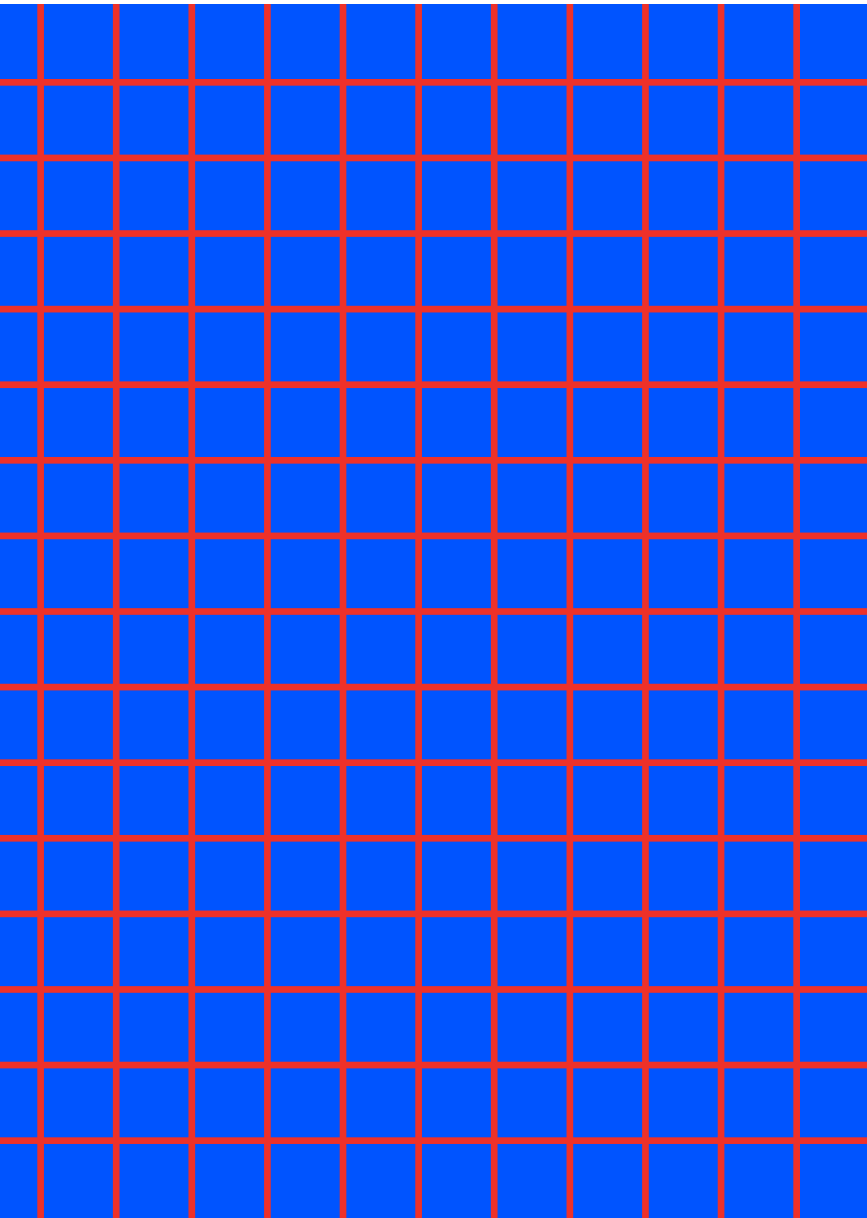


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# THE WHOLE AND THE INDIVIDUAL PARTS STRUCTURES AND REQUIREMENTS

How can I access knowledge networks locally and internationally to benefit my business?



How can I share expenses and knowhow with others?

Where can I find fields for the meaningful application and testing of VR/AR/MR?

# THE FUTURE IS NOW

## CONTRIBUTION BY SARA LISA VOGL

Digital realities are no longer visions of the future, but have reached our daily lives. How can we put virtual, augmented and mixed reality to good use in order to generate real added value for our society and economy? The ideal scenario: Future generations are not controlled by technological progress, but rather see it as a way of shaping their real and digital environments.

The current hype surrounding the development of augmented, virtual and mixed reality (AR/VR/MR) is indicative of the great expectations put in these technologies. Private risk capital but mainly investments made by all the major technology companies such as Microsoft, Amazon, Google and Facebook fuel the hype like never before. The promise of making previously unimaginable scenarios tangible makes VR a kind of dream machine. AR is already impacting our day-to-day life by digitally supporting interactions with our environment. Whether the navigation app on our smartphone, which provides us with a schematic depiction of reality, or the game with cute monsters that transforms our surroundings into fantastical worlds. How MR can really add significant value, however, remains to be seen.

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### IDEA MEETS KNOWLEDGE

What does it take to develop and use these new technologies beneficially and profitably? To do this, certain requirements must first be met. VR is an area that is not yet well established and therefore still costly. Special infrastructures, tools and resources are necessary for innovations and new content to be developed and tested.

Networking, exchange and transfer of knowledge relating to proven processes are central for the research and definition of the new medium. At the moment, it is crucial to create places and formats where ideas and prototypes can be developed and that facilitate free experimentation. Trial and error is the way to venture into as yet unexplored areas. Hackathons, game jams,

workshops and similar open formats show how important the experimental approach is. These provide a setting in which ideas can be freely explored without the burden of (profit-oriented) objectives, but with promising results. One example is the MR hackathons where experiments were carried out on new forms of mobility that could open up new perspectives and possibilities for interaction with the virtual worlds. Because that kind of research is still light years from having concrete applications, a company would hardly commission it.

Incubators offer suitable conditions for this type of work. XRBASE in Berlin and Amsterdam, for example, promotes collaboration and networking between developers, creatives and start-ups under one roof. It offers infrastructures and hardware that everyone has shared access to, such as VR/AR goggles and phones, computers, cameras and green screens, which would be costly investments for individuals. These laboratories of inspiration, collaboration and exchange give creatives the opportunity to connect with technology partners, with the VR industry, potential customers and investors, and to receive targeted information about current and future hard- and software developments. These offline networks, formed during investor days, hackathons and networking events, as well as online networks facilitate the creation of specialised groups in which different disciplines can come together. This brings added value, especially at the international level, because it allows culturally different approaches and work methods to be discussed and tested.

Larger companies, publishers and consultants such as Axel Springer and Deloitte are dipping into VR and AR by means of innovation hubs and events where they hold workshops or develop new concepts together with start-ups or small creative agencies. Here too, networks and platforms like XRBASE play a role, as this is where established companies come into contact with creative innovators and “makers” for the first time.

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### INTERDISCIPLINARY, INFORMED AND RESOURCE-INTENSIVE

VR itself is still very young, as is the possibility to utilise this medium. This is why best practices and tools are constantly changing. Almost every week sees a new milestone in the development, and there is practically no such thing as a recognised expert anymore. Against this backdrop it is especially important for developers to stay up to date on new tools and software by taking part in specialist events, trade fairs and meetups, as well as by reading relevant blogs and online publications, e.g. the German-language VRODO, VRNerds.de and Bloculus.

Something that’s really exciting about VR is that the people pushing the development of this new medium come from a variety of creative disciplines with different qualifications and experiences. Often these interdisciplinary teams with the goal of creating completely new, immersive worlds of experience consist of creatives from the areas of theatre, film and art, as well as musicians, gamers, interaction designers, communication designers, UX (user experience) and UI (user interface) designers. Various knowledge backgrounds—for instance, the staging of rooms—find a new medium for expression in VR. Overlaps between the disciplines are identified and explored. So you might find sound designers and theatre playwrights, for example, collaborating with programmers on realising a virtual world. This open approach and interdisciplinary exchange is essential in order to develop the medium, add content and create new genres specifically designed for virtual and augmented realities.

In addition to the transfer of knowledge, financing plays an important role. The designers need funding to make the creative exchange possible. In Europe, in particular, both public and private funding are needed to support a strong, independent and internationally connected European creative scene that can do without the resources provided by such giants as Google or Facebook. Creatives who are working on developing the medium need funding that goes beyond general subsidies for projects, films or games. The production of VR projects is complex and they require freedom for experimentation. For this reason, they need more funding than, for instance, 2D movies with a longer running time. Just think back to the 19th century, when films were no longer than a few minutes in duration and were shown at fun-fairs between magic shows and fire-eater performances.

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### FROM THE NICHE TO THE MASSES

Developers and also users who dabble in new technologies also face frustration and initial hurdles in the handling. The main reason for this is that neither the hardware nor the software are fully mature yet. So a pronounced affinity for tech is beneficial when using them. Relevant programs for use are only just emerging, and there are still very few established platforms and publishers who release software with proven quality standards. Bear in mind that the Oculus Rift, the first VR device for end

E users and a fully interactive device, was only launched at the beginning of 2016. The HTC Vive, which allows you to enter a predefined space and interact with the virtual environment through controllers, was released in April 2016. Consequently, the content for these devices has not yet been sufficiently regulated and tested. The main responsibility for this currently lies with big players like Facebook, HTC and Google.

What doesn’t necessarily make the spread of VR/AR any easier are the preconceptions regarding the negative effects of the goggles in terms of escapism or even loss of reality. The fact that one needs to put on a headset in order to really understand what VR is all about makes it hard to educate people on a large scale. This means that it will likely take a while before definitions of

One way of entrenching the topic of VR/AR more firmly in society and in the minds of potential customers and cooperation partners is to apply these technologies where they are of use.

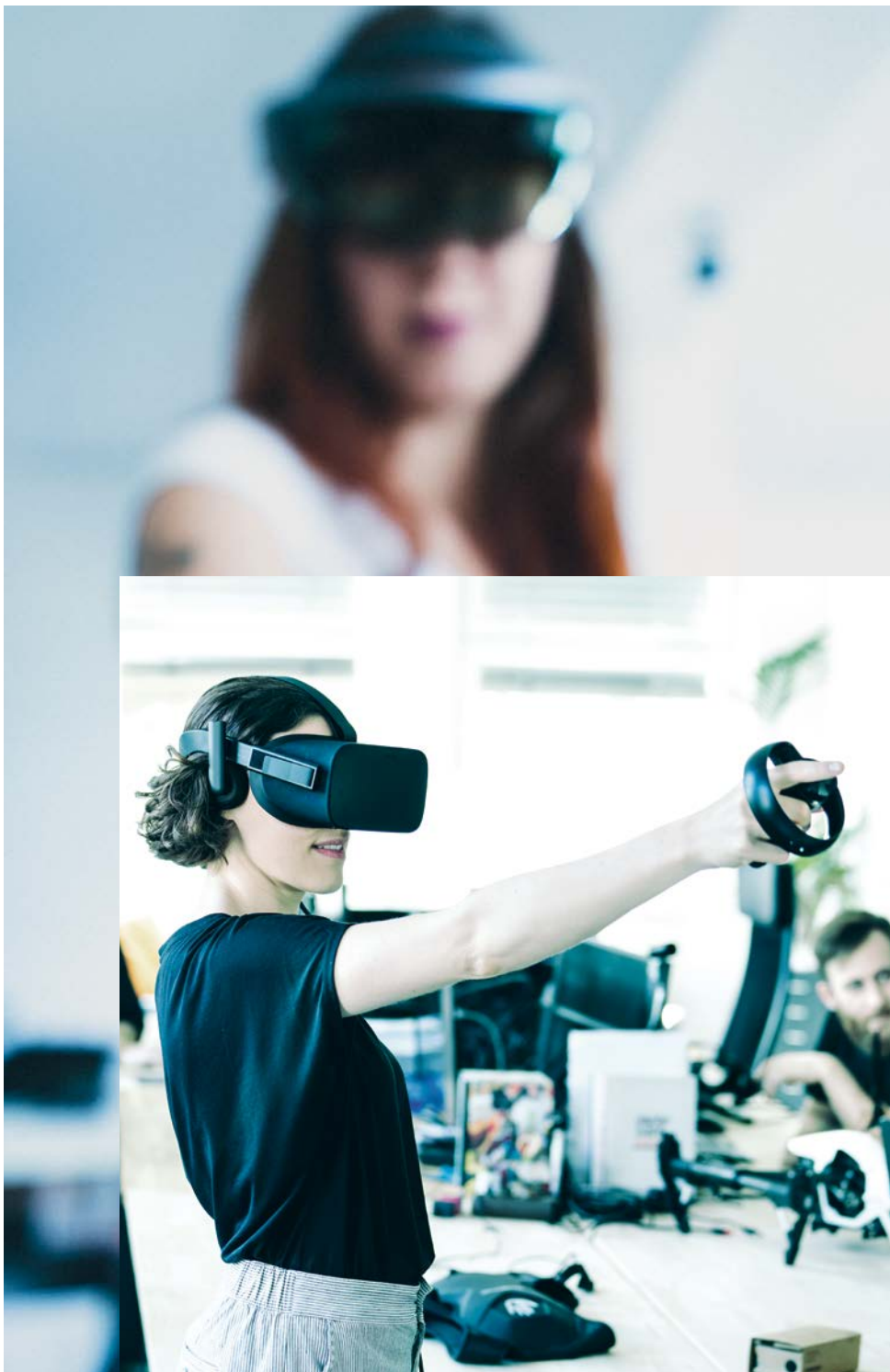
Sara Lisa Vogl (right) at XRBASE Berlin — an incubator that provides infrastructures for experimentation with virtual reality and connects creatives from different disciplines.



social and ethical maxims for virtual worlds of experience are recognised by the mainstream. Still, there is enormous potential in learning and training applications, which has already been proven and accepted, especially in health research and in therapies such as the treatment of anxiety disorders and post-traumatic stress disorders.

One way of entrenching the topic of VR/AR more firmly in society and in the minds of potential customers and cooperation partners is to apply these technologies where they are of use. With the appropriate supervision, they can be an uncomplicated introduction to new experiences with virtual or augmented reality. This also means distancing oneself from quickly and easily produced gimmicks and marketing gags, and instead focusing on more comprehensive and profound applications. Training simulations, for instance, are useful in mechanical and automotive engineering and also in all those professions in which certain work processes pose major risks, as VR makes it possible to practise the necessary motions specifically and systematically. Empathy-promoting experiences in journalism are also conceivable. They allow users to change perspectives and to experience the world from a different point of view — for instance, that of a refugee child. To sum up, VR/AR works well wherever the “dream machine” can generate concrete added value.

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**Sara Lisa Vogl** is co-founder and CTO of XRBASE, a VR/AR co-working space and incubator with hubs in Amsterdam and Berlin, and was named a cultural and creative pilot by the German government in 2018. She promotes the synthesis of art and technology by building up a community of creative professionals, developers and industry partners in the area of VR/AR and holding workshops, courses and talks on the subject.

# VIENNESE COMPANIES ARE COMPETING WITH GLOBAL GIANTS

RENATE BRAUNER, VIENNA'S STATE MINISTER OF FINANCE, ECONOMY & INTERNATIONAL AFFAIRS, AND VIENNA BUSINESS AGENCY MANAGING DIRECTOR GERHARD HIRCZI ON THE TOPIC OF “DIGITAL REALITIES” AND WHAT THEY MEAN FOR THE CITY.

**When were you last in virtual reality? When did you last make use of “digital realities”?**

**Renate Brauner:** Just today I used Google Maps to find my way to an appointment.

**Gerhard Hirczi:** I visited an exhibition called “Klimt’s Magic Garden”. It is a fantasy landscape based on a Klimt mosaic which visitors can currently experience through VR goggles at the Austrian Museum of Applied Arts.

**Why is the Vienna Business Agency offering funding for virtual reality?**

**Renate Brauner:** Because it’s a topic with economic potential, and the Viennese scene is very active. Virtual reality has arrived in the here and now, and the studios and their creatives are already on their way into the future. It is plain to see that it’s not about gimmicks, but about concrete products.

**Gerhard Hirczi:** This is where companies in the creative industries and companies that come from this “digital reality” meet: for instance, fashion meets augmented reality, or architecture meets the virtual reality that makes it tangible — and new projects emerge from this. The aim of our funding and of this white paper is to draw attention to the possibilities and initiate new projects.

**What other areas of application can you envisage?**

**Renate Brauner:** There are already excellent examples of applications in the area of healthcare. One such example is the ADHD research collaboration between Black Cell and the St. Anna Children’s Hospital. But it is also used in education — gamification being the keyword here. And of course there are many areas of application for the creative industries, in particular: in distribution, in presentation, in communication. And virtual reality itself is a new form of collaboration.

**The total funds amount to EUR 1 million. That’s a lot of money. Why so much?**

**Gerhard Hirczi:** The development of virtual reality, augmented reality and mixed reality is extremely costly. The Viennese companies are competing with global giants that invest a lot of money in pushing this development. If you want to achieve something in this field, you can’t mess around, but have to get down to business. That’s why we initiated this grant.

**Renate Brauner:** Virtual reality is undoubtedly one of the most important future issues, and we want it to be anchored in our city. And the business location as a whole benefits from the approach of creative minds collaborating across industries and creating something new.

# IMPRINT

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