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WIT ACADEMY

#AI #3D #VR

interview with Bisi Williams and Bruce Mau

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editorial

With great pleasure we present you the latest, third issue of the scientific journal dsignn. The field of graphic design and new media is evolving at a dizzying pace, driven by constant technological development. Artificial intelligence is playing an increasingly important role in this process, opening up new possibilities, challenges, and questions. In this edition, we aim to take a closer look at this technological breakthrough and its impact on the art of new media.

On behalf of the entire editorial team, I hope that this issue of dsignn will become a valuable source of knowledge and inspiration for you. We have made great effort to ensure that the topics we address will encourage further exploration and creative research solutions.

We wish you a pleasant read.

Magdalena Mirkowicz, PhD
Editor-in-Chief of dsignn

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Grzegorz Rogala, PhD
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Artist's adventures in AI land

...Soon her eye fell on a little glass box that was lying under the table: she opened it, and found in it a very small cake, on which the words "EAT ME" were beautifully marked in currants. Surprised with her mysterious discovery, she decided to investigate it further.

She lifted the box gingerly, and when she opened it, the room was soon filled with an intense smell of fresh baking. The cake looked extremely appetising, and the words "EAT ME" inscribed in the pastry evoked mixed feelings in Alice – from curiosity to careful uncertainty."

First sentence:
Lewis Carroll, Alice's Adventures in Wonderland.

Remaining sentences: **generated by the GPT3 algorithm based on the first sentence.**

Each and every technological breakthrough – whether it be the invention of pigments, paper, the printing press, photography, film, sound recording devices, or the computer – hugely influenced our civilization, revolutionising each field of human activity, including art.

Computer art already has its history. Generative works, also referred to as algorithmic, appeared on the eve of 1960s together with the popularisation of digital technologies. The breakthrough moment on the road to have them accepted as art was the 1968 international exhibition entitled "Cybernetic Serendipity", held in The Institute of Contemporary Arts (ICA) in London. This exhibition gathered such artists as Nam June Paik, Jean Tinguely, John Whitney, Charles Csuri, Georg Ness or Edward Ihnatowicz.

In a way similar to earlier technological achievements, artificial intelligence has already had a deep impact on our reality – and the scale of those changes is currently difficult to estimate. Each new tool expands human capabilities, becoming a kind of a prosthesis of senses, enabling us to examine the surrounding world in more and more detail. Just like photography did by opening a door to viewing the reality in a way that would be impossible for the naked human eye, letting us have a glimpse into events that last mere thousandths or billionths of a second, and at the same time becoming a creative tool.

As any novelty, AI inspires distrust and dread in some, and delight in others. Artists, without waiting for art theorists to profess their opinions, are independently discovering the creative potential hidden in this new technology.

The history of artificial intelligence dates back to the end of World War II when the first contemporary computers were created in Germany, the United States, and the United Kingdom. Already in 1950s, scientists considered the possibility of building intelligent digital machines, which led to the term "electronic brain" being coined. The term "Artificial Intelligence" was born in 1955 at Carnegie Mellon University in the USA. The definition of intelligence has been evolving in recent decades. Currently, it is believed that it is the ability to build a model of any phenomenon.

The first stage of the AI were expert systems, based on programmed rules and schemes. Despite years of work on them, the results achieved were not satisfactory – e.g. the handwriting recognition systems achieved the effectiveness of just 70-80%, which was insufficient for their practical application. The slow progress and low efficiency of the initial algorithms blocked the funding of further research. 1970s and 1980s were the stagnation period known as an "AI winter".

The renaissance came with the development of the Internet and the increased computing power of computers. John McCarthy's idea of 1959 was revisited, in which he called for the AI to learn like humans do, dynamically through experience, and not be limited by a set of programmed rules. This type of algorithms that are capable of learning, currently referred to as "machine learning", uses Convolutional Neural Networks (CNN). Just a few years ago, the largest of them had around 16 million neurons – which roughly corresponded to a frog's brain. In 2019, Google announced that their Deep Mind exceeded the number of 11 billion neurons (for comparison, a human brain contains around 100 billion). Chat GPT3 (2022) uses 175 billion parameters (connections between neurons).

Thanks to the access to trillions of bytes of information offered by today's Internet ("deep data"), a newer type of "machine learning" has emerged, referred to as "deep learning". It uses the huge computing power that such technological giants as Google, Amazon, Microsoft, Nvidia or Facebook have at their disposal. Systems based on "deep learning" are capable of creating speech recognition and generation models, translation, analysis, image or music generation. The rapid development of AI in the recent years has brought several spectacular victories in the human-machine competition: the Watson supercomputer won in 2011 against the Jeopardy competition master, the AlphaGo program beat one of the best Go players in 2016, and AlphaZero which in 2017 won against Stockfish, the grandmaster chess program that was deemed unbeatable by humans. In order to understand the power of AlphaZero, it is worth remembering that, in order to win, AlphaZero learned the game for just four hours by playing games of chess against itself, equipped with just the basic rules.

From their earliest years, people learn through observation and examples. Our mind, by using neural networks, creates a continually changing model of the world. All stimuli and sensations we receive go through that model. Our brain needs about one third of a second to process the stream of sensory information. To provide us with the feeling of the here and now, it uses the prediction mechanism, i.e. it "hallucinates" what will most probably happen in that 1/3 of a second. Artificial intelligence based on neuronal networks learns in a way that is similar to human learning – through examples and not through rules. The effect of this learning is a model, for now much more modest than the one we have in our minds. It often describes a specific task, e.g. speech recognition, image generation, stock exchange data analysis, or game of chess or Go. Models based on neuronal networks may be dynamic, and are perfected as new information flows in. They cope excellently with the interpretation of Big Data. Similarly as in the case of the human mind, the effect of learning is a model which "hallucinates". The AI model of a human face, based on the analysis of several or hundreds of thousands of portraits, does not "remember" any of them. It creates an abstract function which enables it to generate any face that is compatible with the examples used by the AI to learn. If the input data did not include any persons with negroidal features, the model will be unable to "hallucinate" them.

Through the neuronal network learning on selected examples, artists have access to a tool that is capable, similarly as a brain is, of analysing selected elements of reality, of creating models, and then "hallucinating" unusual, strange, surprising, and sometimes even beautiful visual, musical or literary forms. This leads to the reflection on the nature of creation, on who the creator is, whether AI's "hallucinations" fit into these notions?

Creativity is defined as a mental process that leads to the creation of new ideas, concepts, or new associations, combining them with the already existing ideas and concepts. This is thanks to this process that we develop, moving from Mediaeval art, through the Renaissance, Baroque, to Modernity. The AI algorithm, taught on the examples of Renaissance art, can create new, previously non-existent works, however it is people who evaluate which of these are sufficiently interesting to continue work on them. You must remember about the limitations of the AI: taught on Renaissance examples, it is unable to autonomically and gradually create Baroque or any other artistic style. It can learn the rules of the game of chess at a level that is inaccessible to a human being, or analyse huge quantities of statistical data, however it cannot independently create and develop new ideas.

The age of artificial intelligence capable of synthesising images began in 2014 thanks to a young scientist Ian Goodfellow. During a casual chat in a pub with his friend who was a doctoral student, Ian tried to help him create an algorithm that generated human faces. Goodfellow had an innovative idea. He suggested using two neuronal networks: a generator and a discriminator. The first one generates results, the second one evaluates them in comparison with the original data. After several tests, this combination produced spectacular results in a short space of time – faces generated by the AI reached a nearly photorealistic quality! This is how GAN – Generative Adversarial Network was born; it forms the basis of the majority of algorithms analysing and creating images.

One of the first artistic tools originating from AI was "Deep Dream", an algorithm created by Alex Mordvincev from Google in 2015. Mordvincev experimented with fundamentals of the operation of neuronal networks and Deep Learning. He modified the existing network ImageNet whose model encompassed over 1000 categories of objects, reinforcing the activation of artificial neurons to "hallucinate" images in accordance with what patterns AI searched for. The effect of this were psychedelic pictures full of dog-like, cat-

-like or snail-like creatures, built from recognisable image elements.

Another important step in the development of AI was the creation of a modification of GAN called Pix2Pix by Christopher Hesse. This algorithm is trained on pairs of images: one presenting item A, and another – item B. Thanks to this, Pix2Pix learns the function changing item A, which may be e.g. a contour, into a photorealistic image of what the contour represents. This was followed by an avalanche of new, increasingly interesting visualising algorithms: BIGGAN, StyleGAN, AttnGAN, GauGAN, Stable Diffusion, text generators based on the GPT model, or music generators. This evolution became a milestone in the development of creative AI tools.

At the initial stage of artificial intelligence development, there was a shortage of ordinary user-friendly programs. As a result, it was mainly young IT specialists who took control of the tool to begin with. Despite this, the fascinating capabilities of the AI started attracting ever growing circles of artists. This trend was also supported by the free access to the AI resources made available on platforms such as GitHub or Colab.

The RunwayML application which appeared in 2019 thanks to the team led by Chris Valenzuela, is a unique proposal. Thanks to a simple interface, the user may dive into the world of AI tools. The program not only allows the exploration of various built-in models, but also combines them into chains and creates completely new ones.

Another interesting platform is the Discord online platform which is becoming a kind of interactive lab for artists, enabling them to create new visual concepts free of charge, by mixing, combining and experimenting with various published models.

AI is often presented as a potential competitor to humanity. A vision of machines appears, in which their abilities surpass those possessed by human beings. The fear that we will be pushed out to the fringes by conscious and intelligent machines that can make us their slaves has been the motif of many discussions. However, such visions are just sci-fi, and not actual reality.

The critique of such a scenario points out several important issues. Firstly, current AI, although it develops and achieves impressive results in many areas, has its limitations. AI based on neuronal networks, such as GPT-3 or similar, is very good at carrying out specific tasks, but has no consciousness or the ability of self-discovery. It also lacks the capacity for spontaneous self-improvement that would be independent of programming or new data input by humans.

Of course, the development of AI requires supervision, ethics, and responsibility on our part. We are the ones who shape the development of technology and decide how to use the achievements in the field of artificial intelligence. It is therefore worth focusing on responsible and deliberate control of AI development in order to use its potential in a way that is sustainable and safe for humanity. ■

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END OF WAR

ON PHOTOGRAPHY, WAR, ARCHIVES AND THE HELPLESSNESS OF ARTIFICIAL INTELLIGENCE

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The year 2023 vibrated with hope, anxiety and this unspecified, ontological shiver that accompanies you when you commune with generative artificial intelligence. Our news feeds exploded with machine-generated images and everyone at the Faculty of Design of the USWPS University wondered what implications the new technology would have for the area of our research and the future of our students.

Together with Agnieszka Rayss we started testing new algorithms and wondering how generative tools alter the definition of a frame in photography. We complemented each other: she is a photographer with extensive oeuvre both in documentary photography and in critical post-photography, I lecture on artificial intelligence in art and I design interactive experiences. The first attempts did not bring any interesting discoveries. Augmented contemporary photographs proved boring, and the results of our exploration – inconclusive. However, when we started working on archival wartime photographs, really interesting things started to happen. Errors and distortions suddenly gained relevance and were revived with new meanings.

The outcome of our quest was the exhibition entitled "End of War" which was held in the Social Centre of Photography in Warsaw throughout March 2024. We showed 24 black-and-white photographs, mostly from the First and the Second World War, extended with the use of generative tools. The proportions between the source photograph and the one we generated varied: sometimes the artificially created tissue constituted half of the new image (fig. 1 and 2),

The works were usually in non-standard formats, there were some long strips and squares. Our goal was to test how the generative algorithms would behave if we gave them archival photographs to interpret – grainy, black-and-white, contrasting – and so with a relatively small quantity of visual information. Thus, we provoked artificial intelligence to make errors which added further interpretational layers to the photographs and deepened our reflection on wartime photography and photography as such.

#ARTIFICIAL INTELLIGENCE #GENERATIVE ALGORITHMS #ARCHIVAL PHOTOS #WAR PHOTOGRAPHY
#PHOTOGRAPHIC FRAME #TRUTH IN PHOTOGRAPHY #POST-PHOTOGRAPHY

Fig. 1 David Sypniewski, Agnieszka Rayss, photo (fig. 2) augmented by artificial intelligence.

Fig. 2 Author: unknown. A Field kitchen of the First Brigade of the Polish Legions in Karasin in the Volhynia Region
Year: 1916
Source: National Library, https://polona.pl/preview/d3550a9a--fc30-4854-8804-1be9aa190bf4

To conduct our searches, we used tools available in Adobe Photoshop. We intuitively started from generative expand allowing the expansion of the image frame, however after a while it turned out that generative fill provided better results. The best quality of images created with this tool was achieved by generating 1024x1024 px squares. First, we created an empty space around the original photograph, then we selected the location of the first square immediately next to the photograph, and then another one. This way we wrapped the photograph on all sides, covering a wider and wider area, gradually increasing the synthetic part. Our images were therefore created in a way in layers. During the generation of the image, the program tried to recreate matters present in the photograph, but did it in an imperfect way, which meant that in the process of creation it took into account not just the source photograph but also the elements it had generated itself – and this led to further deterioration of quality. The closer it moved to the edge of the frame, the greater was the accumulation of errors, and the entropy of the image and meanings progressed. This is why wartime photographs benefited from this process. War also brings disintegration. Vehicles turn into wrecks, and then into objects that are difficult to recognise, and finally become undetermined matter (fig. 5).

Soldiers marching in a column (fig. 6) lose their individuality, they morph into a single mass, they dissolve, as if they were changing consistency, because war strips you of your subjectivity.

Little is known about how exactly a generative algorithm works, we know, however, that it searches for materials and contents present in the photograph. Because in our project we did not provide additional information through the prompt, the algorithm had to be limited to the interpretation of the image so that, by trying to match and use pat-

Fig. 3 David Sypniewski, Agnieszka Rayss, photo (fig. 4) augmented by artificial intelligence.

terns deduced from learning on a huge amount of date, it could create a new fragment. It did not do it correctly every time. This could be due to the low quality of the medium and some objects which were often out of focus. Thus, surprising images were created, full of fantastic landscapes and weird shapes, looking more or less like people or animals. Further in the background of the photograph (if it is still a photograph) cityscapes, mountain landscapes, and genre scenes appear. Idyll intertwines with apprehension, sometimes dread – just like this luminous bower above wounded Japanese soldiers in trenches (fig. 7) or – conversely – a cemetery next to soldiers playing on a skating rink (fig. 8).

Compositional errors also appeared – errors of perspective or proportion. These were particularly interesting to us because they added surrealism to the sometimes cruel images. An impossible roof arch and a line hanging in a void became a commentary to a photograph in which German soldiers were posing next to a hanged man (fig. 9), as if saying that it could not have really happened.

Yet, have all of the scenes from the original photos really happened? It is well known that photography, particularly during war, was used for propaganda purposes. Some events, seemingly spontaneously captured, were in fact posed. Cameras of the time had long exposure times. Objects had to be motionless for a longer period so that they did not come out blurry. Artificial intelligence is currently at the centre of a debate about truth in the media. Regulators are trying to curb its manipulatory potential. In this context, it is

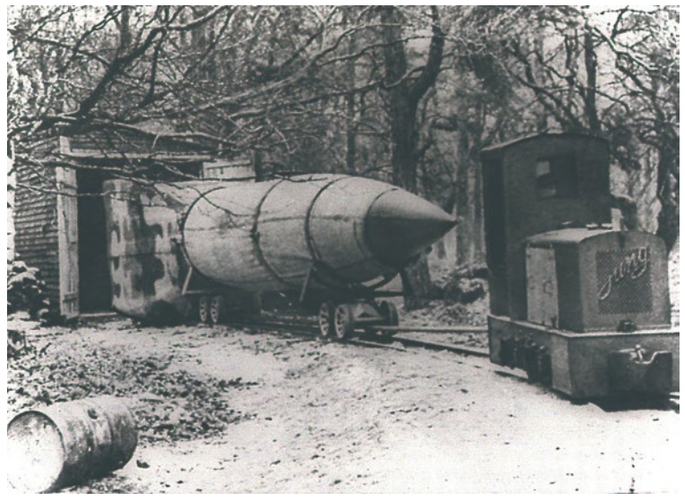

Fig. 4 Author: unknown, V-2 Emerges from Shelter
Year: 1940
Source: NASA/Marshall Space Flight Center, https://archive.org/details/MSFC-9801786
Public domain

Fig. 5 Photo augmented by artificial intelligence based on:

Sgt. James J. Kee, VMSB-133 on Palmyra Island in 1943
Year: 1943,
Source: PalmyraArchive.org, https://archive.org/details/Photos-of-the-VMSB-133-on-Palmyra-Island-in-194315950/Yost%20in%20SBD%20gunner%20seat.jpg.
Printed with the author's consent.

compared with photography, forgetting how often it was used as the means of conveying untruth.

To our surprise, exhibition visitors did not notice the errors immediately. According to the uncanny valley theory1, an anthropomorphic robot seems friendly as long as it does not resemble a human being so much that it is difficult to tell the difference. In such case it becomes scary, or sometimes repulsive. Our images may also be placed on a similar realism scale – some reveal the foreign origin of some of their fragments immediately, other have to be studied for longer before you can understand that "something is not right", something that you can feel in your guts rather than be able to point out.

The situation was similar during the creation of the images. We felt that each new image looked less and less like a photograph and became similar to our everyday vision: sharp and condensed in the middle and getting gradually more and more blurry towards the edges. Sometimes afterimages seen in the corner of your eye reveal reality that can only be sensed.

We were asked about the authorship. We decided that Agnieszka and I were the only authors. We reject the possibility of artificial intelligence being a (co) author. We had been the ones to design the creative process which included the selection of source photographs, conscious utilisation of machine errors and imposition of new meanings. In this sense, we can say that we have hacked a tool to create images that have not been foreseen by its creators. The creative act was less in the generation of subsequent squares around the photograph, and more in the selection of the image and long conversations held around it. Our areas of competence complemented each other – Agnieszka brought in her photographic sensitivity and her experience in creating exhibitions, and I provided my technological knowledge and the related intuitions.

We are aware that our project is a commentary on a certain moment in the development of AI tools – an ephemeral phenomenon that will change in a few months. For this reason, we have had to hurry, wanting to achieve cohesive effects.

The generation of an image is simple – sometimes even frighteningly so. The new medium dazes us with its agency, making it difficult to perceive its specific nature. Through our project, we explored the boundaries of its abilities, trying to gain better understanding of what it was capable of, how far it could reach beyond the frame, where its power of seduction ended and it became helpless, needing our interpretations to continue being the carrier of meaning. ■

The authors of "End of war" exhibition:

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Agnieszka Rayss, PhD
photographer, visual artist, lecturer at the Faculty of Design of the SWPS University

Bibliography
Mori M., Bukimi no Tani [The Uncanny Valley], "Energy" nr 7, 1970, pp. 33-35.

Fig. 6 Photo augmented by artificial intelligence based on:

Author: unknown.
Deportation of the Second Brigade of the Polish Legions in the Carpathian Mountains , year: 1915.
Source: National Library, Patrimonium project, https://polona.pl/preview/987a7274-2004-49ef-9abf-0c82ec13a27b
Public domain

Fig. 7 Photo augmented by artificial intelligence based on:

Author: unknown.
Japanese soldiers with a wounded mate, year: 1939.
Source: National Digital Archive, https://www.szukajwarchiwach.gov.pl/jednostka/-/jednostka/5989338/obiekty/342205#opis_obiektu
Public domain

Fig. 8 Photo augmented by artificial intelligence based on:

Author: unknown.
Soldiers on a skating rink in Karasin in the Volhynia region, year: 1916.
Source: National Library, Patrimonium project, https://polona.pl/preview/ecf7493d-3b05-47c9-888c-2212a14e5a01
Public domain

Fig. 9 Photo augmented by artificial intelligence based on:

Author: unknown.
Antoni Bartoszek hanged by the Germans at the entrance to his restaurant in Wawer, year: 1939.
Source: National Library, Patrimonium project, https://polona.pl/preview/706ab703-9e3a-4c5b-8c-95-27a184e26332
Public domain

Piotr Duraj
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Use of generative **artificial intelligence** in design process and its implementation in teaching

#AI #ARTIFICIAL INTELLIGENCE #MIDJOURNEY #STABLE DIFFUSION #CHATGPT #DIDACTICS
#AI IN DIDACTICS #3D GRAPHICS #DESIGN #USE OF AI IN THE CREATIVE PROCESS

Introduction

The purpose of the following work has been to verify the hypothesis that artificial intelligence (AI) is becoming an integral part of the design process by offering new possibilities of creation, optimisation and analysis of projects. This article presents several ways in which AI may be used in the design process. Moreover, it will discuss examples of specific technologies, such as Midjourney or Stable Diffusion, that constitute artificial intelligence models known as generative models – i.e. ones that create images – and ChatGPT which generates text.

It is worth stopping here and emphasising the "generative" aspect, as it is an advanced section of artificial intelligence. Artificial intelligence itself has been previously encountered in the form of a pre-programmed system with a pre-coded set of answers to questions asked or tasks posed. Examples include voice assistants, such as Siri by Apple and Alexa by Amazon, or chatbots which we can meet on different websites. It is more than enough for most tasks, however generative artificial intelligence allows it to be used in completely new situations. We can understand these differences better by quoting Adobe, i.e. one of the leading graphic software companies, including Firefly which focuses on the use of the technologies mentioned above:

"Generative AI systems are more flexible because they rely on machine learning, which doesn't require explicit programming. Instead, humans give computers access to large amounts of data. The machines train themselves to recognise patterns in that data and, most importantly, to draw conclusions from what they've learnt. (...) The size and quality of the dataset is important. AI is only as good as the data on which it's trained." [1]

Models of application of the tools mentioned above in the creative process will be cited in the form of selected experiences of the author who professionally designs exhibition stands as well as scenography, and has been reaching more and more frequently for support in the form of artificial intelligence at the conceptual stage of work, but also during postproduction.

Next, problems concerning the importance of AI implementation in teaching, ethical doubts connected with the use of AI will be discussed, and an example of a task implemented by the author during 3D graphic creation classes will be presented. This task will also be presented using examples of selected projects completed by undergraduate students at WIT Academy in Warsaw.

> Cars are faster than humans, but that doesn't mean we stopped walking. When we're moving huge amounts of stuff over huge distances, we need engines, whether that's airplanes or boats or cars.
>
> **And we see this technology (Midjourney) as an engine for the imagination. So it's a very positive and humanistic thing.**

Midjourney

Midjourney is a company founded in 2021 by David Holz [2]. Holz studied physics and mathematics, and during his work on a PhD he simultaneously worked in NASA and in the Max Planck Institute. He interrupted his doctoral studies in order to found his first start-up Leap Motion, and in 2021 he started working on Midjourney with a group of 10 engineers. Originally this tool was created as a research project aimed at exploring the possibilities of using advanced generative models in the design process. After successful lab tests, around six months after the work started, the tool was made available as open-source software for the designer community – the first version of the software was presented to the world in the form of a text bot on the Discord platform. Users conduct a kind of chat with the bot, describing what picture they want to generate. Commands given to artificial intelligence are referred to as prompts [3].

David Holz's view on the presence of artificial intelligence in the creative process is very interesting: "Cars are faster than humans, but that doesn't mean we stopped walking. When we're moving huge amounts of stuff over huge distances, we need engines, whether that's airplanes or boats or cars. And we see this technology (Midjourney) as an engine for the imagination. So it's a very positive and humanistic thing." [4]

Midjourney is based mainly on advanced generative models such as Generative Adversarial Networks (GANs) and autoregressive models. Thanks to these models, the tool is capable of generating high-quality visualisations of design concepts based on user's descriptions or ideas [5]. The visualisation generation process takes place through iterative improvement of the image on the basis of the user's feedback, which allows quick exploration of various design scenarios.

The task of Midjourney is to generate visualisations of design concepts on the basis of a short description or sketch/image. The user enters the design description or sketch and the tool uses advanced generative models in order to create a visualisation of the design. The user may then evaluate and modify the visualisations generated, which allows the iterative refinement of the design concepts.

Stable Diffusion

Stable Diffusion is another AI model operating on the text-to-image and image-to-image basis. The main difference is the fact that Stable Diffusion is available to use for free, whereas subscription needs to be paid for Midjourney. Free use is based on an open-source licence, which allowed the creation of many tools based on this artificial intelligence, e.g. Leonardo.AI which may be used through a convenient graphic interface in an internet browser.

This technology was developed by a group of scientists from the Ludwig Maximilian University in Munich and the University in Heidelberg, and originally was called Latent Diffusion [6]. The scientists accepted help in the form of computing power offered by Stability AI, a company founded by a British-Bangladeshi businessman and mathematician Emad Mostaque. This technology constitutes an extension of the concept of generative models based on diffusion processes. However, unlike the earlier models, Stable Diffusion introduces innovative solutions which eliminate certain problems connected with the training and stability of the model.

Stable Diffusion uses diffusion processes to generate high-quality images. This process consists in gradual revealing of the image through adding noise to the starting image, and then gradually removing ▶▶

that noise [7]. Thanks to this process, the model is capable of generating high-resolution images that look authentic while retaining details and structure of objects in the picture. Because the basic method of operation of Stable Diffusion is the process of generating images through gradual application of noise to the starting picture - this is exactly how artificial intelligence is trained. It destroys millions of images through application of noise in order to then reverse this process during the generation of images on the basis of small amount of data. This process is controlled by advanced regulation mechanisms which ensure stability and quality of images generated. The user may control the generation process through the adjustment of model parameters such as the level of noise or the number of iterations. Contrary to Midjourney mentioned above, the results which may be achieved often require a longer process of trials and errors so that the outcome is satisfactory. The reason for this is that Midjourney is based on a similar learning system, but is also supported by LLM (large language model). LLM is a database which stores information about the images analysed, places them in various categories and describes elements of those images in the form of texts. This helps the machines find connections between the text and the image. One of such data sets is Microsoft Common Objects in Context, more widely known as MS COCO. It is a set of data and benchmark created by Microsoft Research, used to evaluate object detection and image segmentation algorithms. It contains over 200,000 images which include over 1.5 million labelled objects [8]. These images have been diversified by scenes, objects and contexts, which makes COCO a useful tool for training and testing machine learning models in image analysis. The set of COCO data contains images originating from natural scenes, which means they represent varied situations with which algorithms have to cope.

Stable Diffusion represents a new era of generative models of images, offering advanced image generation techniques that create high-quality and authentic-looking images. Thanks to this tool, designers, artists and researchers may produce high-quality images quicker and more efficiently, which opens new possibilities in the field of computer graphics and generative art. Stable Diffusion may be downloaded and installed locally on a computer, and the tool interface may be then launched in an Internet browser. This interface is much more elaborate than what is offered by aforementioned Midjourney which is restricted to a chat with a bot. In the case of Stable Diffusion, you can paint simple shapes and, on the basis of these, images can be generated, masks painted, and individual elements may be altered in the pictures, and first and foremost – you can instal external artificial intelligence models [9]. These models are trained on various databases and this way an example of how it works may be presented: if you wish to modify your image – let us assume that it is an external visualisation of architecture – you can import it into Stable Diffusion and mask trees which will be edited by the artificial intelligence on the basis of prompts given. This way you can for example change the species of the given tree, or simply obtain much more realistic vegetation, or any other models appearing on the render. Referring to the models mentioned above, that may be implemented into the Stable Diffusion – in the example in which the user wants to change a tree, it would be better to use a model which has been trained on the basis of pictures of vegetation, whereas if the user wanted to change a 3D model of a human being, a model trained on a database composed of portraits will be a much better choice.

Chat GPT

ChatGPT was developed by OpenAI and presented for the first time in 2018 [10]. It is an advanced natural language model which is based on the Transformer architecture and is capable of generating fluent and comprehensible answers on the basis of questions asked or messages provided. From the moment of its launch, ChatGPT has quickly gained popularity and found application in many different areas.

ChatGPT is based on advanced machine learning models which are trained on large text data sets in order to learn to understand and generate human natural languages. Thanks to the use of deep learning techniques and neuronal network architectures, ChatGPT is capable of generating fluent and sensible responses to various questions and messages posed by users. The basic method of its operation is the analysis of the context of the given message and generation of a response on the basis of the understanding of the contents of that message. The model is capable of detecting essential information contained in the user's questions or messages and generating answers which are consistent with that context [11]. This process is performed by a multilayer neuronal network which processes text data and generates answers..

Use of AI in creative process

The process of creation of any design consists of many stages, however in nearly every case we are able to distinguish the conceptual stage. The

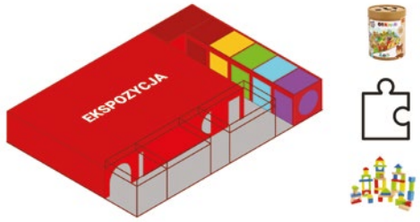


Fig. 1 Isometric drawing presenting the idea of the Trefl stand
Source: Own design / Konarski Bzowski Sp. J.

author's designs include exhibition stands where this stage is particularly important – it allows the designs to enter a higher level. If the architecture designed, besides meeting the basic rules of aesthetics, may contain an idea which refers to the investor's business, it is automatically perceived as a solution designed in a much more cogent, professional manner. Additionally, the development of this idea helps the designer in the process – finding the appropriate points of reference immediately triggers an avalanche of ideas and further places to explore in order to find inspiration.

Time available to design such temporary architecture is always much shorter than that available in the case of traditional architecture where sometimes designs are created over many years. In the case of exhibition stall designs, the designer often has no more than two weeks to develop the concept, create the functional system, model, texture, light, render it, and create the presentation of such design, and often these designs are for spaces in excess of one hundred square metres. However, if you have a concept, the remaining stages are a relatively simple task for an experienced designer. As of the date of this article, artificial intelligence is incapable of designing any space independently, however it can streamline a designer's work in many areas, including the most important one – the conceptual sphere.

The first example from the author's experiences is the creation of an exhibition space design for a Polish brand Trefl which mostly creates jigsaw puzzles. As part of the designed space, the investor wanted the stall to include a separate complex of rooms set up as a maze with only one entrance and one exit, and so you have to go through all rooms in sequence – each of them was to contain a presentation of another branch of the Trefl brand. Due to the fact that jigsaw puzzles were the product that created the foundation for the company's growth, the author spent two days trying in vain to include this motif in the design, after which he had an idea to confront his musings with ChatGPT's AI, telling it to create a list of associations with jigsaw puzzles. The feedback he received contained such associations as: entertainment, logical game, pieces of image, perseverance, family fun, cooperation, education, collecting, matching, and many others. It was the "matching" that helped him clear a certain "block" and develop another idea – creation of the façade of this maze in the form of another toy also sold by Trefl – a block sorter where the shape of the block must be matched to the appropriate shape on the lid. Rooms for business meetings that continued the block motif were also added next door (fig. 1).

The situation described here shows that sometimes in the design work artists implement their concepts too stubbornly. This proves that they need an external stimulus to look at the problem from another perspective. In creative teams, these stimuli most commonly come from other members of th team. In the author's opinion, thanks to artificial intelligence we gain a new creative tool – one you can "have a conversation with" and give it tasks which can change the way we perceive the problem we are working on.

Fig. 2 On the left, a model of a figure rendered from the V-Ray Cosmos database, on the right, the figure altered using Stable Diffusion. Source: Own work / Konarski Bzowski Sp. J.

Fig. 3 On the left, a model of a figure rendered from the V-Ray Cosmos database, on the right, the figure altered using Stable Diffusion. Source: Own work / Konarski Bzowski Sp. J.

Another example of how artificial intelligence may be used is the use of generative models to create images. Until now, artists in the process of collecting references had to rely on images found e.g. online, and thus images that had been created by someone at some point. However, today, thanks to models such as Midjourney or Stable Diffusion referred to above, you can describe what exactly you are looking for and receive more or less that thing. At the moment these images are not perfect and require a lot of experience in writing prompts so that they are realistic. However, they will be perfectly suited to collecting references because although the final results are often distorted, they draw from a huge database and contain elements which have the closest association to the prompt entered. This is not the final product, but it is a first-class semi-finished product which may lead the designer towards the correct direction in which their design may be developed.

To conclude, another method in which the author uses AI should be mentioned – and namely Stable Diffusion. When designing architectural visualisations, designers often use 3D models that are photogrammetric scans, which in some cases (e.g. in the case of human models) attracts the audience's attention quite strongly due to the low quality of these models. By using artificial intelligence we are capable of changing them and generating much more realistic figures and other objects to replace them (fig. 2, fig. 3).

The examples cited show that the quality of visualisation has improved after Stable Diffusion was used. It should be noted, however, that this is not achieved by simply entering a prompt such as "correct human models" but a much more complex process.

The Stable Diffusion model generates correct images with the maximum resolution of 768x768 px [12], and the smaller the number of pixels to process, the better it will handle the task. Above this threshold value, the model begins to create repetitions, distortions, and generate errors (as of April 2024, the author of the article believes that there is a chance that this will change). This means that e.g. architecture renders that are usually of very high resolution are impossible to process as a whole. Stable Diffusion allows masking, i.e. using a paintbrush to select areas in which something is to be generated. This way the given render may be modified section by section. Rendering in lower resolution may also prove to be a good idea in certain cases – this will allow selecting larger masks and then using another AI tool – upscaling, i.e. increasing resolution, where AI "predicts" what the missing pixels should look like. For now, this is a rather complex, time-consuming process, considering that Stable Diffusion is still not coping perfectly with the interpretation of prompts and needs a long list of negative prompts which indicate what AI should not do. Examples of negative prompts include: bad quality, glitches, low quality, bad proportions, bad anatomy, ugly, blurry, error, disfigured, low res, artifacts etc.

AI in teaching

The implementation of the artificial intelligence tools in the process of teaching in higher education institutions is not just a step towards modern teaching, but it also opens doors to many benefits, both for students and for lecturers. Moreover, the integration of AI into the design process may significantly streamline the development of designs, opening the route to new possibilities and innovations. The integration of AI tools into the teaching process is also very important for the design process. Benefits include quicker prototyping, exploration of new solutions, and optimisation of the decision-making process. Thanks to the AI tools, designers may generate initial designs, analyse data in order to identify new trends and opportunities, and use analyses and forecasts, which makes it easier to make design decisions based on data. The implementation of AI tools in teaching is therefore a step towards modern, effective and student-guided teaching process which contributes to better quality of education and development of innovative designs.

We are facing similar concerns that the humanity faced during the industrial revolution [13]. Part of the society is worried that machines will take their jobs. In the author's opinion, there is significant probability that the introduction of artificial intelligence is a process that can no longer be stopped. This means that the mankind must adapt to this progress, and it is the academic teachers' task to lead subsequent generations towards this progress and to eliminate the fear of unknown. It is also the teachers that will have a potential impact on shaping the ways in which artificial intelligence is used by students. The author would like to emphasise that in his opinion, at this point of technological development, AI is unable to create a product that could be deemed a "final product". However, considering the dramatic rate at which this technology is developing, there is a chance that this will change. You should remember that designers often have to interpret the investors' needs in order to given

Fig. 4 Images generated using AI with comments
Source: Patrycja Damięcka / WIT Academy

Fig. 5 Pocket watch rendered in the Blender software
Source: Patrycja Damięcka / WIT Academy

them what they actually need and expect, and not what they have described. This creative thinking and interpretation of other people's words constitutes the greatest barrier for AI at this moment. It also creates an opportunity for creating a new profession – an AI operator who would be able to translate the client's requirement into the language of artificial intelligence.

There is another dilemma: the issue of copyright, plagiarism, and simple ethics connected with the use of AI. From the legal point of view, this topic is still very unregulated and approaches vary from country to country, or even between states in the case of the USA. In the end, AI, in order to learn, had to analyse someone else's work and it has been generating images on that basis. And, besides, the fundamental question should be asked – who is the author? AI creators? The author of the prompt? Authors of objects used by AI to learn? Currently there is no unambiguous answer to this question and the topic is complicated enough to probably remain no more than a subject of deliberations for a long time. According to the author, at the moment AI performs well in creating half measures which can help in developing the final product, and this is how he presents this issue during his academic classes.

TASK PERFORMED BY STUDENTS

As part of the 3D graphics design classes he teaches, the author of the article decided to add an aspect forcing the use of generative artificial intelligence to one of the tasks performed by his students. The task originally consisted in creating a visualisation of a product, the so-called packshot. The product was to be invented by the student and then developed in the process of consultations, and the final effect was to be a finished render of the given product. The task was modified to include an aspect of generation of inspirations by artificial intelligence. This made it possible to present ideas in a visual way and generate them in many variants with nearly zero time expenditure. This allowed the comparison of images, listing of positive and negative aspects of each of them and pointing the students towards the final product. The conceptual process was often expanded to include sketches, or an initial 3D blockout [14], so that the design was not based exclusively on what AI came up with. To illustrate the process described, 5 projects prepared by students of the Graphics course from Warsaw WIT Academy were selected for the article.

Patrycja Damięcka – pocket watch

The student decided to use the challenge to reproduce a completely original object in the 3D graphic technique – so far she had focused on detailed reproduction of already existing objects. She entered different names of items into the artificial intelligence generative model called Leonardo.AI. She mixed up these names with various styles, e.g. sci-fi. It was when she was testing sci-fi watches that one of them attracted her attention as it was reminiscent of a pocket watch. The student decided that it was an interesting object to reproduce in the vintage style. Initially, the images generated presented watches that were too ornate, and the author ▶▶

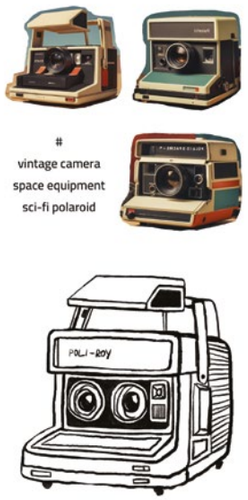


Fig. 6 On the left, fragments of images generated by AI, and on the right, camera rendered in the Blender software.
Source: Zuzanna Jóźwiak / WIT Academy

Fig. 7 Sketch developed on the basis of images found on Pinterest (on the left) and images generated by AI (on the right).
Source: Agata Kazubska / WIT Academy

Fig. 8 Futuristic cowboy boots rendered in the Blender software. Source: Agata Kazubska / WIT Academy.

Fig. 9 Images generated using AI together with prompts.
Source: Anna Kowalczyk / WIT Academy

Fig. 10 Elven engagement ring rendered in the Blender software.
Source: Anna Kowalczyk / WIT Academy

Fig. 12 Drawing developed on the basis of references generated by AI.
Source: Nina Śledzik / WIT Academy

Fig. 11 Images generated using AI.
Source: Nina Śledzik / WIT Academy

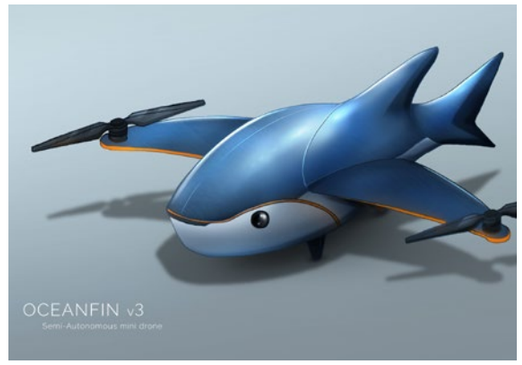
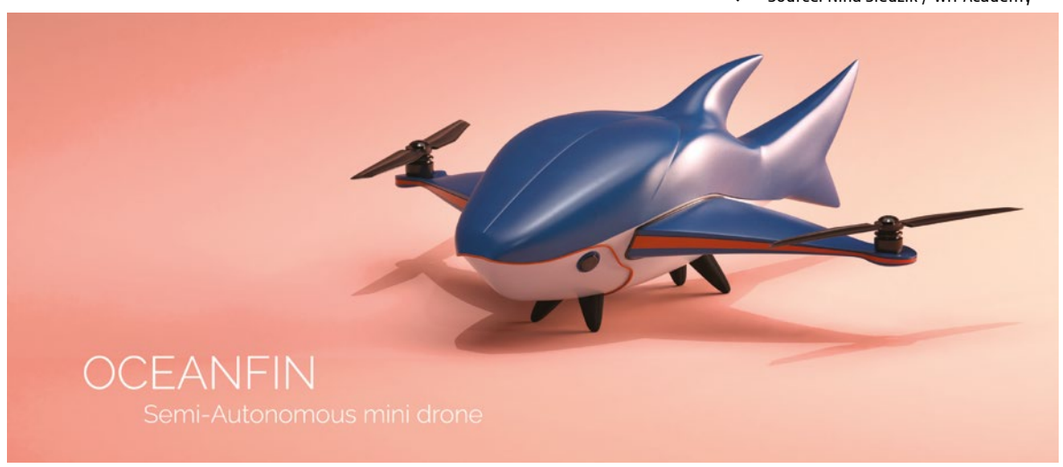


Fig.13 Render of a drone produced using the Blender software.
Source: Nina Śledzik / WIT Academy



wanted to design something more restrained in its expression. However, on the basis of these references, she started finding in each watch elements that fitted her concept. She generated more and more references, increasing the number of descriptions of the watch in prompts, until finally she collected the sufficient amount in order to develop an original watch design (fig. 4) – austere in its form, with visible mechanisms and a subtle ornament, and the incomplete watch face, emphasising the dualism of the design, is one of the most interesting elements. The render (fig. 5) presents the object on two planes, and its reflection in the surface perfectly fills the frame.

Zuzanna Jóźwiak – retro-futuristic instant camera

The idea of modelling a camera was the student's first concept and AI was used to refine the form and style. During the generation of the images the prompts used included: "space equipment", "vintage", "sci-fi". On the basis of images generated, the student developed an original sketch which was used as a base during modelling. The final product slightly deviates from the sketch because it evolved during the creative process. In the final visualisation (fig. 6), she managed to present an original design of a retro-futuristic instant camera in an interesting colour scheme with its form constituting a clear reference to the first Polaroid cameras.

Agata Kazubska – futuristic cowboy boots

The idea of presenting boots came from the author's love of fashion. She decided to pour one of her concepts into a visual form – in the form of a render. In the design creation process, it was of key importance for the author to combine different elements and styles, and at the same time maintain holistic cohesion. During the image generation process, the student found some features of boots that the artificial intelligence came up with and she transplanted these to her design – these were among other things the colour and the material. Combining this with elements found on Pinterest, she developed an original conceptual sketch (fig. 7) on the basis of which she started work in the 3D space.

In the end (fig. 8), the author abandoned rounded inserts, however the stitching gained a futuristic aspect and became LED strips. Organic shapes that were finished off with a strong accent in the form of "molten" metal trimmings were illuminated with neon light in cyan and magenta, which additionally emphasises the style of the cowboy boot design.

Anna Kowalczyk – elven ring

The starting point of the task was the intention to create an engagement ring in a style drawing on the fantastic elven motifs. The student used AI to generate inspirations – she assumed that the ring will be a combination of gold and emeralds, and at the same time will use a floral motif which is characteristic of elven architecture and fashion. Using generative models, she produced inspirations (fig. 9) on the basis of which she continued developing her concept.

This way an original engagement ring design was created, with an emerald as the main gemstone and smaller stones forming leaves (fig. 10). This visualisation provided an opportunity among other things for examining in detail the issue of lighting on uniform black background, which can be a challenge for inexperienced artists.

Nina Śledzik – shark-drone toy

In this case the student started with a clean slate – she had no idea what object she could design, and this was the first time that she used the support of artificial intelligence. She asked ChatGPT to generate a list of 100 objects from the range of electronic devices, kitchen appliances, toys, gadgets and other accessories which may be found at home. From this list she picked a drone, believing it to be a suitable challenge, because she normally designed things in a completely different style. Next, she asked ChatGPT for more information about drones – she was mainly interested in types and uses, e.g. military drones, racing drones, recreational drones. It was a recreational drone design that became the final challenge.

The next step was to move to a generative AI model, and namely Playground.ai, which is also based on Stable Diffusion. Initially, the student started with a basic prompt "generate drone", but after several attempts the AI started to get lost and the images generated presented objects that resembled planes more than classic drones with four propellers. However, something in this idea enchanted her and she decided to generate images of toy drones which additionally looked like an animal. First, she started with birds, but these ideas were too obvious, then she moved on to dragons and other animals, and finally settled with a shark. The student collected various interesting concepts (fig. 11) that she generated along the way, and she developed an original drawing (fig. 12) which was the basis for the final render (fig. 13).

Summary

As the above examples show, the use of artificial intelligence in the design process offers a number of benefits, such as quicker generation of concepts, postproduction of visualisations and support for the creative process through intelligent tools and assistants. Examples such as Midjourney, Stable Diffusion and ChatGPT show how various technologies based on AI may be effectively used in the design practice, speeding up the process of creation and improving the quality of final solutions. It is worth remembering that it is just a small fraction of all available tools that use artificial intelligence.

The presented task performed by students shows that designers should not be afraid of being replaced by artificial intelligence but should learn to live with it in symbiosis and should use this technology to improve the quality of end projects. Of course, the above text omits to a large degree the very important issue of copyright and other aspects relevant to artists. It is undeniable, however, that these technologies are becoming our new everyday reality, and which follows – it is important to adapt the teaching staff to the new technologies and introduce matters concerned with the use of artificial intelligence into the academic discourse.

This is progress which should not be denied but which artists should try to understand, at the same time adapting their artistic technique to allow for this new technology in order to expand their horizons. ■

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14. blockout – an early stage of creation in which the designer prepares an initial version of a scene or a model; it uses simple shapes to determine the general structure and distribution of elements, but does not focus on details or textures; blockout helps assess proportions and layout and plan space before the designer moves on to more detailed work (author's explanation).

Influence of Virtual Reality on graphic design

with the accent on poster design

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Technological progress throughout history has greatly shaped the development of graphic design, and with Virtual Reality (VR) it marks a crucial transformation in the field. While the incorporation of VR into graphic design is not widely covered in existing literature, this paper aims to explore this integration by presenting personal and other relevant research and findings. Furthermore, it will adopt a practice-based PhD methodology, wherein the production of graphic artworks, specifically Glagolitic Alphabet posters using VR, serves as both the research technique and outcome.

Virtual reality is significantly transforming the field of graphic design by enhancing the interactive experience and offering more immersive presentations1. This technology allows designers to create environments where users can engage with visual information in a dynamic and experiential manner. As VR technology advances, its integration into graphic design, especially in areas like poster creation, is deepening. This shift not only unlocks new creative possibilities but also alters the conventional ways we interact with visual art. Through VR, designers can simulate real-life experiences, enabling them to convey messages and emotions more powerfully. Additionally, VR contributes to the accessibility of visual information, making it more inclusive for diverse audiences by presenting data in ways that can be understood regardless of physical or cognitive limitations. As VR continues to evolve, its role in graphic design is expected to expand further, reshaping the landscape of visual communication and art.

Fig. 1 "Pontresina", Herbert Matter, 1935.
Source: https://www.moma.org/collection/works/5323

Fig. 2 Man with VR glasses.
Source: AI generated image, Midjourney v6

The use of virtual reality in graphic design, especially in poster creation, is not yet widely studied and offers a fertile ground for scholarly research. It offers exploration in multiple aspects of VR in graphic design, from the initial conceptual stages to the interaction with viewers. In my research on VR's impact on poster design, I have employed a mixed-methods approach and encouraged the collaboration of interdisciplinary teams during the research design process. This collaboration has led to the formation of supervisory teams that include both academics and practitioners from related fields. Such a partnership not only enhances the quality of the research findings but also fosters professional development and improved outcomes.

Balancing teaching, art creation and personal growth

As an artist researcher deeply involved in virtual reality art, my work is pivotal in redefining VR's role within my field of interest. By actively engaging in the creation of VR art, I am pushing the conceptual and perceptual boundaries of the medium, exploring its vast potential beyond entertainment and gaming into a profound artistic and communicative tool. This approach not only demonstrates VR's capacity as a powerful medium for artistic expression, but also highlights its effectiveness in the future social landscape.

As a graphic designer I often approach my work with objectivity, focusing on practicality, functionality, and the needs of the user, adhering to specific goals and constraints. In contrast, artists typically engage in their work subjectively, prioritizing personal expression, emotional depth, and aesthetic values, often without the rigid boundaries that guide design work. This difference highlights the distinct intentions and methodologies between designing for utility and creating for artistic expression.

As a precursor to modern graphic design and visualization techniques, I would mention Herbert Matter's poster "Pontresina" from 1935 (see fig. 1). It represents a significant example of early 20th-century graphic design, known for its dynamic composition and innovative use of photomontage. Matter skillfully blended natural imagery with typography to promote tourism in Pontresina, Switzerland. This method was groundbreaking at the time, employing visual techniques that manipulated perspective and scale to captivate the viewer's attention. When contextualizing "Pontresina" within the framework of today's virtual reality technology, particularly VR glasses, the poster dominates the contemporary visual landscapes.

Matter's work captured the viewer's attention by pulling them into a crafted visual environment, whereas modern VR glasses create a similar impact by immersing the user in a digitally constructed 3D space (fig. 2). Similarly, VR glasses dominate users' visual and sensory fields, creating compelling virtual environments that can alter perceptions of physical space and presence.

Both the traditional poster and contemporary VR glasses demonstrate how visual tools can profoundly influence and shape our perception of reality. This contrast underscores the transition from static imagery to dynamic, interactive, multi-sensory experiences in dominating the visual landscape. Therefore this study incorporates creative work that emerge as part of the academic inquiry, thereby expanding both conceptual and practical understandings of VR in graphic design, especially for the "Macedonian Glagolitics" poster design research project.

As an arts educator in virtual reality, I tend to integrate immersive technology with artistic expression and education to enhance how VR redefines the creative processes for artists, transforms audience engagement through unique, non-traditional interactions, and boosts educational outcomes in art museum environments. Furthermore, by delving into VR's role in collaborative art creation, curatorial practices, and improved accessibility, I aim to explore its capacity not just as a potent artistic medium but also as a transformative educational instrument that expands both conceptual and perceptual art understandings. In the educational context, VR significantly improves training by imposing real-world scenarios, which allows students to develop more of their skills in a controlled, risk-free environment. This immersive technology not only nurtures creativity and spatial awareness, but can also foster collaboration among students, enriching their learning experiences particularly in digital art education by offering a vibrant platform for experimenting with diverse design concepts and techniques.

Fig. 3 "Sword of Damocles", 1965, Ivan Sutherland.
Source: http://etsanggarp.blogspot.com/2016/03/

What is VR/Immersion?

In order to proceed further we need to understand what is VR and what is Immersion in VR environments. According to Merriam-Webster dictionary "VR is an artificial environment which is experienced through sensory stimuli (such as sights and sounds) provided by a computer and in which one's actions partially determine what happens in the environment. also: the technology used to create or access a virtual reality." [2]

The initial surge of VR technology began during the 1950s and 1960s, initiated by pioneers like Morton Heilig with the Sensorama in 1958 and Ivan Sutherland with his concept of "the ultimate display" and the Sword of Damocles in 1965 (see fig. 3). As the early expectations for this technology were unmet, other technological innovations, such as color televisions, gained consumer trust and saw an increase in sales. A resurgence, or second wave, of VR occurred in the 1980s and 1990s, notably led by Jaron Lanier and his com-

pany VPL, which introduced the first VR headsets and data gloves [3]. This period also saw the Nintendo Virtual Boy advance the commercial aspect of VR. During this phase, the philosophical and theoretical considerations surrounding VR and its user experiences deepened, expanding on the technology's potential and exploring existential questions about a limitless world. This era also focused on presence within digital realms heavily influenced by gaming, drawing on Heim's concepts of networked communities and complete immersion [4]. Although Carolina Cruz-Neira developed virtual caves in 1992, the ambitious visions for VR and the expectations of spaces filled with these caves did not materialize due to technological and market limitations. It wasn't until after 2010, in what is considered the ‚third wave' of VR, that technology finally began to align with its envisioned possibilities and started to realize its full potential [5].

Regarding the Immersion in virtual reality environment, according to Slater, M., Wilbur, S. in their research "A framework for immersive virtual environments (FIVE): Speculations on the role of presence in virtual environments. Presence-Teleoperators and Virtual Environments, 6" [6], they defined as the perception of being physically present in a non-physical world. Further, the immersion in a virtual environment can manifest in two primary forms: physical and mental [7]. Physical immersion, a key element of virtual reality (VR), involves bodily entry into a medium where technology stimulates the senses, though not necessarily all senses or the entire body. Mental immersion, on the other hand, is the aim of most media producers, characterized by deep engagement and the suspension of disbelief.

In "Understanding Virtual Reality: Interface, Application, and Design", authors Sherman, W., and Craig, A. discuss how VR creates immersive experiences by surrounding the user with visuals, sounds, and other stimuli to forge a captivating total environment. Their analysis provides an in-depth look at the technological underpinnings and sensory engagements that are crucial in developing these immersive VR settings. Additionally, academic papers featured in the different journals often explore similar themes, focusing on how VR environments influence the sensory and cognitive perceptions [8] of users, by immersing them in a 360-degree visual and spatial audio setting, enhancing realism and engagement [9]. This immersion affects visual and auditory senses and includes haptic feedback to simulate touch, deepening the sensory experience. Cognitively, VR enhances spatial awareness, improves focus, and evokes strong emotional responses, which can increase empathy and emotional connection to the content.

Understanding the Approach

Virtual reality can become a unique medium that transcends traditional boundaries of artistic creation and viewer interaction. VR pushes the limits beyond conventional and standard interfaces, introducing users to immersive three-dimensional spaces where they can interact within virtual settings as if they were real [10]. VR engages users through physical gestures and movements, enhancing the intuitiveness of digital interactions. This shift offers profound implications for diverse areas such as education, entertainment, and healthcare, revolutionizing the way we engage with and comprehend digital environments.

The direction of my VR design project was centered around introducing the concept of the "Virtual Poster", a term I coined in 2021 to establish a clear connection with my work among artists and researchers. This initiative has significantly broadened my understanding of virtual reality. Initially focused primarily on 2D and 3D graphic design, I have come to recognize that VR encompasses a much wider, interdisciplinary field. This expansion goes beyond mere environmental immersion to include elements such as enhancement of experiences, spatial awareness, rapid prototyping, digital storytelling, expressive 3D sculpting, interactivity, and user-centered designs [11]. This holistic perspective marks a departure from traditional graphic design, moving towards a more integrated examination of how these diverse components converge to craft compelling virtual experiences, like:

- Virtual reality enhances user experience by offering high levels of immersion, scale, embodiment, and presence, allowing users to feel as though they are truly part of the virtual world [12]. This real-time interactive environment increases emotional and cognitive engagement, making the experience more memorable and impactful.
- VR acts as a multidisciplinary force of creativity, merging technology, art, design, and storytelling. This fusion encourages collaboration among professionals from various fields, resulting in innovative, complex experiences that push the boundaries of traditional disciplines [13].

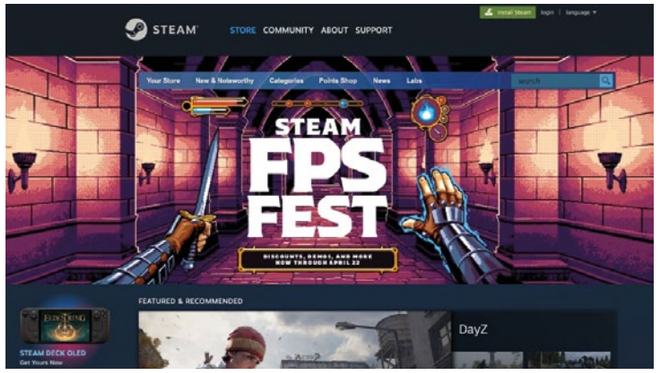

Fig. 4 STEAM web platform.
Source: https://store.steampowered.com

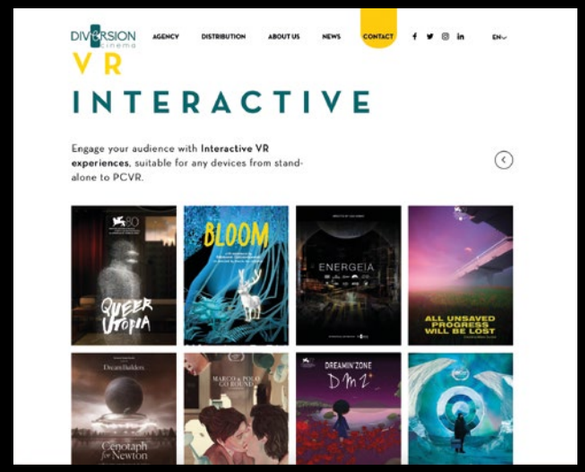

Fig. 5 VR web movie platform.
Source: https://www.diversioncinema.com/vrinteracti

> We modern, civilised, indoors adults are so accustomed to looking at a page or a picture, or through a window, that we often lose the feeling of being surrounded by the environment, our sense of the ambient array of light... We live boxed up lives.
>
> Gibson, 1986

- The adoption of VR in design necessitates a new way of thinking for both spatial and interaction designers. Spatial designers must consider user interactions within virtual spaces, while interaction designers need to account for the physical aspects of these interactions, enhancing design quality and user experiences across both fields [14].
- In VR, static artists are compelled to learn animation techniques to bring their designs to life. This shift allows for more interactive and engaging experiences, utilizing VR's full capabilities to create more realistic and dynamic environments [15].
- 2D designers are transitioning to 3D, learning to apply design principles in a three-dimensional context. This includes mastering depth, volume, and spatial interactions, essential skills for staying competitive in a landscape increasingly shaped by immersive technologies [16].

Each of these points illustrates a significant transition in the conceptualization, creation, and consumption of art and design, driven by the capabilities and demands of VR technology, which is embracing a new way of thinking about what it means to create, experience, and interact with art and design today.

Impact on Graphic Design

The evolution of design approaches within the context of virtual reality signifies a substantial paradigm shift in graphic design, marked by the adoption of new methodologies, tools, and conceptual frameworks. This shift transforms how designers tackle projects, interact with audiences, and conceive spatial and interactive elements. VR, which relies heavily on graphic design, demands the creation of immersive digital worlds through user interfaces and captivating visual assets that are integral to the virtual experience. Historically centered on two-dimensional media, graphic design now must embrace Enhanced Visualizations in 3D and Interactive Designs. VR not only facilitates the creation of dynamic, interactive graphics but also improves collaboration, allowing designers to work together in real-time from different locations within virtual spaces. Key design elements like color theory, typography, and visual hierarchy remain critical in VR as they en-

Fig. 6 Museum of Other Realities.
Source: https://www.museumor.com

hance user experience and aid interaction within these complex digital environments. Moreover, animation becomes a pivotal tool in VR, enriching user engagement through interactive experiences. This comprehensive shift not only redefines the role of graphic design in digital media but also expands the potential of VR as a transformative tool in visual communication. Additionally, VR impacts graphic design by offering enhanced innovation, like:

- Innovative 3D environment sculpting and painting tools, enabling artists to sculpt and paint in a virtual environment with greater precision.
- Innovative immersive environments that inspire new perspectives and ideas, sparking creativity through interactive experiences and spatial design.
- Innovative Real-time haptic collaboration virtual reality, breaking barriers of physical distance and sharing creative processes seamlessly with global peers.

Graphic design in VR can benefit significantly from the storytelling techniques and visual strategies used in the film and video game industries. Filmmakers and game designers are adept at crafting narratives and visual scenes that capture attention and evoke emotions. By collaborating with these creatives, graphic designers can learn how to better control pacing, mood, and engagement through environmental storytelling and cinematic techniques [17]. This is particularly useful in VR, where the user's attention can be directed through visual cues and narrative devices to create more cohesive and immersive experiences.

Usability

Virtual reality offers a versatile platform that can be utilized across various fields for educational purposes, cultural exploration, innovation, gaming, medicine, and as an inclusive tool. In education, VR transforms learning by immersing students in interactive environments where they can engage with content in a hands-on manner, enhancing comprehension and retention. Cultural applications of VR allow users to virtually visit museums, historical sites, and cultural events from around the world, promoting global awareness and appreciation. In terms of innovation, VR drives advancements in numerous industries by enabling professionals to visualize complex data, prototype new products, and simulate different scenarios without physical or financial constraints.

In gaming, VR takes the experience to new heights by placing players directly into the game world, offering a level of interaction and immersion that is unachievable with traditional gaming setups (STEAM platform – see fig. 4). The medical field benefits from VR by using it for surgical training, patient rehabilitation, and therapy, providing safe environments for practice and treatment. Lastly, VR serves as an inclusive tool by creating accessible experiences for people with disabilities, offering them ways to explore and interact with the world in ways that might otherwise be difficult or impossible. This broad utility makes VR a powerful tool for education, cultural enrichment, healthcare, entertainment, and beyond.

An immersive multiplayer art showcase in virtual reality, the Museum of Other Realities (see fig. 6) is a space to connect, share, and experience a growing collection of mind-bending VR art with others. See more at: https://www.museumor.com

In education, (see fig. 5) VR significantly enhances training by simulating real-world scenarios, allowing students to practice their skills in a safe, risk-free environment. This immersive technology aids in skill development through interactive exercises that not only foster creativity but also enhance spatial awareness and encourage collaboration among students. Moreover, VR enriches the learning experience, especially in digital art education by providing a dynamic platform where students can explore a variety of design concepts and techniques.

The Future of VR

The future of virtual reality holds significant potential to revolutionize several industries by deepening how we engage with digital environments and each other. VR will enhance social interactions, allowing for real-time collaboration and shared experiences in virtual spaces, fundamentally reshaping our interaction with digital content. On the other hand, as I have mentioned previously in my text, the future of virtual reality in graphic design will revolutionize the field by providing designers with immersive, three-dimensional workspaces that enhance creativity and visualization capabilities.

As VR hardware and software advance, designers will gain access to new tools that enhance creativity and innovation. Increased accessibility of VR technology to the general public is expected to boost demand for VR content across various industries, including advertising, entertainment, education, and training (see fig. 7). Additionally, VR will play a significant role in the usability of virtual reality art galleries, the creation and collaboration on interactive posters and advertisements, and the development of immersive brand experiences. These changes will expand the scope and impact of graphic design, opening up new possibilities for engagement and creativity.

We also must be aware that the future carries significant responsibilities and risks. Engaging VR experiences can lead to deep absorption, raising concerns about psychological effects and potential escapism that could impair daily functioning and interpersonal relationships. Moreover, prolonged exposure to VR poses health risks including eye strain, motion sickness, and cognitive overload, prompting the need for safer user guidelines and health-conscious design practices.

The interactive nature of virtual reality also intensifies concerns about plagiarism, as it becomes easier to replicate or subtly alter artworks without appropriate attribution. As designers harness VR to craft more immersive and complex visual experiences, the demand for ethical considerations grows. This includes addressing user privacy, data security, and the potential psychological effects of prolonged exposure to virtual environments. Navigating these issues is crucial in maintaining integrity and safety within the expanding realm of VR in graphic design.

This necessitates the development of robust intellectual property frameworks tailored to VR's unique challenges, to ensure that original creators are recognized and compensated. Strengthening copyright laws and implementing advanced digital rights management systems specific to VR are critical to protect artists' rights and promote a culture of innovation and respect in the burgeoning field of VR digital art. These considerations underscore the need for a holistic approach to VR in digital art, ensuring technological advancement enhances artistic experiences without compromising ethical standards, artist rights, or user well-being.

Evolving Design Thinking – more responsibly

Our growing dependency on social media, the internet, and search engines like Google is raising concerns about what is often viewed as an addiction (see fig. 8). It is linked various challenges, such as mental and health issues, but for us the most important ones are those of information overload, privacy concerns, as well as reduced productivity, and the digital amnesia [18]. Simultaneously, the focus on user interface (UI) and user experience (UX) in graphic design reflects a broader societal shift towards technology that is easy and quick to use, catering to our increasing demand for instant gratification and smooth interactions [19]. This compels designers to constantly innovate, creating interfaces that are visually appealing while reducing user effort and cognitive load. This design strategy is intended to foster an addictive ease of

use, encouraging users to prefer and seek out digital environments that simplify their interactions.

The concept of design thinking and its global application has brought about the pursuit of simplicity in systems and technologies, enhancing user-friendliness but at the potential cost of diminishing critical thinking and problem--solving skills among consumers. This phenomenon, often referred to as "skill atrophy" or "deskilling", raises concerns that as technologies become more anticipatory and automated, they may inadvertently weaken essential cognitive and manual skills by diminishing the necessity for individuals to solve problems independently. The primary challenge in the development of these technologies is to ensure they augment human capabilities without replacing them. The aim is to use these tools to empower users, enrich their lives and work without creating dependencies, thereby striking a balance between technological convenience and personal skill development (see fig. 9).

Historically, Buckminster Fuller [20] introduced the concept of a "comprehensive anticipatory design science" in 1957, proposing a global vision for guiding human development towards a desirable, sustainable future through innovative planning. In a more recent context, Prestes Joly [21] emphasized the importance of envisioning new service ecosystem projects to facilitate institutional change and anticipate a future based on sustainable lifestyles and consumption patterns. This discourse extends into the realm of design thinking, which has increasingly adopted a user-centered approach applied to social innovation. As design thinking becomes a common tool across various sectors for complex decision-making, a framework that incorporates responsible innovation and addresses environmental and social issues is critical. This approach helps prevent oversimplified conclusions and ensures that design thinking supports sustainable design, management efforts, and policy-making, promoting responsible human development and environmental stewardship.

Glagolitic Transformations in VR

After all the above mentioned, in this chapter I would like to justify the observations gained thru my project titled "Macedonian Glagolitic" (see fig. 7), and to amplify the understanding of the new terminology "virtual poster". As I have previously concluded thru elaborating the challenges and possibilities, as well as usability of technology, to formulate and establish the understanding of the Glagolitic Slavic letter heritage is the main priority. This would serve the purpose, due to its expressive context. In my previous research [22] I have examined the role of the poster as a traditional media tool versus the poster influenced by the technology and the digital media as well as the social media. The outcome of that early phase of practical research, includes visual approaches where VR technologies were employed to create innovative poster designs. These examples highlight the practical applications of VR in graphic design and serve as empirical evidence of VR's capabilities to enhance artistic expression and audience engagement.

The initial phase of the project, launched in June 2023, centered on the digital transformation of the Glagolitic Alphabet from 2D to 3D in a virtual environment (see fig. 8). This stage involved adapting to the relevant technology and software, including programming, and exploring the nuances of interactivity such as motions, spaces, transitions, and forms in VR. A significant challenge encountered was the contextualization of the Glagolitic Alphabet into a three-dimensional virtual space while retaining the essence of its original

> **Instead of becoming a consumer, VR encourages you to become a producer**
>
> **Olafur Eliasson**

two-dimensional visual form as seen in traditional posters. The project aimed to adapt the spatial planning and content effectively within this new medium. The overarching focus was to explore how virtual reality and technology could enhance the cultural significance of the Glagolitic Alphabet, aiming to evoke a renewed sense of belonging and inspiration through a modern, interactive format that also considers the gaming aspects of VR, thus leveraging both the advantages and challenges of these design interactions to enrich the storyline and user engagement.

This broadened scope presents designers with the opportunity to craft more dynamic and interactive compositions. The shift from static imagery to immersive experiences enables viewers to navigate around and directly interact with design elements, such as altering the size or position of components within a digital poster. Furthermore, the concept of animated posters, which have become increasingly popular on social media and digital outdoor displays, serves as a valuable tool for understanding and engaging audiences [23].

In order to continue with the second stage, I need it to expand my team, including two of former students, Dime Gjorgievski graduated from FON University in 2013, holding MA from Aalto University and Faton Islami graduated from International Balkan University in 2023, both from Skopje and both very talented and experienced in immersions and VR related design projects. We have reconsidered the challenges in the process of development of the storyline, scenario, immersions, interaction and the concept of presence in immersive virtual environments. Therefore, we decided to go develop two scenarios', as listed below following some images as references, as well as textual outcome of the trials:

Scenario no. 1 – Virtual Gallery with Glagolitic Posters (see fig. 9) – Innovative way to combine cultural heritage with modern technology, providing an immersive educational and artistic experience. In this virtual space, visitors would enter a simulated gallery environment where the Macedonian Glagolitic posters are displayed. Each poster could be interacted individually, allowing visitors to learn about the history and significance of the Glagolitic script, which is one of the oldest known Slavic alphabets. This interactive setup could include features such as zoom-in capabilities to examine intricate details, audio descriptions

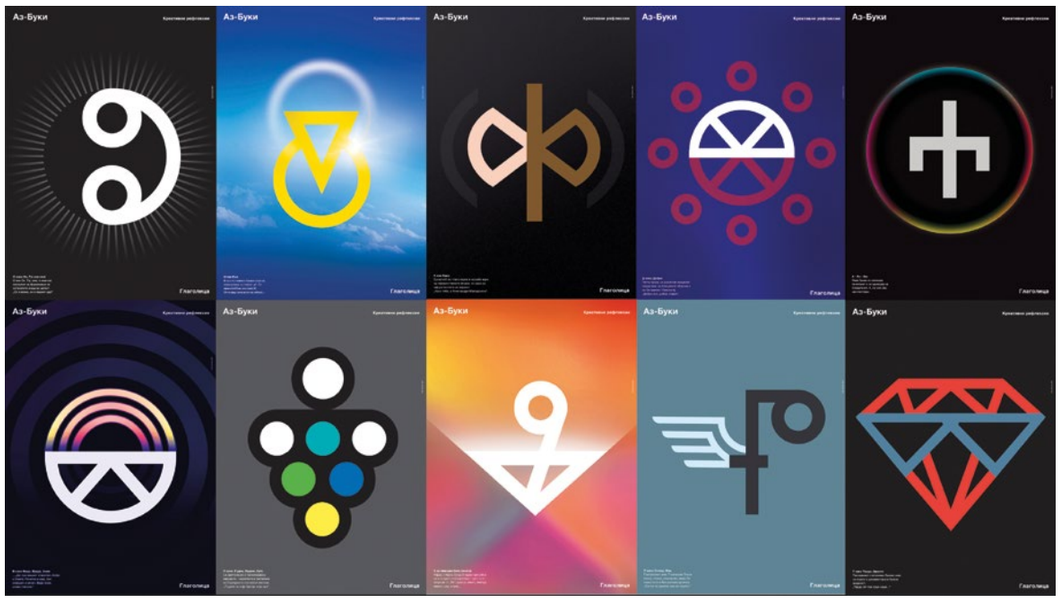

Fig. 7 "Macedonia Glagolitic" series (personal project), 2024. Source: Laze Tripkov.

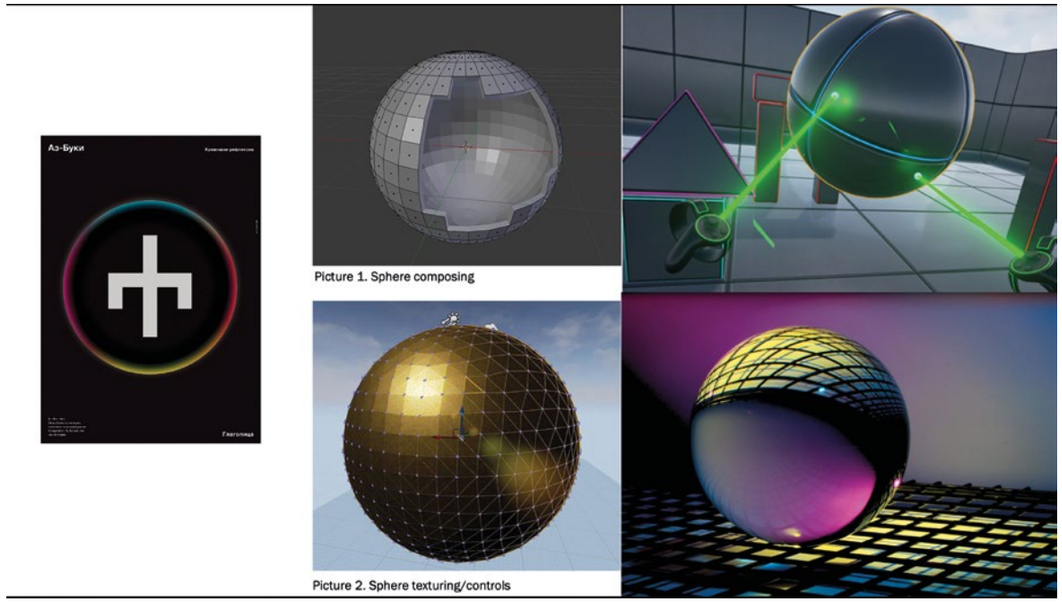

Fig. 8 "Images as Example of Glagolitic Letter transformation in 3D", software Unreal Engine, 2022. Source: Laze Tripkov.

that narrate the history and context of the posters. The virtual gallery could also offer explanations of the text on the posters, enhancing understanding and accessibility for a global audience. Additionally, this virtual gallery would not only serve as a repository of cultural and historical knowledge but also as a dynamic educational tool, promoting unique aspects of cultural heritage in an accessible, engaging manner.

Scenario No. 2 – Gamification/Cultural approach to the Glagolitic Alphabet (see fig. 10). This approach seemed more suitable, as the scenario suited more to the idea of interactions and immersive expectation of the audience. For the purpose of presentation of the project, we have introduced an avatar in our VR environment that acts as a representation of a person's identity. As this avatar follows the guidance, the user often feels a deeper connection, which leads to greater immersion in the VR environment.

This approach displays simulated historical settings to engage users deeply in the cultural and historical context of the Glagolitic Alphabet, originating from the 9th century. Centered around the oldest church, "Ss Sophia" in Ohrid, which is closely associated with the founders of the Glagolitic Alphabet, Ss Cyril and Methodius, this experience serves as more than just a cathedral simulation – it incorporates the first-ever Slavic Gallery and Library. The interactive experience unfolds across various levels that detail the script's history, usage, and broader significance, blending these elements with interactive storytelling to enhance immersion. As players delve deeper, they interact with digital replicas of historical artifacts and solve fresco puzzles, encouraged by a creative rewards system that deepens their exploration and appreciation of this ancient script. This approach not only makes learning about the Glagolitic Alphabet entertaining but also enriches players' understanding of its enduring cultural heritage. Also, we are aware that Issues such as addiction to video games storytelling format and excessive immersion can lead to confusion and a disinterest in reality due to repetitive inconsistencies.

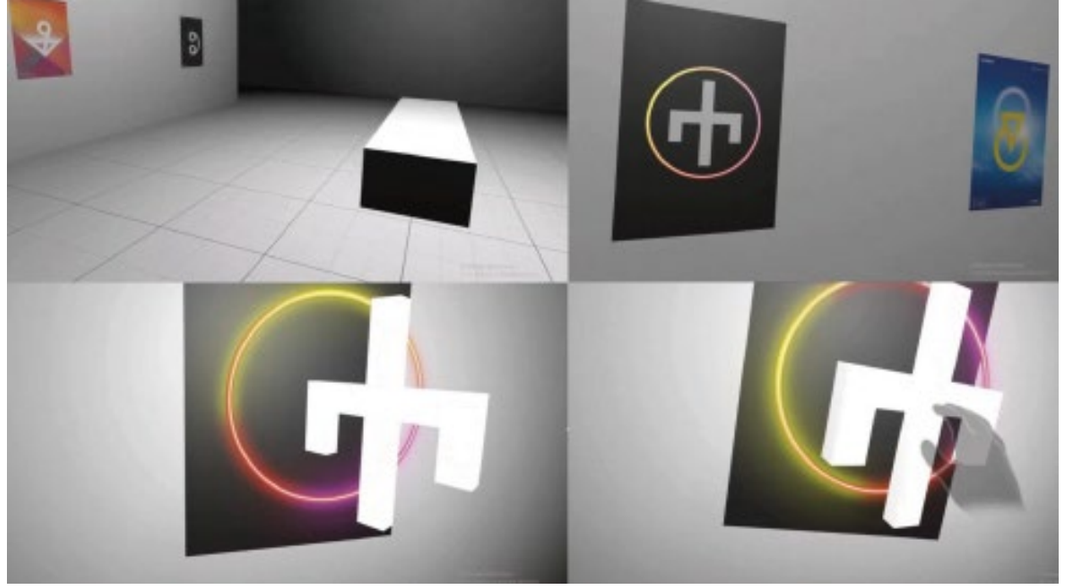

Fig. 9 "Scenario no. 1 of Virtual gallery", 2024. Source: Laze Tripkov.

Fig. 10 "Scenario no. 1 of Virtual gallery", 2024. Source: Laze Tripkov.

Discussion

Before we conclude, we can confirm that VR enhances user engagement through its immersive nature, which has profound implications for graphic design in the digital immersive storytelling. This allowed us to create environments where the narrative can unfold around the user, making them a part of the story, which generates deeper emotional responses and a stronger connection to the content. Additionally, it provides us with an ability to create interactive experiences where users can manipulate elements of the design. Due to the technology capabilities and hardware and software limitations, we became aware that too much complexity or repetition of the situations can also overwhelm the user or lead to performance issues, like lack of interest.

Therefore, focusing on a holistic approach that integrates art, in order to develop a strong professional identity, and to establish myself as a researcher in the area of virtual reality, particularly

The future is always more complex than the present because we have to deal with multiple possible ends, each of which has all of the vagaries of the present." [24]

contribute significantly to the field, and ensure that my work is recognized and remembered, I have noted several priorities to my future project development:

- Develop (new) methodologies or frameworks that blend VR with art in ways that have not been explored before. This could involve creating immersive art experiences, developing new tools for artists in VR, or theoretical contributions that redefine how VR is used in art.
- Interdisciplinary Research: Engage in research that spans multiple disciplines, combining elements from art, technology, psychology, and design. This approach not only enriches the research but also appeals to a broader audience.
- Networking and Collaboration: Professional mentorship and Partnership with the Royal College of Arts and prof. Camiller Baker, as well as to establish collaborations with other researchers and practitioners in both academia and industry. This can provide access to new technologies, resources, and perspectives. Following this activity, in December in New York I will showcase an exhibition of the VR project research. This can serve as a practical demonstration of my research and engage a wider public audience.
- Engage with upcoming researchers and students. Being a mentor not only helps others but also establishes a reputation as a leader in the field.

Overall, the integration of Virtual Posters into virtual reality represents a pioneering approach in graphic design that marries traditional techniques with cutting-edge technology, opening up new possibilities for audience engagement and educational opportunities in various cultural and academic settings. ■

VR

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Technology and memory.

Digitalisation and 3D reconstruction for the purposes of the documentary: “Hruszów. Community across the border”

Fig. 1 Church in Hruszów now. Source: fot. M. Osiadacz

Introduction. Project assumptions.

Modern teledetection techniques that allow non-invasive examination of a historic monument are widely used in the protection of historic heritage. Besides the possibility of conducting detailed analyses and tracking changes in the preservation of a facility, they make it possible to remotely access and disseminate research results and to create accurate digital reconstructions used to present effects of research work and to promote them [1].

Various fields of science and art, despite the diverse methodology, more and more often interact with one another thanks to the use of digital tools. An example of an interdisciplinary project is the documentary “Hruszów. Community across the border”, produced in 2023 for the purposes of the Museum of the Eastern Territories of the Old Polish Republic (MZWDR) in Lublin [2]. The starting point for this story is the history of the historic neogothic church (fig. 1) from the end of the 19th century, located in the village of Hruszów within the territory of Ukraine, just over one kilometre from the existing Polish-Ukrainian border crossing Budomierz-Hruszów. The monument, constituting an element of the past ages, serves as a pretext for telling a story of people who were emotionally connected with it, and without whom it would have lost its context and meaning. The world presented, although relatively close to our times, belongs to the past, and its material traces are fading fast. At the same time, it remains alive in the memory of many people who connect their own and their families’ stories with it.

One of the assumptions of the project was the use of digitalisation and 3D rendering methods in order to create a visualisation of historic monuments in a broad cultural and natural context. A decision was made to use a game engine for this purpose. Its significant benefits include real-time rendering of the image, which allows continuous preview during scene building, as well as strong optimisation, allowing the creation of significant size maps with extended natural environment. Unreal Engine, developed since 1988, was originally used to create popular FPS „shooter” games. As the years went by, its value as a tool for creating visualisations, also historical ones, was recognised.

The use of the engine potentially enables the designer to introduce the possibility of full interaction between the viewer – player – with elements of the virtual world, that is typical of games. This tool i salso used to create educational content that involves the user in carrying out tasks specified in the scenario. Because in the project discussed the map had been created from the very start with the animation rendering in mind, the authors focused on achieving high quality of the image and not on th eoptimisation and possible interativity – extended models, textures and visual effects overload the computer too much to allow the introduction to the world of the player figure. In the case of redevelopment and optimisation of the map, there is always such option for project development.

#DIGITALIZATION 3D #3D SCANNING #3D RECONSTRUCTIONS #HERITAGE #MONUMENTS
#SACRED ARCHITECTURE #3D ANIMATION #GAME ENGINE #UNREAL ENGINE 5

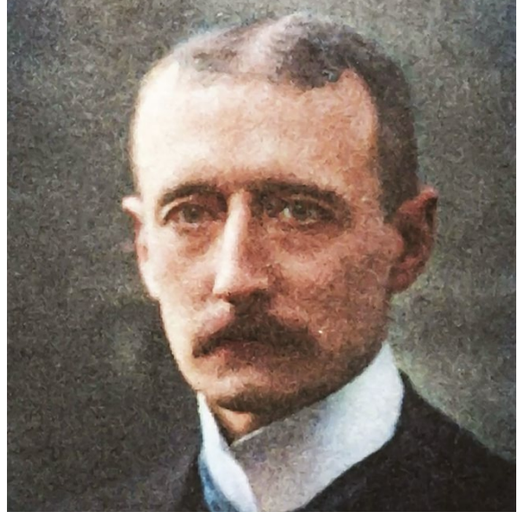

Fig. 2 Franciszek Wojciech Dzierżykraj-Morawski
Source: https://www.porta-polonica.de/pl/lexikon/morawski-dzierzykraj-franciszek, colorysation: M. Osiadacz

The reconstruction of the appearance of the church and its surroundings required the use of a broad range of sources that went beyond those used in standard research on historic monuments. In order to reconstruct a facility as accurately as possible, it was deemed helpful to scan it. Modern measurement and visualisation methods of technological nature were juxtaposed with oral tradition – personal, emotional and subjective. Digital tools were supposed to be used to supplement the traditional film narration, and at the same time popularise knowledge about the facility, help restore memory, and revive this small fragment of the multicultural world of Eastern Borderlands, one of the chapters of history of the Republic of Poland that was closed at the end of the Second World War.

History

The origins of the church reach back to the end of the 19th century. This was when Franciszek Wojciech Dzierżykraj-Morawski bearing the Nałęcz coat of arms (fig. 2) moved to Galicia. He was a well-known Poznań political and social activist [3], later a member of the Prussian parliament [4], author of numerous publications on politics, economics, and land ownership political relations. In Hruszów, one of the villages he received as a result of marrying Countess Wiktoria Łubieńska, he decided to erect a Roman Catholic church, probably with the function of a private chapel, constituting part of the manor estate layout planned in this location. It is possible that the objective was also the establishment of a place of prayer for the local Polish community. Hruszów was a village with quite a large population, in 1890 it counted 1307 residents [5]. The largest ethnic group, Ukrainians, had St Michael’s Orthodox Church dating from the 18th century, Jews had their own synagogue, however there was no Catholic church there, which Franciszek, connected with the conservative community, wanted to change. However, practical skills required to manage his own estate did not go hand in hand with his excellent education and theoretical experience in economics, therefore he quickly ran up debts and lost the estate, after which he went to the west (near Poznań, and then to Berlin and Paris), to once again continue his political and publishing activity. After many years he returned to the nearby Krakowiec where he lived out his days in his wife’s property.

The investor left a lonely structure by the road, at some distance from the Hruszów buildings – a small neogothic church dedicated to Saint Joseph, with a single nave, more like a chapel. The building was completed in 1898 [6]. In accordance with the information from Rev. Dean L. Sawicki who visited the parish, it was quite a spacious church, brick-built, covered in roof tiles, with one beautiful altar, furnished with all the necessary church paraphernalia. The nearby parish in Niemirów made attempts for many years to find out the whereabouts of the owner of Hruszów, Mr Morawski, who – when he sold the estate – excluded the plot on which the chapel stands from the sale [7], until finally it took over the care of the building. Due to the lack of appropriate base in the village, a priest was sent from Niemirów to hold a mass there only on some Sundays and holidays [8].

At the same time, the church quickly adopted the function of a garrison church for cavalry units that stationed in the village: first Austro-Hungarian, and after Poland regained independence – Polish (fig. 3). As the letters sent by the local police in 1920 show, during the initial period units of the 4th Mounted Rifles Regiment made the life of local population a misery due to the numerous requisitions, plundering, robberies, and beatings, which stopped only after the county authorities ▶▶

Fig. 3 Polish cavalry units in front of the church in Hruszów, 1920s. Source: collection of Krzysztof Raczek, photograph found by Marcin Materniak.

Fig. 4 Soldiers of the 3rd Squadron of the 10th Regiment of Mounted Rifles in front of the barracks buildings in Hruszów, 1920s. Source: collection of Krzysztof Raczek, photograph found by Marcin Materniak, colorization by M. Osiadacz.

intervened and the unit was finally transferred. Further units of the 22nd Uhlan Regiment that were garrisoned here joined in the support for local population, also with regard to cultural and educational activities. The last cavalry units stationed in Hruszów were 3rd and 4th Squadrons of the 10th Mounted Rifles Regiment[9] (fig. 4). In 1927, the garrison was liquidated, and the barracks were rented to soldiers and their families [10].

During World War II, masses were continued to be held in the church, and Jadwiga Balko, a Roman Catholic of Jewish descent, took care of the church and taught local Polish children [11]. Hruszów did not avoid the tragic events of World War II, including German and Ukrainian crimes. The story of the Ukrainian head of the Hruszów village named Taraban bears testimony to the dramatic choices faced by the then residents of those lands. He was murdered together with his family by OUN-UPA troops in 1944 for refusing to carry out the orders of this organisation [12].

After peace was established in 1945, in the course of mass relocation, Polish population was transferred to the west of the new border, and the church building which remained within the Ukrainian SSR was to be used as an agricultural storehouse for a newly established kolkhoz. However, it was only after the collapse of communism, when the building lost its function and any care, that the church suffered the greatest damage [13]. During recent years, the Lubaczów Commune Authority together with the Association of Socio-Economic Initiatives undertook numerous efforts aimed at securing and preparing renovation of the church, however these were interrupted by events which made the continuation of the work impossible – first, in 2020, the pandemic, and then in 2022, the war started by Russia.

Digitalisation

Detailed documentation of the historic facility usually constitutes the first stage of work connected with it, in particular if it a structure at risk. Before the pandemic, the Lubaczów Council drew up architectural and conservation technical documentation of the status of the building, however later all of the work ceased. In April 2023, the church was already in very bad condition, the tower had collapsed, and besides part of the frame there was practically no roof, which in consequence always leads to very quick deterioration of the walls (fig. 5). Preparing 3D digitalisation under the project, besides the prospect of using it for visualisation, had an additional value of creating a documentation of the current status of the facility, useful for conservation purposes.

Fig. 5 Church in Hruszów, as of April 2023. Source: photo by M. Osiadacz.

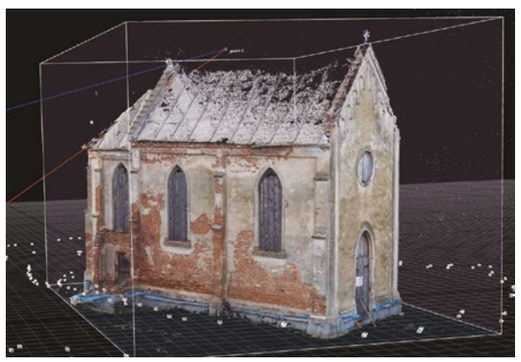

Fig. 6 3D scan of the church in Hruszów in Reality Capture software. Source: own work by M. Osiadacz, colorization by M. Osiadacz.

Fig. 7 Field survey in Hruszów, ruins of the barracks buildings juxtaposed with an archival photo. Source: photo by E. Józefowicz.

In accordance with the wording of the doctrinal documents in force, first and foremost the London Charter [14], there is a number of rules that should be followed in research and promotion of knowledge about cultural heritage, including the commercial sector and the entertainment industry, leading to presentation of results in a form which reflects the actual state of historical knowledge. The reconstruction of an object may be performed on the basis of traditional documentation (drawings, photographs), however in this case it is of lower accuracy and is more exposed to errors than if 3D documentation were used [15]. Digital measurement data obtained through scanning are redundant in nature, they make it possible to carry out analyses, measure distances, and create cross-sections in any place on the solid, without the need for extrapolation. This is why it is a good practice, minimising the risk of errors, to create digital reconstruction on the basis of a scanned model in its current state preservation [16].

A decision was made to scan the structure using photogrammetric software. With the use of the Sony a6500 camera and Sigma C 16mm f/1.4 DC DN and Samyang AF 12mm f/2.0 lenses, series of internal (491) and external (221) photographs were taken. Although the pinnacles were not positioned in the correct location on the façade, one of them stood near the church and it was also possible to scan it. It was a huge impediment that there was no possibility to take photographs of the church from above, using a drone, however acquiring a consent for a flight so close to the border just a few months after the tragic explosion of a missile in Przewodów was out of the question.

A graphic station (AMD Ryzen 9, 128GB RAM, GeForce RTX 4090) and Reality Capture software (fig. 6) were used to put together 3D models. At the first stage, software algorithms find the same elements appearing in different photos and, taking into account the perspective distortion, locate the position of the camera in the relative system of coordinates. Then, a point cloud is created, which, after removal of errors, is covered by the polygon mesh. This way, for the external solid of

Fig. 8 3D reconstruction of the church in Hruszów. Source: work by M. Osiadacz and M. Osiński.

Fig. 9 3D reconstruction of the barracks buildings in Hruszów.
Source: work by M. Osiadacz and M. Osiński.

Fig. 10 3D reconstruction of the barracks buildings in Hruszów.
Source: work by M. Osiadacz and M. Osiński.

the church, its interior and the pinnacle, models with, respectively, 108 million, 296 million and 41 million polygons were obtained.

Reconstruction and visualisation

Due to the specific nature of the project, it was important to recreate not just the appearance of the church itself, but also its immediate surroundings, including the barrack complex, a major part of the village and the original flora. This required the integration of data from many sources, besides the 3D scan of the church itself. A lot of valuable information was obtained thanks to archival materials. The barrack buildings were visible on a postcard sent (although as can be seen, unsuccessfully) by an Austro-Hungarian dragoon of Czech origin to the USA. In turn, numerous photographs from the 1920s and 1930s show cavalry soldiers stationed in Hruszów, with the church and garrison buildings in the background [17] (conf. fig. 3, 4). During the preliminary research, some objects visible in photos were successfully located (fig. 7). Maps of the Military Geographic Institute [18] proved to be helpful in reproducing the old spatial layout of the village of Hruszów, and archival pre-war plans [19] – in the case of the barrack complex itself.

A lot of information concerning the parts of the church that did not survive, such as the tower and the vestry, was accessible thanks to the technical documentation mentioned, created by the Lubaczów Council. Original ceramic roof tiles from the Roof Tile Factory in Niepołomice, and a cast iron cross, originally placed on the tower, were protected inside the building. Some data concerning the spatial layout of the village and the road to the church was obtained directly from representatives of the community residing there until the end of the war. The decision to present a detailed reconstruction of the altar was abandoned. Although it is definitely known that it had been sculpted by Ferdynand Majerski, a well-known craftsman who had a large art and stonemasonry studio in Przemyśl [20], there were serious doubts as to the form of the Hruszów monument. Therefore, the altar was presented in a simplified manner, without specific decorations, mainly to demonstrate its location within the church space.Individual models were created in the Blender software using the data mentioned, and in the case of the church, also the 3D scan. Eventually, they were imported into the Unreal Engine 5 game engine. This allowed the creation of a relatively large map (with the area of around 4km²) with rich natural environment, which the researchers tried to reproduce as faithfully as possible on the basis of available sources [21] (fig. 8-11). All of the camera sequences necessary to render the animation for the video were designed in the engine. 360° panoramas were also created, presenting the hypothetical former appearance of the church and its surroundings, thanks to which it is possible to create a virtual tour of the monument.

Conclusions. New life of monument

In studies on its history, an object often constitutes a medium, a go-between, which can be used to reach stories of people connected with it. This concerns in particular archaeology which studies old communities through the monuments they have left. Focusing on an object is not a goal in itself, it is to lead to the "manifestation" of the past, restoring it in people's awareness, and at some level, also in the present [22]. Although the project discussed concerns the latest history, its central point has also been a historic monument which served as a pretext to tell the stories of people connected to it.

For the purposes of the project, the church in Hruszów was 3D scanned, which proved very helpful in the process of creating its reconstruction – in particular in the case of the complicated construction of the groin vault. On the basis of a lot of data from many diverse sources, the researchers successfully recreated the appearance of the church and the nearby buildings. The Unreal Engine 5 game engine was very useful n presenting wider surroundings of the monument, including nature, landform features with watercourses, and spatial layout of the village. The 3D animations rendered were used as an element completing the contents of the video, among other things through the juxtaposition with contemporary recordings, old photographs, and eyewitness accounts.

The results of the projects were used successfully in a convergent manner, with the application of varied multimedia formats and technical media adapted to the audiences [23]. The map of Hruszów, reproduced in the game engine together with its historic buildings, constitutes an open system which may be modified, expanded, and used in various functions, including the creation of interactive and non-interactive VR content. 360° panoramas were created, showing the church interior and surroundings in its current state and as a reconstructed historic monument, which made it possible for the user to compare the probable

Fig. 11 3D reconstruction of the barracks buildings in Hruszów. Source: work by M. Osiadacz and M. Osiński.

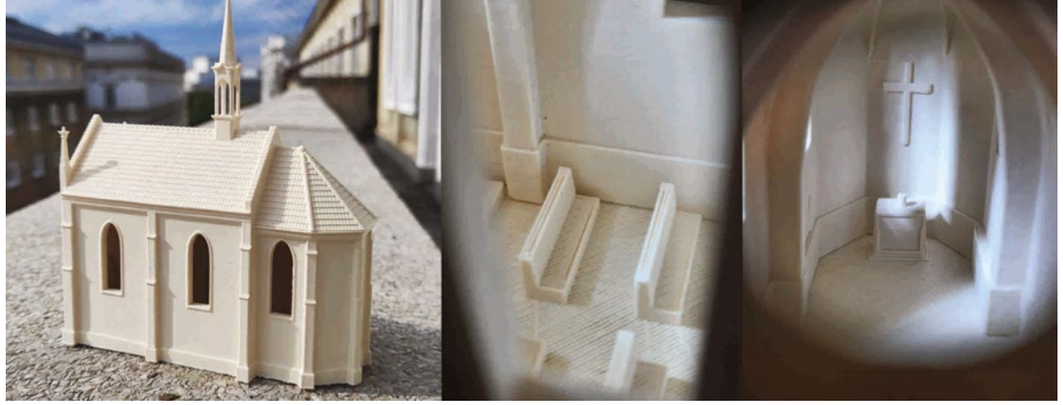

Fig. 12 3D print of the church. Source: photo by M. Osiadacz, Sz. Wojcieszonek.

appearance of the building 100 years ago and now. 3D printouts of the church were produced [24] (fig. 12), which now can be seen among other places in the Museum of the Eastern Territories of the Old Polish Republic and in the Lubaczów Council Offices. A mini-conference and a thematic meetings were organised for representatives of the Eastern Territory community connected with these lands [25].

Digital technologies constitute a very useful tool for history promotion and raising the awareness of the role that a historic building played in the local community in the past. This, in turn, allows the restoration of memory about it and give it a new lease of life not just in the virtual sphere. Activities that raise social awareness of shared heritage contribute to building shared identity and increase the feeling of responsibility for historic monuments, and thus their better protection. In the case of the church in Hruszów, the next step should be securing the monument, and further down the line – its possible renovation. Although currently there is no Roman Catholic community in this place that would be willing to use the church, one of the concepts of its revitalisation is creating a church that is ecumenical, open to services and cultural events for Ukrainian and Polish representatives of large numbers of uniformed services present in this region, as well as residents on both sides of the border. This would allow the establishment of conditions for rapprochement and cultural cooperation between Poland and Ukraine in the vicinity of a border crossing, in a place that is busy and has a rich history. The building that is located in the border region and has been witness to many dramatic events could become a symbol of cooperation and shared multinational heritage of these territories. ■

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Together We Can Design an Abundant Future for All of Life!

A question and answer interview with designers Aiyemobisi ‚Bisi' Williams and Bruce Mau

THE WORLD NEEDS ACTION. NOW.

Designers Bisi Williams and Bruce Mau in an exclusive interview for ‚dsignn' magazine

DSIGNN: As designers and creators you are fluently moving in a wide and diverse realm of creative fields. Are there specific areas of design that captivate you more than others? Are there specific fields you like to return to?

BRUCE & BISI: Yes! We need to respond to the scale of our global crisis with a solution that meets the scale of the challenge. MASSIVE ACTION™ is a multidisciplinary global research demo of proof and possibility. Our goal is to empower 100 million designers with the tools of a life-centered design mindset. Collectively we are tackling some of the world's most vexing problems and designing a better future for all of life.

In the midst of compounding global crises, with no end in sight, many of us are feeling not only overwhelmed, we are losing hope. Things have got to change — now! What if 100 million people from around the world could develop a life-centered design mindset and see opportunity where others see barriers? What if they could work collectively to replenish, revive, and massively change the quality of life on our planet? Now, what if that change progressed at such a speed that we could all see and feel it in this lifetime?

What if we could create MASSIVE ACTION?

Our methodology is based in life-centered design. Today's complex problems demand a radical new way of thinking, one which considers all of life — not just humans — at the center of everything we do. This holistic approach contextualizes challenges across multiple systems, minimizing negative impact and accelerating positive change.

We are working with partners around the world to create multiple interconnected components enabling us to introduce the MC24™ Design Principles of life-centered design in many contexts and activate the widest audience possible including museum exhibits, education programs, summits, community engagements and challenges, and a global communication campaign. Together, we can design an abundant future for all of life.

D: What are your reflections on the collaboration between graphic designers and other fields like science, technology, or art? Do these disciplines still function independently, or are they already inseparably intertwined?

BB: I had the privilege and pleasure of working with Julio Ottino on a book called THE NEXUS (MIT Press, 2022), exploring the cultural synthesis of art, technology, and science. What we discovered is that those disciplines have been moving away from one another, developing different languages, systems of support and recognition, and increasingly deep and complex internal cultures. The most striking realization in the work is that it is DESIGN that brings those disparate practices together to create a new synthesis.

Fig. 1 Invitational messaging to a MASSIVE ACTION® Virtual Salon, 2023. Source: © Massive Change Network®.

Fig. 2 MASSIVE ACTION Sydney participants with Williams and Mau, on the steps of the Centre for MASSIVE ACTION at the University of New South Wales (UNSW), 2022. Source: Image courtesy of UNSW.

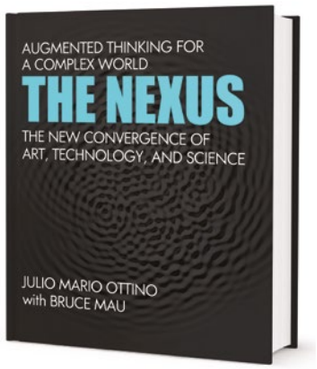

Fig. 3 THE NEXUS (2022) is Mau's project with engineering researcher and author, Dr. Julio M. Ottino, to offer a guide for navigating the intersections of art, technology, and science.

Not just graphic designers but all designers and all design are woven together in the way that we live and work. Design is a synthesis that rests on science and expresses itself through technology. In today's world, we are facing problems of massive complexity. These kinds of challenges demand new ways of thinking and doing. When we augment our thinking spaces, we expand our potential for finding creative solutions. The best way to achieve this is to blur the boundaries between art, technology, and science and converge them into a new space — the nexus. When those boundaries are removed, the whole becomes greater than the sum of its parts and entirely new solutions can emerge. Nexus thinkers will become the innovators of the future. These disciplines can and do still function independently, but when that's the case, they are unable to drive innovation.

I have been engaging in nexus thinking my whole life. When I was in high school, I had intended to be a scientist and at the last moment decided to become an artist and studied art. It's really always been part of my mind and my language and my imagination to kind of bring all these worlds together, but it's only recently that I named it as such.

D: Which project do you consider your greatest achievement and why?

BB: The greatest thing Bisi [Williams] and I have achieved together is a design ethic. We are proud to share with our children that we stayed in the game, that we have always tried to do the best we could. We try to bring an ethical and just approach to our work so that we contribute to the world in productive ways. Overall, it's a challenging approach and we haven't always succeeded but, ultimately, when I look back upon our body of work accomplishments and I consider the work that lies ahead, it really all comes back to making choices that serve the public good. We've had many projects that I'm satisfied with, but I consider that design ethic of public good is probably our greatest achievement.

D: Which project has had the most positive impact on the community in your career?

BB: In 2004, peace was still new to much of Guatemala. Nearly four decades of civil war had wiped out possibility and violence left the Guatemalan people full of fear and unable to dream about their future.

The Minister of Education of Guatemala invited us to join a group of Guatemalans looking to design a better future by reinventing their country and instilling a sense of optimism in the nation. We started with the name "Guatemala" which has a negative connotation because "mala" means "bad" in Spanish. Just as people's behavior tends to conform to positive or negative labels, a collective sense of pessimism among Guatemalans was reinforced by the name of the country.

Fig. 4 Diverse activists of the ¡GuateAmala! (Love Guate) Movement sharing, graphic T-shirts, 2004.

To encourage Guatemalans to think positively about their future, we sought to inspire people to join a movement named ¡GuateAmala! (Love Guate) that offered a new reality of possibility to people stuck in their perceptions of how bad things had been during the 36 years of war.

This was not Pollyannaism. ¡GuateAmala! sparked fact-based optimism by communicating the stories of Guatemalans already independently working on projects to redesign their country's future. Events and exhibits highlighting real people provided powerful proof that change was underway.

The experience of trauma meant that the challenge for Guatemalans was not simply what to dream but how to dream. A series of Culture of Life posters focused attention on a multitude of possibilities for the future of Guatemala through images and words: Culture of Prosperity, Culture of Diversity, Culture of Community, Culture of Education. Our strategy allowed these diverse activists to come together, see one another, and reinforce what each of them was doing. Together we created a movement: the ¡GuateAmala! Movement.

There are many intangible ways our work impacts and affects communities long after we've completed a project and although that's very hard to measure, I know it when I see it. When I walk into a museum and see some of the ideas we were working with during MASSIVE CHANGE, I know that thousands of people are experiencing the exhibition more viscerally because of the work we did in Vancouver in 2004 and then I wonder how many times this has been repeated across the world. Perhaps a similar effect is in process throughout much of our work. Perhaps it is the entire body of our work that has the most positive impact on our communities and that work continues to grow, develop, and influence.

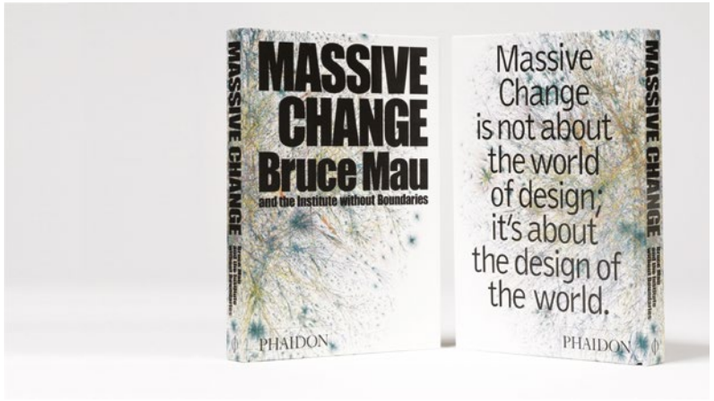

Fig. 5 MASSIVE CHANGE (2004) was part of a larger research project between Mau and the Institute without Boundaries, culminating in a traveling museum exhibition and book by the same title. The project radically expanded the field of design and its potential to respond to the world's most vexing problems at speed and scale.

D: Have you ever declined a project, such as the MoMA brand redesign, because the design was perfectly suited? Have there been more cases like this?

BB: Yes! We have declined many projects over the years. Not usually because they were already perfect, but often because we didn't have the capacity to take on the work in the time allowed, or the project didn't square with our values. My preference is to do as little as possible. It's counter intuitive for a group called Massive Change Network. I try to get my clients to do as much as possible so that they own the change. There are some parts of the project that we have to do and we focus our resources and attention on that. I've always been very careful with our client's money. They are making a significant investment in working to get to a new place, and I am very deliberate to make the most of that investment.

We used to have a five "P" test for new work:
> PROJECT: What are they trying to accomplish? Is it exciting?
> PLATE: Do we have the capacity to take it on?
> PLACE: Do we have to travel?
> PROFIT: Can we make the budget work?
> PEOPLE: Are they going to be good to work with? Are they ethical?

But in the end we had only one "P" — PEOPLE. Because good people can solve all the other challenges! We are very entrepreneurial and can make practically any budget work. We can find a way to make things happen with good people. And the foundation of our work is relational, not transactional. Many of our clients have been working with us for decades.

Fig. 6 Williams, Mau and Gretchen Gscheidle, Managing Director of Massive Change Network (MCN), design community engagement at MASSIVE ACTION Sydney, 2022.
Source: © Massive Change Network.

I am still working with my first client — Sanford Kwinter was an editor of Zone Books that we began working on in 1984 — and I am still working with him forty years later. He is great people!

D: When and under what circumstances did the idea of MASSIVE ACTION originate? How did it all begin?

BB: In the late 2010s, Song Xiewei, the Dean of Design at the Central Academy of Fine Arts (CAFA) in Beijing, invited us to recreate the MASSIVE CHANGE exhibition there pretty much identical to the exhibition we created for the Vancouver Art Gallery. We thought about it but realized that rather than repeating something which was now nearly 20 years old — and about change, no less — we wanted to consider what worked and what didn't in MASSIVE CHANGE and see if we could build upon the experience and create MASSIVE ACTION.

One of our most significant realizations was that we had led people through a vision of change but we had not equipped them with the tools to make those changes in their own lives. The new exhibition was envisioned as 6,000m2 — triple the size of MASSIVE CHANGE and likely the biggest design exhibition ever produced! But we knew we wanted people to leave with the ability to take action — it could not be a passive experience.

Diplomatic tensions ultimately scuttled the plan for China, though we knew that we were developing a good idea, that it could take different forms. In fact, the vision for MASSIVE ACTION is greater than an exhibition. We want to create an initiative that puts the tools of life-centered design in the hands of as many people as possible — millions of people! We came upon the provocation to aim for 100 million designers. That figure represents close to one percent of the global population and we defined a designer as ANYONE who wanted to see change and engage in making it within their own communities and lives.

MASSIVE ACTION was therefore created as a multidisciplinary global research demo of proof and possibility to engage 100 million designers in a life-centered design mindset. If we can reach one percent of the world's population then we can reach the remaining 99 percent.

D: What are the differences between MASSIVE CHANGE and MASSIVE ACTION?

BB: When we were making MASSIVE CHANGE, our practice was focused on human-centered design. We were looking at ways to envision a better future for humans. But then, as we described in a recent issue of DSIGNN, a Vancouver high school student prompted us to not just think about human life but ALL of life. It was a massive change for us both. From that point forward, we started engaging and building a life-centered design mindset.

Further, MASSIVE ACTION asks anyone who engages with the initiative to take action in their own lives, to engage consciously with the world, and consider the ramifications of every choice we make and ponder how it impacts the world around us.

Last, MASSIVE CHANGE was an exhibition and book, tangible and defined. MASSIVE ACTION is an exercise in raising consciousness to embrace a life-centered design mindset. It is wider, wilder, and less defined. It includes

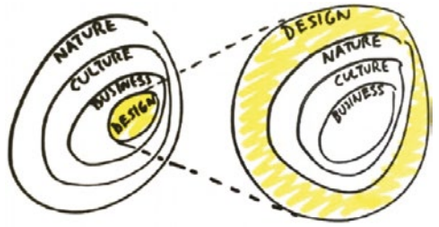

Fig. 7 An inspirational sketch by Bruce Mau demonstrating the role of design across all economies and ecosystems, 2020.
Source: © Massive Change Network.

a whole array of components including exhibitions, summits, institutions of learning, and our client work. We're still actually iterating and dreaming while we're manifesting and engaging because we're running out of time to enact the kind of changes we need to see if we want to change the world.

D: How does life-centered design differ from human-centered design?

BB: Human-centered design places humans at the center of all design choices. The challenge with this methodology is that as long as the result is human comfort, it takes no responsibility for the impacts those design choices have on the world around us. Think about a car that uses gasoline for power. We have been making millions of cars and outfitting them with luxury components and making them to be larger and faster. Yet the basic design of the automobile is absurd. We wouldn't bring a car into our home and turn it on and let the engine run for hours; it would kill us. Yet we think nothing of driving millions of cars on roads all over the world and the effect of this and other similar sources of power has been catastrophic climate change.

Life-centered design puts all of life at the center. We come to life with all living species to honor and respect life. We see ourselves in context, as part of a living ecosystem. We are not the owners of the natural world, we ARE the natural world. We are not separate and above nature. It changes everything. It is a different cosmology. We still operate as if we are the only species that matters. But science clearly shows that our life is only possible in the context of the living ecosystem.

D: Is human-centered design contradictory to life-centered design, or can they complement each other?

BB: When we think about the way we do almost everything today, it's still designed around an outmoded understanding of science and the natural world. It's designed as if we own nature and that we're not part of nature — as if nature is unlimited and we have unlimited resources to deal with. It's still designed as if there are no implications to the decisions we make. But now we understand that there's a real limit to the boundaries of nature. We ARE the natural world. We ARE a part of nature. And where we fail to design, we design for failure. We ensure that we are going to destroy the ecologies that sustain us. When we take all of life into consideration, we're actually looking after humans in the most sustainable way possible because if we destroy entire ecosystems in the pursuit of comfort and convenience, eventually we'll end up destroying our own ecosystem.

I would argue that life-centered design is actually an extension of human-centered design. Our empathy for humans should not stop at humans. Keep going. Extend that empathy to the user's family and community, to their cultural context, and ultimately to their ecology. By seeing the challenge of serving the user IN CONTEXT we have an opportunity to design something that fits into the ecosystem and has a long life of contribution. So, don't stop human-centered design — keep going and extend it to the rest of life!

D: How do users experience life-centered design, and does it impact our present? Where can we observe or feel life-centered design in daily life?

BB: The most fundamental places we find life-centered design in action are in nature itself, and Indigenous communities. In Australia, for instance, Indigenous peoples are still handing down knowledge, evolving ideas, and sharing information so that they can live in harmony with their surroundings — as has been the case for tens of thousands of years. Indigenous cultures around the world practice how not to over-fish or over-hunt, for example, so that

Fig. 8 One of the 24 Life-Centered Design Principles shared in Mau's MC24 (2020).

they leave resources for their children. The cultures that have survived do not see themselves as separate from or above nature, but part of a delicate fabric and they have learned not to leave intrusive ecological footprints.

Frequently, we find that long-standing Indigenous methodologies — particularly around persevering ecosystems — are able to regenerate plant life and animal populations. We learn from this that our task as human beings is not to dominate nature but to take a place of stewardship and RESPONSIBILITY and work to live in harmony with the very ecosystems that sustain us. When we care for the natural world, we care for ourselves. We must recognize that we are ultimately an impermanent lifeform. Of all the species that have ever existed, 99 percent are extinct. One day, this will be true of us, too. There is a small window of time in which to create the best out of what we are. We therefore need to align and collaborate with life.

Ultimately, nature does not passively submit to our interventions; it responds. Today, we experience this response in the form of climate change, soil erosion, and species extinction. Nature responds with much more ferocity than ANY technology we can invent, so we are left with no other choice but to re-engineer, to reimagine our way of life in order to reflect our true context within the natural world. Nature, in fact, will always have the last word, so we must finally consider the welfare of ALL OF LIFE on the planet if we are to survive.

Fig. 9 Williams facilitates a community design workshop at Arizona State University for addressing the issue of homelessness in the greater Phoenix metropolitan area in 2024. Source: Image courtesy of Theorem Media Inc. Photographer: Danny Stipanovich.

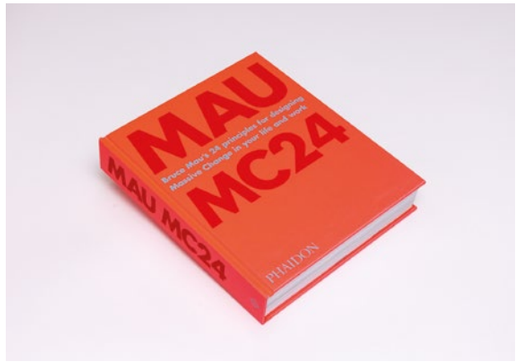

Fig. 10 MC24 translated Mau's advanced design practice — over thirty years of design innovation — into a codified approach and methodology, 24 Design Principles for realizing massive positive change in one's life and work.

D: Does the concept of MASSIVE ACTION translate into practical/project-specific design? In what areas of design does MASSIVE ACTION have the most significant impact or translation?

BB: The concept of MASSIVE ACTION translates into all practical projects and all areas of design! Practically everything we do today needs to change. We are still doing most things as if we own nature and have unlimited resources. We work as if waste is not a problem. We treat nature like a pantry and a toilet. We think short term, party like there's no tomorrow and pass the check to future generations. We dump problems we can't solve into places we can't see. And many of our solutions create more problems than they correct. MASSIVE ACTION is not a focused and passive exercise; it is a call to action for a sustainable way of living in order to ensure that we have a future to look towards.

At the moment, we are exploring projects taking on the redesign of cities, energy, education, interplanetary living, global security, healthcare, neuroscience and brain health, climate change and sustainability, cultural reuse, rejuvenation, and homelessness. All of these projects are being developed through the lens of life-centered design. It fundamentally changes the way we live and work — and changes the remit of the design program.

MC24:

D: In 2020 you published a book called "MC24"which shares 24 Principles for realize massive positive change. Can you tell us more about how you developed these unique Design Principles and how one can practically apply them?

BB: The MC24 Design Principles are a tool kit. And like the tool kit you have at home, you don't always use the hammer first. You need to know the tools and how to use them. For a given situation — or design project in our case — you apply the tools that are most relevant and useful.

The idea for the MC24 Design Principles emerged when I was made an Honorary Royal Designer for Industry by the Royal Society of Arts in London. They had sent a group of young leaders to Chicago to visit the studio and to talk with us about our work. Bisi and I showed them the work we were doing which included at the time cities, social institutions, and social movements, as well as brands and businesses.

They said, "You are a really weird dude! What kind of designer are you?" They were thinking of designers being defined by their products. In other words, architects do buildings and graphic designers do posters and so on. And I said, "I'm a designer. This is what I do." They then asked, "How do you think like this?" A little irritated, I responded, "I just showed you. You should have paid attention!" They countered, "No, you showed us the results, but you actually didn't even mention how you think."

I realized in the moment that I didn't actually have an answer for them. I didn't know how we thought. My intuitive methods had evolved over a 25-year period. I realized that there had to be underlying principles. You can't succeed so consistently without having principles. We decided to codify those principles so that anyone could apply them and advance their work to a higher order of complexity.

Our ambition was to put the power of life-centered design into as many hands as possible, much beyond the design community itself. I would argue that we are ALL designers now. We're all designing our lives. We're all living in designed environments. We're all interacting through designed interfaces. We need to think more deeply about what it is that we're designing. We need to take responsibility for our design. Over time, we ended up with 24 principles which are pretty comprehensive.

Fig. 11 One of the 24 Life-Centered Design Principles shared in Mau's MC24 (2020).

D: Is there an MC24 Design Principle without which no project would succeed?

BB: In many ways the first MC24 Design Principle is the first for a reason: FIRST INSPIRE. DESIGN IS LEADERSHIP. LEAD BY DESIGN. Our job is to inspire. I can't make people do things. I have to inspire them. I have to show them a future that is better than their past and inspire them to move towards it. But I can't make them move there. Our client's CEO can't make them move, either. Only being inspired will make them move. So we almost always start with that principle.

But I think the winner would be the last principle, which is WORK ON WHAT YOU LOVE. Although it is the last of the MC24 Design Principles, it is perhaps the most widely applicable of them all. To quote from MC24,

"Work on what you love is such an easy thing to say. It seems so obvious. And yet, the problem of aligning our passion and our production, our love and our work, remains one of the great life challenges. To work on what you love, you need to protect your energy and innocence, your beauty and thought. Protect your time and your mind and give all that you can of these great treasures to the work you love the most. Starve the things you do not respect. Give them nothing of your extraordinary talent. You have the ability to imagine new worlds. Dedicate all of your creative energy to the love of your life. When you discover that love, you wake up every day with fresh energy to share your time on the planet in new ways. The love of your life will inspire you, move you and draw the talent and energy from you in ways that you cannot imagine."

It is the golden thread that binds all the other principles into a single creative force. It's the key to unleashing the fierce devotion that MASSIVE CHANGE and MASSIVE ACTION require.

D: Does this set of MC24 Design Principles currently cover the entire subject, or have there been indications for their modification or expansion since their formulation?

BB: The principles were developed organically over several years. We looked back at all the work over the decades and tried to distill the

underlying — and often unstated — conceptual models. During that process there were some compressions and clarifications and we ended up with the final 24 that we have been working with for a decade or so. We're settled on these 24. They're really tools that anyone can use. As I mentioned, the MC24 Design Principles are about giving people a kind of mindset toolkit to help them integrate life-centered design into their lives, their work, and their business.

D: How can designers approach creating with consideration of MC24 Design Principles? Can individuals do it, or is a team necessary?

BB: Our MC24 Design Principles are applicable to anyone in any profession. In the MC24 book we outline exercises that can apply to your life or your work. Writing a personal manifesto, for instance, is the exercise for FIRST INSPIRE. The manifesto is a powerful method of inspiration that has moved people throughout history. You can use it to inspire yourself — or your team at work, or your class at school, or your government.

We think of our work as "product agnostic". In other words, the design methods we have developed can be applied to any challenge. Whatever problem you put in, it will solve that problem.

Fig. 12 Applying MC24 Design Principles toward The Great Brain Gain movement, Williams facilitates a group workshop at the Center for BrainHealth in Dallas, 2024. Source: Image courtesy of Center for BrainHealth.

These principles are ultimately the result of nearly 40 years of creative cultural studio practice, thinking, and doing in the design space. They are intended to prompt new ways of creatively solving problems in our lives, our work, and our communities. They can be practiced by individuals, by teams, by institutions, by organizations, even by nations. In fact, if the United Nations adopted them as guiding principles, perhaps we could all work together as a species with a greater sense of mutual respect, harmony, and empathy for each other and for the world around us.

AI in Graphic Design:

D: What are your thoughts on the role of AI in the future field of design in terms of its ability to support humans with automated tasks such as augmented thinking?

BB: It's an important question. In fact, I think it's a question for all of us because it's clear that anything that can be routine, anything that is repeatable, can be automated or assigned to AI. And for the most part, we WANT to automate those things and assign them to AI. Think about all the repetitive, mindless work that has to happen when designing something; that can all be automated. The challenge, of course, is that the force of automation is unstoppable and it will gobble up things that we might not be entirely happy about. But the way that we have to think about it is to say we need to be in a partnership with technology; it's not a contest. It doesn't have to be about replacing people, it can be about augmentation.

So what could AI do working with a person that would be safer and healthier and a better experience for that person and also have a positive effect on the business? This way of thinking is about how AI and automation can really be part of our future.

It's more about synthesis. What it does is push our work into something that cannot be automated — our imagination. When we think about imagination, taste, subtlety, nuance, culture, we're a long way from being able to automate those kinds of things. In the end, that's where value is created. The value is not in doing 20,000 details for a big project; it's really in the vision and the cultural value of the project.

D: How does AI influence the evolution of graphic design, especially in the context of holistic design?

BB: AI is a rearview mirror. It looks backward, it can't see forward. It then takes those ingredients from the past and spins them in a giant blender without judgment. In creative work, you want the opposite. You want to look forward and you want to be carefully judicious. The magical talent in design is the ability to know when something is right. That cannot be codified. Normal, yes; right, no. We can use AI to augment our thinking to explore our ideas quickly and cheaply. But we are going to get some funky, often hilarious, version of our rearview mirror in the blender. So be careful. In "An Incomplete Manifesto for Growth", I advised creative people to "Avoid Software. The problem with software is that everyone has it."

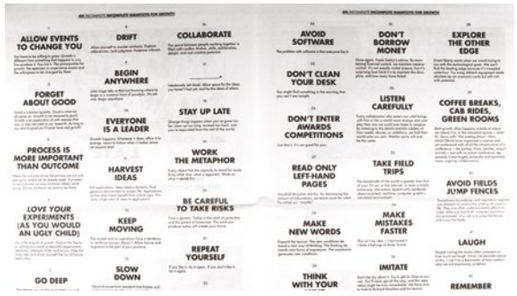

Fig. 13 Mau's first widely disseminated work, an incomplete manifesto for growth, was first published in 1998. Taking on a popular life of its own, the clarion call to nurture one's creative life continues to inspire contemporary audiences.

D: Can AI impact MASSIVE ACTION's ideas? Can it help or hinder, and how can designers leverage it?

BB: AI is a wonderful way to understand what everyone is already doing. It is great for mapping out the existing ecosystem, the players, the people who have been working hard to make these changes. It won't give you the insight to solve the problem, but it might give you a lay of the land that will help you get to the insight. It might remind you of something, or you might see something in the past that could be the answer that you are looking for to amplify and explode into the future.

Final Questions:

D: Do you believe graphic design already plays a significant role in solving global issues, such as communication in education or ecological awareness?

BB: I think design in general already plays — and must play — a significant role in solving global issues. The fundamental idea of design is to make the world a better place. I've never met a designer who wakes up in the morning and says, "You know what? My idea is to make things worse!"

The core idea behind design is, can we do this better and can we make a better way of doing it? Can that be driven by an ethical commitment to society, and ideally, can that ethical commitment to society become ever broader during the design process? For instance, the more we understand global warming, the more we actually have to design to address it. The more we know about the impact of pollution and toxins, and the more science there is, the more complex and broad the mandate for design becomes.

If we really want to play a significant role in addressing global challenges, we must accept that our greatest strength lies in diversity. We need the contribution of everyone if we're going to accomplish the things that we need to solve. All the pathologies that we're experiencing today — the social pathologies of racism, sexism, anti-gay bigotry, anti-environmentalism, and anti-science — all of these really trace back to a lack of empathy, a lack of caring, an inability to actually understand someone else's experience. And I think that's where design really plays a huge role. Design at its core is empathetic. Our job is to understand someone else's problem.

Designers must develop a very acute capacity for empathy. If they're successful, they develop ways of listening to people, ways of actually hearing other people and allowing other voices into the conversation. We talk about how the obligation to dissent is critical to a design culture, that we need honesty. Without honesty, we could end up working on the wrong problem. This kind of commitment to empathy and caring is really the core DNA of design, with education lying at its foundation. This is essential to solving global issues.

Fig. 14 Mau presents the opening keynote for the Brain3 Summit, hosted by the Center for BrainHealth in Dallas, 2024.
Source: Image courtesy of Center for BrainHealth.

Second, we must think of design as breaking out of traditional forms. The challenges we now face don't fit neatly into classical categories. They are higher order complexity challenges, therefore, they really need a fresh perspective. We need to look at them in new ways, because imagining that we're going to solve new problems with the old categories is just not plausible. We'll need interdisciplinary thinking if we're going to be successful in this new world. For me, the idea of boundaries and crisp lines between disciplines is becoming less and less realistic. Think about the classical way that we approached problems, in that we extracted the problem — like an object from its context — and then applied design to that singularity, imagining that it could be taken out of its context and still make sense.

Once we had a solution equation developed, we would put the problem back into its context. The end result was that it created all kinds of new problems. This is how we have produced the ecosystem problems we are facing today. And the idea that the ecosystem problems are going to be solved by classical solutions is really unrealistic. It is impossible to solve climate change using human-centered design. If we're focused only on the human experience, we miss the big picture.

This means that we have to blur the boundaries and create new kinds of practices. That's a great opportunity. For me, I think well, where are the people who are already doing this? Who are the people who naturally do it? Look at cinema, for instance. Cinema is a really unique practice of synthesis. Just watch the credits at the end of any film. There are hundreds, even thousands of people who have worked on the project and yet the end result is a kind of synthesis of all those creatives into a clear, beautiful, coherent, singular experience. I think we can make that happen in any area of design. I think that practice of synthesis is really the future of design.

Let's go after the problems and get whatever we need to solve the problem. And if we do it that way, we'll learn to move through these new terrains in an entrepreneurial way. That's what design really offers us. Design is an entrepreneurial method. When you think about what a designer does, it's look around the room for opportunity and advantage. That's what an entrepreneur does. So when an entrepreneur has an opportunity, they look around the room, they think, how can I advance this business? How can I advance my cause and what can I use? Is there someone in this room who can help me? Like, how can I move forward? And for me, that's a design sensibility.

I want to develop that model, that entrepreneurial model that isn't constrained by the disciplines, because while the disciplines are good for the job market, they're not so useful for the problem market. And I want to really address the problem market because that's where the opportunities are, it's where the challenges are. The challenges don't fit the categories of the disciplines anymore. We don't have a graphic design problem; we have an ecology problem. And I haven't seen an ecology designer yet. So we need to create new kinds of designers, and that means we need new thinkers. And we don't want them bound to the classical disciplines.

D: The world of digital products, such as mobile apps, social media, and online entertainment can be captivating. Users sometimes prefer the digital world over the real one, becoming dependent on these products, ultimately separating them from real-world functioning. Is there a chance for design to help find a balance in this phenomenon?

BB: Digital products are certainly making the designed environment more challenging. If you think about the number of images that we're consuming daily and the amount of information that we're exposed to every day, we're receiving more in a day than we would have in a lifetime only a few decades ago. At the same time, something interesting is happening. When I started in design, it was an opaque world; if a brand or a business or a government put up an image, you had no way of getting around that image. You couldn't actually get behind it and see whether or not that image was true. You needed professionals to run that down.

But today the devices that we use, the technology that we use everywhere, is making everything accessible. So everything is transparent. You can see behind the image. The best example that we use is Nike. Nike had an incredible brand, but

Fig. 15 One of the 24 Life-Centered Design Principles shared in Mau's MC24 (2020).

Fig. 16 One of the 24 Life-Centered Design Principles shared in Mau's MC24 (2020).

back of house they were using child labor and they didn't think that was part of their design. They were just out in the market buying stuff. So they thought, we're going to have producers sell stuff to us and then we're going to package it and sell it for a big profit, and how those producers work, that's their business. Our business is branding and we're going to market these things. But people accessed their system and connected the dots. When they were able to actually see that while Nike said one thing, it actually did another in that it was exploiting children in its labor force. People stripped billions of dollars out of the brand in the space of a few weeks and now Nike is incredibly advanced in actually protecting against the use of child labor.

This new world of transparency means that if everything is visible, everything therefore must be designed. If it's not designed to be part of the story, it may be telling a story that we don't want to tell and that we don't agree with. Therefore, we must see the whole enterprise as a design project and design it to be the world that we want to live in and we have to design our enterprises to be the way we want to live.

D: You claim designers now have more power than ever. How should they proceed, what tools should they use, and where should they direct their energies to have the most positive impact?

"The most common way people give up their power is by thinking they don't have any." — Alice Walker

BB: We have the power to shape the future. If we have the ability to say, "I can envision a future, and I can help people arrive at that future," it's an absolutely extraordinary power. Designers have that magical ability to create a vision, to inspire people to move to a new place. When you think about your life, you live a designed life. We live inside of our design. We live in a designed world. We live in a designed environment. We live inside of designed products and experiences. And there is an ever-increasing urgency to accelerate solutions to the challenges we are facing globally. But so many people are working so hard to address them. Most of the technology needed to address these challenges therefore actually already exists. We don't have to invent a lot. We just need to change a lot. So it's an extraordinary period of time for designers to be taking on this level of global transformation. The opportunity is just off the charts!

In terms of the tools we should be using, I would name optimism as one of the most important. As designers taking on the great challenges we face today, we have no choice but to be optimistic. Even though our media is structurally organized around violence and conflict, the real story of our time is living together and caring for one another. We cannot afford the luxury of cynicism. This, for me, is one of the most important mindset principles. When you watch the media, it's important to understand they're not bad people. It's not that they're intentionally setting out to tell you a story that isn't true, but they are structurally organized. They're structurally designed around violence and conflict. The pattern that works in their model is violence and conflict.

The real story of our time is collaboration, cooperation, and innovation. People are working together to solve problems that in some cases have vexed us since the beginning of time. In fact, today more people are wealthier, healthier, and living longer. It's really critical as designers that our job is to bring optimism. We cannot afford the luxury of cynicism. It's a luxury for someone else.

Fig. 17 Mau and Williams engage students, faculty and community artists, as part of the one-month long MASSIVE ACTION Sydney design sprint, 2022. Source: © Massive Change Network.

D: What advice would you have for young designers in Poland aspiring to succeed in their field and influence shaping the world through their work?

BB: My advice to a young designer — not just in Poland but anywhere — would be to work on what you love. When I was quite young I had this kind of crazy image in my mind that there was a thin layer around the whole world made of particles. Those particles were very, very far apart and the particles were, in fact, people. They were the people that I was looking for to do my work. They needed me. I was the perfect person for what they were trying to do, but they had never heard of me, and I didn't know who they were. So I imagined that if I put a message into that thin filament, if I consistently put out a message of what I wanted to do, they would find me, and I would find them.

I realized that meant that the only message that worked in that thin layer was truth. That if I put out a consistent message of truth and beauty, they would see who I was and what I was trying to do, and they would find me. And that's what eventually happened. It happened because I consistently tried to work only on what I really loved doing. And I think that young people should be more selfish in order to be more generous.

D: Thank you very much for the inspiring interview! ■

Iranian female artists

Ghazal Hosseini
Isfahan Research Center
Iran

From tradition to new media. Iran Darroudi and Sara Niroobakhsh' works

Women in Iran have a long history of playing significant roles in shaping the cultural and artistic landscape of the region, dating back to ancient times. In ancient Iran, women held esteemed positions as poets, musicians, and patrons of the arts, contributing to the flourishing of literature, music, and visual arts. Similarly, in Babylon, women played vital roles in the cultural and religious spheres, with priestesses, musicians, and artisans making invaluable contributions to the artistic heritage of the region. Despite the patriarchal structures of ancient societies, women found avenues to express themselves creatively and assert their influence in the realms of art and culture. Her are some examples of Iranian female artists that have moved forward for their ambitions:

Painters:
- Monir Shahroudy Farmanfarmaian – Known for her geometric mirror works and abstract paintings.
- Farideh Lashai – Noted for her expressive paintings and multimedia artworks.
- Parastou Forouhar – Recognized for her intricate and politically charged drawings and paintings.
- Shadi Ghadirian – Renowned for her photography work exploring themes of gender and identity.
- Shirin Neshat – Acclaimed for her photography, video installations, and films addressing issues of gender and politics.
- Pariyoush Ganji – Known for her vibrant and expressive paintings, often depicting scenes from Iranian folklore and mythology.

Sculptors:
- Lili Golestan – Noted for her sculptures and installations exploring themes of memory, history, and identity.
- Zahra Faridnia – Recognized for her sculptures that blend traditional Iranian forms with contemporary aesthetics.
- Parvaneh Etemadi – Known for her abstract sculptures, often made from metal and other industrial materials.
- Samira Eskandarfar – Acclaimed for her conceptual sculptures and installations that address social and political issues.

Contemporary Artists:
- Shirin Neshat – In addition to her work as a painter, Neshat is known for her photography, video installations, and films exploring themes of identity and politics.
- Shirin Aliabadi – Renowned for her multimedia works addressing issues of gender, consumerism, and popular culture in Iran.
- Nazgol Ansarinia – Noted for her conceptual

Fig. 1 Iran Darroudi, student time, Iran.
Source: irandarroudi.com/en/photos

artworks that investigate urban transformation, consumer culture, and social dynamics in Iran.

- Ghada Amer – Though born in Egypt, Amer's work often explores themes of feminism, sexuality, and cultural identity, and she has exhibited extensively in Iran.
- Farhad Moshiri – While primarily a painter, Moshiri's work often incorporates sculpture and mixed media, exploring themes of consumerism, pop culture, and tradition.

This list represents just a selection from many talented female artists from Iran who have made significant contributions to the art world. In this article, two contemporary female artists from different generations have been mentioned.

Iran Darroudi

Iran Darroudi is a revered Iranian painter, director, writer, art critic and university professor. She was born in 1936 in Khorasan to a prominent dynasty. Her paternal family were well-known merchants in the north-eastern province, while her maternal family were Caucasian merchants, who traveled to Iran following the Soviet Revolution and took residence in Mashhad.

Darroudi discovered her passion for painting at a young age. After completing her secondary school education, she traveled to France and continued her studies at the University of Fine Arts (École des Beaux-Art). To learn the secrets of successful color mixing, she headed to the Belgian capital and attained a course in "stained glass" at The Imperial and Royal Academy of Brussels. Darroudi completed her education with a degree in the History of Art at Ecole du Louvre in Paris.

In 1968 Darroudi was commissioned by the ITT corporation to create an artwork, entitled Iranian Petroleum, on the occasion of the launch of a pipeline from Abadan to Mashahr. The painting generated a great deal of media interest and was published in the likes of Time magazine, Newsweek and Life Magazine – to name but a few. The artwork was later dubbed "Our Veins, the Earth's Veins," (fig. 2) by Ahmad Shamlu, a distinguished Iranian poet.

Darroudi continues to add to her ever-growing collection. To date she has held 60 exhibitions worldwide, and contributed to some 200 group exhibitions across Europe, Central America, Japan and of course her homeland, Iran.

Following her success in arts, Darroudi took on a new adventure. In 1966 she began to learn directing at the RCL institute in New York City. That's where she met her husband, Parviz Moghadasi, who was also studying television directing at the time. The two began to collaborate with each-other on various projects at a newly established television production company. Over the period of six years, they produced over 80 documentaries about both Iranian and international artists. Her work was consequently recognised by Iran's university of Sharif, where she was invited to lecture the History of Art as an honorary professor.

On 1 September 2016, the ceremony of laying the foundation stone of the Iran Darroudi Museum, the prominent Iranian painter was held at the museum site at Yousef-abad district of Tehran on her birthday. During this event she gave a speech about her goals and ideology about Iran and art and women.

She said: "We Iranians have accepted art to be synonymous with patriotism; I grow closer to God through art." Iran Darroudi stated that she grew up with the saying "If Iran does not exist, it is better for me to die." She remembers that her father taught her as a child that her identity as an Iranian is the most important thing and that she should protect it forever. "He named me Iran and told me 'Freedom' is its meaning."

She added: "As long as I live, I will paint with love for Iran and the people of this land, and I will prove as an Iranian woman that even though I wasn't blessed with motherhood, I consider myself the mother of the whole Iranian Nation. This museum will become the cultural center of Iran and the next generation will get acquainted with the art of Iran and the world in this very location." She expressed

Fig. 2 "Our Veins, The Earth's Veins", 1969, 105x80. Source: irandarroudi.com/en/paints

concern that due to the turbulence and instability that Iranian art has gone through recently, it is not currently in a desirable place. She said "We showed art to the world with Persepolis. Art began with Iran and we have accepted it as the meaning of humanity. Art is the most beautiful aspect of man because there is no artwork which has been created with impure thoughts and intentions."

Darroudi emphasizing, to be an artist, one must be in love, noted that: "When I was 33 and my works were published in the most prestigious publications in the world, I wished to present them to my nation one day, and today after 47 years I am very happy because after years of effort I have reached my dreams. And I pray that one day everyone like me reaches his dreams."

She clarified: "I am proud to be an Iranian and I have learned how important my value as an Iranian is. I have relied on and built upon several thousands of years of history, and based on this history, I claim I am an artist, and I am standing. I hope that people will love Iran, because it is our identity, originality, tradition and way of thinking, and we will not ever be separated from it. Throughout history, we have shown our fellow humans that after we have conquered a city, we accept its people with all their beliefs and ideals."

Darroudi's lifetime achievements include her 60 individual exhibitions and 200 group exhibitions, art critiques published in various newspapers, colorful speeches in cultural and artistic establishments around the world, some 80 collaborative documentaries, and last but not least an autobiography, "Distance Between Two Dots".

These are the results of more than 50 years of her work in Contemporary Art of Iran. The same activities that she carried out while rubbing shoulders with great individuals such as Andrew Marlowe, Salvador Dali, Jean Cocteau, Antonio Rodriguez, Ahmad Shamloo etc.

Today she's hailed as one of the most influential artists in the world, with her artwork displayed at internationally recognized venues such as the Tehran Museum of Contemporary Arts, the Kerman Museum of Fine Arts, the Sa'dabad Palace, the Saheb Gharani-e Palace, Belgium's Ixelles Museum and a number of exhibitions of Contemporary Art in New York.

Her latest project takes Darroudi back to her motherland, where she has donated some 150 works of art to a foundation named after her to be put on permanent display for the people of Iran. Frank Elgar has a beautiful point of view about her. He said: "How can be a Persian woman?"

Flowers nonexistent in nature, vegetal flourishes hovering above dead waters, fantastic landscapes scattered oddly and incongruously with familiar or imaginary objects from within which, as in a fleeting dream, a ruin or a monster from Persepolis occasionally emerges. For the author of these dream-like evocations is a young Iranian lady who has returned to Paris to recall the memories of her industrious adolescence, and to show, in an exhibition of her paintings, what she has learned and felt through her dreams as an Oriental artist.

Thus, Iran Darroudi is exhibiting, at the Galerie Drouant (52, Fg Saint-Honoré), a collection of paintings whose surrealist inspiration is undeniable, although they should rather be termed "fantastic", since their affinities with the art of John Martin and Gaspard Friedrich are as conspicuous as with that of Tanguy or Dali. Whatever the case may be, each of her canvases is painted in fluent, elusive colors, with intermingled and furtive reflections, as an indistinct music. And then, amid all this, a deep blue resounds, a blood red rings out, a golden yellow explodes...

If pictorial art is the poetic and abstract interpretation of reality, Iran Darroudi is a true artist. Her surrealism has no need not for worn out devi-

ces. To accomplish herself, she only needs to draw on the rich symbolic tradition of ancient Persia, the Persia of Sa'di and Behzad.

Spanish painter Antonio Rodríguez Luna (July 22, 1910 – 1985) also expressed his point of view about Iran Darroudi: "...One of the great painters presently in Mexico is Iran Darroudi, who has brought along different viewpoints of her multi-millennial culture." Some situate her style at the limit between surrealism and symbolism and others consider both attributions simultaneously valid. The truth, however, is that Darroudi dislikes being categorized into frameworks and classifications, because, while depicting the world of her mental images and far-flying dreams amidst flowers growing in mysterious luminous landscapes, she expresses concepts that arise from her own culture and are too meaningful to fit within any frame.

I, therefore, call her a "free" artist, who depicts images of perfection and sublimation while traveling unfettered towards whatever point she has set herself or created. A wonderful, magic world in which joy and sorrow, audacity and meekness, blood and flowers, are fused together and reality and dream intermingle.

Her pictorially rich works make use of unreal atmospheres and delicate fleeting musical effects. She thus compels the colors to sing. The sound of her paintings ranges from a soft chord to the fearsome roaring strains of the sad silence of the desert, as her imaginary and unreal world shifts from dream to the harsh reality of Hiroshima.

Her "Our Veins, the Earth's Veins" (fig. 2), is none but our "Sources of the Devil's Blood", concerning which she is bound by no taboo. Knowing neither limitations nor interdictions, this artist has opened up a place for herself which in fact comes from her mastery at utilizing the pictorial language. A notable distinction in Mexico is the flames which this artist inspired by a faraway ancient civilization has lit by the fire of the sorrows of history and the myths and legends of past millennia (Antonio Rodriguez, El Nacional, 23 May 1976).

Sara Niroobakhsh

Sara Niroobakhsh (fig. 3) is another notable artist contributing to the contemporary art scene in Iran. Her multimedia installations challenge perceptions of femininity and womanhood, exploring themes of identity, memory, and displacement. Niroobakhsh's recent projects include "Threads of Silence", a series of textile-based installations that examine the interplay between tradition and modernity in Iranian society. Through her use of embroidery, fabric, and mixed media, Niroobakhsh invites viewers to contemplate the silent narratives embedded within everyday objects and materials, offering a poignant reflection on the complexities of Iranian culture and history.

Sara born Nov 05, 1981, is an Iranian-born artist, a visiting assistant art professor in the Interactive Media program at New York University Abu Dhabi. She holds a BFA from the Shariaty Technical College, and an MA from Tehran University of Art and an MFA for art and technology studies from the School of the Art Institute of Chicago.

Working primarily at the intersection of body, science, technology, and new media that engage the globalizing feminine psyche, she has spent the last decade experimenting with a variety of multimedia projects involving living tissue, chemistry, virtual reality, and performance. She is a recent artist-in-residence in the Odin Bio Lab in Austin, and the former resident in Royal Astronomical Society in London, UK, and, and Elizabeth Foundation for Arts in New York.

Niroobakhsh's work, "Saffron Diary", was awarded the Explore and Create Research and Creation Grant as a performance installation art project from Canada Council for the Arts in 2020 and received an art residency at Goldfarb Study Centre Gallery at York University in 2019. In this work, she writes her diary with saffron ink on thousands of grains of rice and covers the exhibition's wall. Her recent performance-based series, "Zaghareet" and "Fifty Women Voices", has been held at the Czech China Contemporary in Beijing, South Korea's CICA Museum, Spartanburg Art Museum Frederick Horsman Varley Art Gallery in Canada and Black Box Space at New York University Abu Dhabi received Visual Artists Creation Projects Grant from Ontario Arts Council in 2018 and Canada Council for the Arts in 2022.

In most of her projects, she references the notion of the body, existence, and limitation through sound, bio art, performance and installation layered with her own technology science-based interventions. Niroobakhsh's recent work highlights the human body transition in life and death and promotes the importunes of the healing process through crystal performance and installation art. She is known for her performance work "Tabalvour" which crystallizes her body inside a terracotta jar with the saturated solution containing saffron and also her "LIE" project (fig. 4) in which she makes her breast produce milk through a multimedia durational performance without consuming pregnancy and hormones.

Fig. 3 Sara Niroobakhsh. Source: saraniroo.com/about

She explains LIE: "This project begins by examining the function of our productive host organs, such as the breasts, in our bodies. Is it true that they are responsible to serve others, or can they function independently? In September 2021, I drafted a plan for intense pumping sessions and I began the project. I documented the whole procedure by photographing and filming each session. Later on, this project, like many other durational art forms, incorporates additional concepts such as non-gender-related context. Because the enforcement of the mechanical effect of the pumping machine was overwhelming for the body, I decided to incorporate new media to make this lie believable to my body. By using sound and listening to the baby's crying, watching videos related to breastfeeding as well as creating a perfume with the baby's aroma, I tried to replace the effect of hormones and medication. In the next phase of the project, I merged all these formats and created an immersive VR and AR environment. In addition, I designed a lactation bag to make this procedure easier when I am outside. In the 18th week of the project, the ultrasound confirmed the activation of breast ducts, and in the 21st week, the first colostrum started to flow."

Another project is "LIE" (fig. 5). It is a multidisciplinary bio art project that uses forensic DNA profiling to extract and reconstruct the voices of four female donors from breast milk samples. Through AI-powered digital audio generators, the project creates four unique lullabies, each reflecting the genetic and cultural identity of the donor. This innovative intersection of art, science, and technology reimagines the role of motherhood and explores the potential of genetic data in artistic expression.

Sara Niroobakhsh describes it: "LIE" (fig. 5) is a visionary bio-audio artwork that transcends traditional boundaries, exploring the intersection of art, science, and culture. The project centers on the utilization of forensic DNA profiling techniques for voice recognition, extracting the voices of four female donors from breast milk. These voices are then meticulously analyzed and reconstructed using a digital audio generator powered by artificial intelligence. The result is a collection of four unique lullabies, each a poetic and melodic composition that emerges from the depths of molecular data.

The project's aim is ambitious yet profoundly human: to regenerate a new image of post-human post-mother. By delving into ancient wet-nursing traditions and comparison with futuristic cultural narratives, "LIE" invites contemplation on the evolving role of motherhood in an ever-changing world. The lullabies themselves serve as a bridge between the past and the future, evoking a sense of nostalgia while pointing towards new possibilities.

In addition to its auditory component, "LIE" incorporates a sculptural element that adds layers of storytelling and personalization. Each of the four donors is represented by a unique story, complemented by standardized information on ethnicity, skin color, age, height, and weight. This dual approach transforms the exhibition space into a rich tapestry of voices, narratives, and identities, inviting viewers to reflect on the interconnectedness of humanity.

Through "LIE" I aim to challenge conventional notions of art and technology, pushing the boundaries of creative expression. The project presents a work that not only embraces new technologies but also celebrates the enduring power of art to inspire, provoke, and unite.

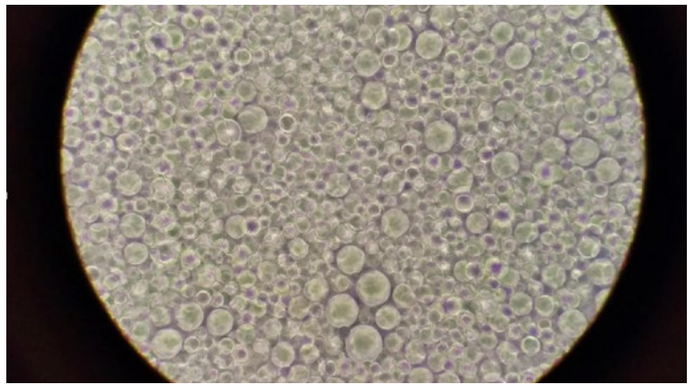

Fig. 4 LIE (Lactation Induction Engine), Bio-Hacking: Multi-Media, 2021-2022, SAIC Washington Galleries, Mana Contemporary Art, Chicago. Source: saraniroo.com/lie#2

Fig. 5 LIE, Sara's milk sample under microscope lens. Source: saraniroo.com/

Conclusion

The role of female artists in Iran is not only a testament to their talent and creativity but also a reflection of their resilience in the face of adversity. Through their bold and innovative work, these artists are challenging stereotypes, amplifying marginalized voices, and shaping the cultural landscape of Iran and beyond. As the world continues to grapple with issues of gender equality and social justice, the contributions of female artists in Iran serve as a powerful reminder of the transformative potential of art in promoting dialogue, understanding, and change. ■

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"Existenz"

Anna Kłos' solo exhibition

Paper View Publishing Gallery, Leiria, Portugalia
24.02.2024 – 4.03.2024

Curator: **Sal Nunkachov**
www.paperviewbooks.pt/journal/anna-klos-existenz/

Anna Kłos's solo exhibition in Leiria, Portugal, was combined with the promotion of her book titled 'Existenzgründer', featuring her collages published by the independent publishing house Paper View Books.

The exhibition included several dozen original collages by the artist. The curator of the exhibition is Sal Nunkachov, a Portuguese photographer, curator, and founder of Paper View.

Anna Kłos, PhD
WIT Academy
Warsaw

The solo exhibition "Existenz" by artist Anna Kłos at the Paper View gallery in Leiria – Portugal brings us the artist's latest collages. Born in Warsaw, her training as a graphic artist is noticeable in her work, in which her interest in typography and artistic prints stands out. Patience in choosing and juxtaposing cutouts with careful attention to visual composition enables the artist to create unforeseen associations, suggesting new meanings and different reading possibilities in each work. The visual and conceptual coherence of the series was compiled in "Existenzgründer" (2024) by independent publisher Paper View Books.

Using the yellowed pages of an old German book by Goethe, Anna Kłos creates small-format collages in which she plays with words and images in compositions that take us directly back to the Dada aesthetic, a fundamental reference to her work and the subject of her doctoral thesis.

The black of the texts, images and textures is superimposed on the aged paper, creating layers of reading that take us back to the passing of time and the reflection on our own existence, as the title of the exhibition suggests. The clippings of Goethe's work, arranged randomly against the highlighted images and words, are a wise choice by the artist and invite us to connect and think about the present and the past, being traversed by the thoughts of one of the authors who managed to capture and express the complexity of the human condition with mastery.

Fabiane Pianowski, PhD
Assistent Professor at Universidade
Federal do Vale do São Francisco (UNIVASF)

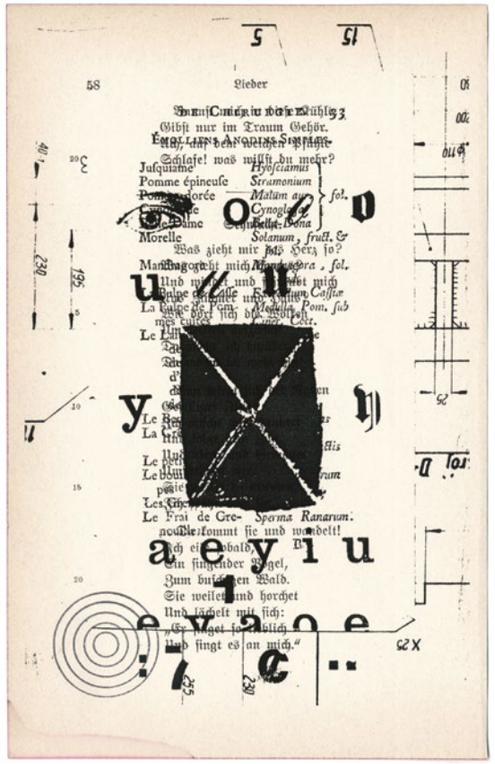


Fig. 1 Lieder [eye], 12 x 19 cm, mixed media

Fig. 2 Einatmen / Ausatmen, 12 x 19 cm, mixed media

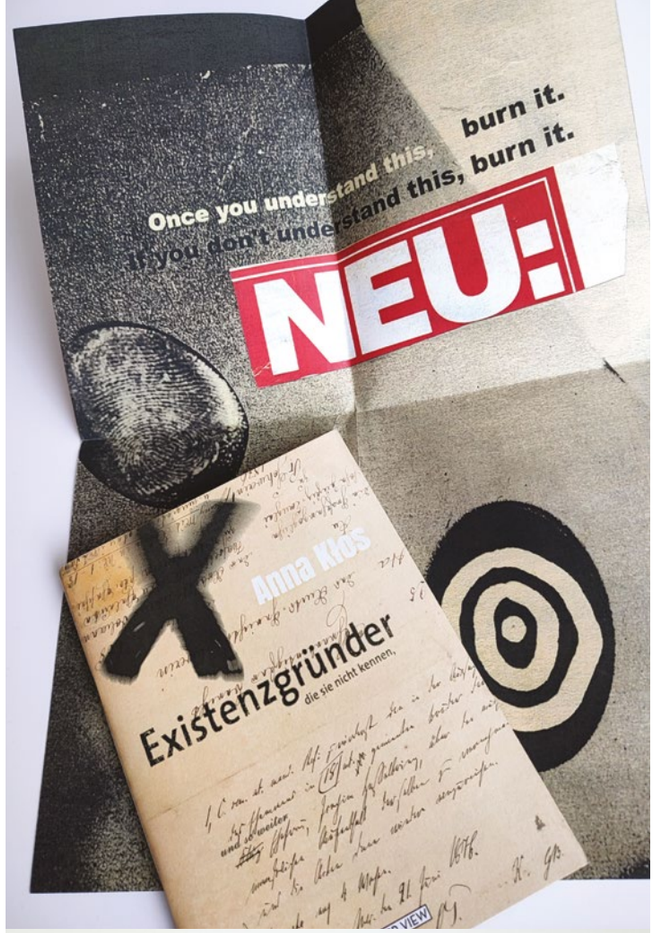
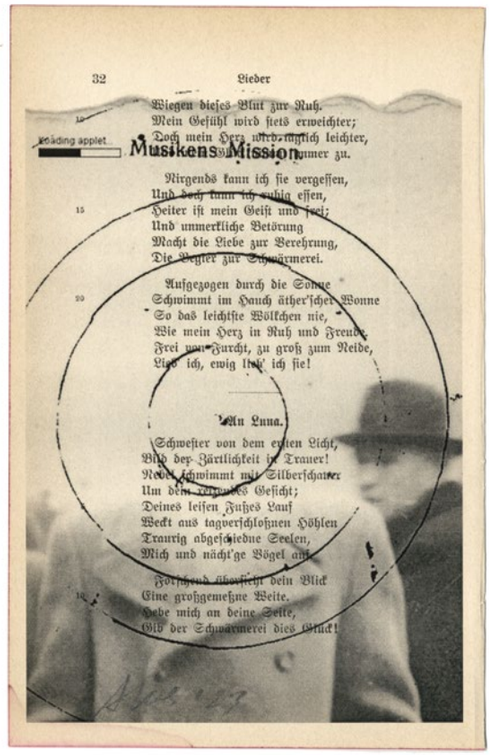


Fig. 4 Schadenfreude, 12 x 19 cm, mixed media

Fig. 3 Musikens Mission, 12 x 19 cm, mixed media



AUTHORS

Grzegorz Rogala, PhD

Multimedia artist. Since 1988, he has been running „Studio Rogala", which focuses on film production and post-production. He has completed or participated in the completion of approximately 800 film and advertising projects. For the past 8 years, he has been actively involved in film, photography, and interactive art. His works are part of the collections of the National Museum in Warsaw, the National Museum in Gdańsk, as well as private collections in France, New Zealand, Germany, the Netherlands, and Poland. He has participated in numerous individual and group exhibitions. Also he is a lecturer at WIT Academy in Warsaw.

David Sypniewski

Designer and head of the Open Artificial Intelligence Studio, he teaches Creative Coding, Social Robotics, and Artificial Intelligence in the context of art at the Faculty of Design at SWPS University, where he is also a doctoral candidate. He completed cultural studies at the Institute of Polish Culture at the University of Warsaw and co-founded the Association of Culture Practitioners for 10 years, where he focused on cultural animation in socially excluded environments. He also worked for 4 years at the creative studio Rzeczyobrazkowe.

Mateusz Osiadacz

Graphic designer (WIT), archaeologist (UW), filmmaker (PWSFTViT), and photographer, specializing in digital visualization and promotion of historical heritage. He has been a longtime employee of the Institute of Archaeology and Ethnology of the Polish Academy of Sciences (PAN), and since 2021, he has been active in the creative industry. He is a co-founder of Bevel Studio.

Piotr Duraj

Designer of event scenography and exhibition stands. He is passionate about 3D graphics in all forms and is currently exploring new technologies related to the development of artificial intelligence. He completed his graphic design studies with a specialization in animation at Collegium da Vinci in Poznań and his master's degree with a specialization in advanced multimedia at WIT Academy in Warsaw, where he has also been teaching 3D graphics since 2022.

Laze Tripkov, Prof.

Graphic designer and educator, professor of visual communication and graphic design at the International Balkan University in Skopje. He specializes in digital creative fields such as VR, media art, and interactive installations. He graduated from the Academy of Fine Arts in Warsaw and Łódź, and as a Fulbright scholar, he researched Balkan symbolism. His works have been exhibited in 6 solo exhibitions and over 75 group exhibitions, earning prestigious awards.

Ghazal Hosseini

Graphic designer and educator from Iran. She earned a master's degree in graphic design from the University of Art in Tehran. Since 2010, she has been working as a graphic designer and lecturer, and she also chairs the advisory board for photography and graphic design for the provincial advisory and audit committee on photography and graphic design at the Research Center in Isfahan. She has won numerous awards, including the Gold Award at the Poster Biennale in the USA (2023) and an honorable mention in Ecuador (2022). She is active in international art organizations.

AUTHORS